

## Academic Program Description Form

University Name: Al-Turath

Faculty/Institute: College of Sciences

Scientific Department: Biology.

Academic or Professional Program Name: BSc-Bio

Final Certificate Name: Bachelor's Degree(B.Sc) in Biology.

Academic System: Bologna process

Description Preparation Date: 1-9-2025

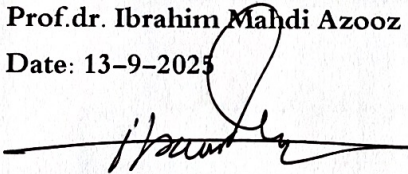
File Completion Date: 13-9-2025

Signature:

Head of Department Name:

Prof.dr. Ibrahim Mahdi Azooz

Date: 13-9-2025

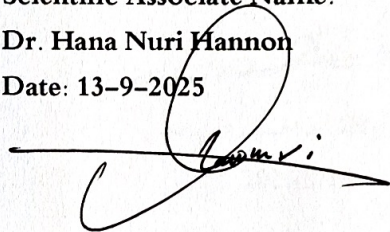


Signature:

Scientific Associate Name:

Dr. Hana Nuri Hannon

Date: 13-9-2025



The file is checked by:

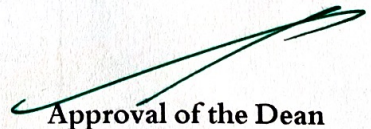
Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:



Date: 5/9/2024

Signature:



Approval of the Dean

**Ministry of Higher Education and Scientific Research  
University of Diyala  
College of Science  
Department of Biology**



**MODULE DESCRIPTION FORM  
FIRST CYCLE  
LEVEL ONE**

**وصف المقرر لمسار بولونيا  
المرحلة الاولى  
الدورة الاولى**

**2024/2025**

# **Semester One**

## MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                        |                               |                                                                                                                                                                                                                                                     |
|------------------------------------|------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                        |                               |                                                                                                                                                                                                                                                     |
| Module Title                       | <b>General Zoology</b> |                               | Module Delivery                                                                                                                                                                                                                                     |
| Module Type                        | <b>Core</b>            |                               | <input checked="" type="checkbox"/> Theory<br><input checked="" type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | <b>Bio-1101</b>        |                               |                                                                                                                                                                                                                                                     |
| ECTS Credits                       | <b>6</b>               |                               |                                                                                                                                                                                                                                                     |
| SWL (hr/sem)                       | <b>150</b>             |                               |                                                                                                                                                                                                                                                     |
| Module Level                       | 1                      | Semester of Delivery          | 1                                                                                                                                                                                                                                                   |
| Administering Department           | Department of Biology  | College                       | College of Sciences                                                                                                                                                                                                                                 |
| Module Leader                      | Ragad Ibrahim Ahmed    | e-mail                        | raghadibrahim@uodiyala.edu.iq                                                                                                                                                                                                                       |
| Module Leader's Acad. Title        | Assistant Professor    | Module Leader's Qualification | Ph.D.                                                                                                                                                                                                                                               |
| Module Tutor                       | Name (if available)    | e-mail                        | E-mail                                                                                                                                                                                                                                              |
| Peer Reviewer Name                 | Name                   | e-mail                        | E-mail                                                                                                                                                                                                                                              |
| Scientific Committee Approval Date | 1/11/2023              | Version Number                | 1.0                                                                                                                                                                                                                                                 |

| Relation with other Modules       |      |          |  |
|-----------------------------------|------|----------|--|
| العلاقة مع المواد الدراسية الأخرى |      |          |  |
| Prerequisite module               | None | Semester |  |
| Co-requisites module              | None | Semester |  |

| Module Aims, Learning Outcomes and Indicative Contents    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Module Objectives<br>أهداف المادة الدراسية                | 1. Understand the difference between science and non-science.<br>2. Be familiar with the specialized vocabulary of zoology.<br>3. Understand the relationship between animal structure and function.<br>4. Know the structural and functional characteristics of major animal groups, and be familiar with current hypotheses concerning how they evolved.                                                                                                                                                                                                                                                                                              |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. Define general zoology.<br>2. Studying the relationship between zoology and other sciences<br>3. An introduction to basic concepts in biology through study of the major lineages of invertebrate and vertebrate animals, with emphasis on the structure, and function of organ systems in an evolutionary context<br>4. Topics covered will include basic cell structure and function, development, systematics, and evolution .<br>5. Studying the classification or taxonomy of zoology.<br>6. The laboratory will focus on observation of structural-functional relationships of living and preserved representatives of the major animal phyla. |
| Indicative Contents<br>المحتويات الإرشادية                | <b>Cognitive goals:</b><br>1. At the first level, knowledge development is to develop the student's ability to recall what he learned from zoology.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## Semester One

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>2. The second level: improving comprehension, developing the ability to interpret.</p> <p>3. Developing application capabilities in detecting classification of zoology</p> <p>4. The fourth level: giving the student the ability to analyze</p> <p>5. The fifth level is to develop the student's ability to integrate ideas (synthesis).</p> <p>6. The sixth level of evaluation is to give a judgment on the value of the material.</p> <p>b- Marathi goals:<br/>To improve the student's ability to observe, to learn imitation and simulation, to learn the method of experimentation.<br/>B - The soft skills objectives of the course.<br/>B1 - knowledge skills – remembering.<br/>B2 - Memory and analysis skills.<br/>B3 - Use and development skills.</p> |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

|            |                                                                                                                                                                                                                                                                                                                              |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Strategies | <p>1. Lecture method, use of the interactive whiteboard, presentation, and use of explanatory films - explanation and clarification</p> <p>2. Asking students a set of questions about animal classification, phylum, family, order, and class during the lectures, such as what, how, when and why for specific topics.</p> |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Student Workload (SWL)

#### الحمل الدراسي للطالب محسوب لـ 15 اسبوعا

|                                                                         |     |                                                                    |     |
|-------------------------------------------------------------------------|-----|--------------------------------------------------------------------|-----|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 78  | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 5.2 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 72  | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4.8 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل              | 150 |                                                                    |     |

### Module Evaluation

#### تقييم المادة الدراسية

|                      |                 | Time/Number | Weight (Marks)   | Week Due       | Relevant Learning Outcome |
|----------------------|-----------------|-------------|------------------|----------------|---------------------------|
| Formative assessment | Quizzes         | 2           | 10% (10)         | 5 and 10       | LO #1, #2 and #10, #11    |
|                      | Assignments     | 2           | 10% (10)         | 2 and 12       | LO #3, #4 and #6, #7      |
|                      | Projects / Lab. | 1           | 10% (10)         | Continuou<br>s | All                       |
|                      | Report          | 1           | 10% (10)         | 13             | LO #5, #8 and #10         |
| Summative assessment | Midterm Exam    | 2hr         | 10% (10)         | 7              | LO #1 - #7                |
|                      | Final Exam      | 3hr         | 50% (50)         | 16             | All                       |
| Total assessment     |                 |             | 100% (100 Marks) |                |                           |

**Delivery Plan (Weekly Syllabus)****المنهاج الاسبوعي النظري**

|         | Material Covered                                                                  |
|---------|-----------------------------------------------------------------------------------|
| Week 1  | INTRODUCTION : define of general zoology and its relationship with other sciences |
| Week 2  | Characteristics of living things                                                  |
| Week 3  | Prokaryotic and eukaryotic cells                                                  |
| Week 4  | Cell cycle, Mitosis                                                               |
| Week 5  | Animal cells and animal tissues                                                   |
| Week 6  | Taxonomy and Classification of Animals                                            |
| Week 7  | Mid-term Exam                                                                     |
| Week 8  | Animal Phyla, 1. The Protozoa                                                     |
| Week 9  | 2. The Parazoa                                                                    |
| Week 10 | 3. The Radiata                                                                    |
| Week 11 | 4. The Acoelomates                                                                |
| Week 12 | 5. The Pseudocoelomates                                                           |
| Week 13 | 6. The Coelomates: Protostomes                                                    |
| Week 14 | 7. The Coelomates: Deuterostome                                                   |
| Week 15 | Preparatory week before the final Exam                                            |

**Delivery Plan (Weekly Lab. Syllabus)****المنهاج الاسبوعي للمختبر**

|         | Material Covered                                                               |
|---------|--------------------------------------------------------------------------------|
| Week 1  | Lab 1 : Light Microscope                                                       |
| Week 2  | Lab 2: Animal cell : Animal cell structure                                     |
| Week 3  | Lab 3: Animal Cell: Animal Cell shape.                                         |
| Week 4  | Lab 4: Animal cell :Living Components and Non-living Components in animal cell |
| Week 5  | Lab 5: Cell Division                                                           |
| Week 6  | Lab 6: Animal Tissues :Epithelial tissue                                       |
| Week 7  | Lab 7: Animal Tissues :Connective tissue                                       |
| Week 8  | Lab 8: Animal Tissues :Muscle tissue                                           |
| Week 9  | Lab 9: Animal Tissues :Nervous tissue                                          |
| Week 10 | Lab 10: Classification :Scientific Name and Common Name                        |
| Week 11 | Lab 11: Classification The Groups of Animal Kingdom (1)                        |
| Week 12 | Lab 12: Classification The Groups of Animal Kingdom (2)                        |
| Week 13 | Lab 13: Classification The Groups of Animal Kingdom (3)                        |

**Learning and Teaching Resources****مصادر التعلم والتدريس**

|                   | Text                                                                                                                                                                                                               | Available in the Library? |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| Required Texts    | Huxley, T. H. (2022). On the study of zoology. DigiCat.<br>Nicholson, H. A. (2022). A manual of zoology. BoD–Books on Demand.                                                                                      | Yes                       |
| Recommended Texts | Honegger, T. (2022). Zoology.                                                                                                                                                                                      | No                        |
| Websites          | <a href="https://alison.com/tag/biology">https://alison.com/tag/biology</a><br><a href="https://www.brianbrookshire.com/online-biology-curriculum/">https://www.brianbrookshire.com/online-biology-curriculum/</a> |                           |

**Grading Scheme**

## Semester One

| مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                                         |                  |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير             | Marks %  | Definition                            |
| Success Group<br>(50 - 100)                                                                                                                                                                                                                                                                                                                                                          | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)                                                                                                                                                                                                                                                                                                                                                               | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                                      |                  |                     |          |                                       |
| <p>Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.</p> |                  |                     |          |                                       |

## MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية |                             |                               |                                                                                                                                                                                                                                                                |
|-----------------------------------------------|-----------------------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Module Title                                  | <b>Analytical Chemistry</b> |                               | Module Delivery                                                                                                                                                                                                                                                |
| Module Type                                   | <b>Core</b>                 |                               | <input checked="" type="checkbox"/> Theory<br><input checked="" type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input checked="" type="checkbox"/> Seminar |
| Module Code                                   | <b>Bio-1102</b>             |                               |                                                                                                                                                                                                                                                                |
| ECTS Credits                                  | <b>6</b>                    |                               |                                                                                                                                                                                                                                                                |
| SWL (hr/sem)                                  | <b>150</b>                  |                               |                                                                                                                                                                                                                                                                |
| Module Level                                  | 1                           | Semester of Delivery          |                                                                                                                                                                                                                                                                |
| Administering Department                      | Department of Biology       | College                       | Type College Code                                                                                                                                                                                                                                              |
| Module Leader                                 |                             |                               | e-mail                                                                                                                                                                                                                                                         |
| Module Leader's Acad. Title                   | Lecturer                    | Module Leader's Qualification | Ph.D.                                                                                                                                                                                                                                                          |
| Module Tutor                                  | Name (if available)         | e-mail                        | E-mail                                                                                                                                                                                                                                                         |
| Peer Reviewer Name                            | Name                        | e-mail                        | E-mail                                                                                                                                                                                                                                                         |
| Scientific Committee Approval Date            | 1/11/2023                   | Version Number                | 1.0                                                                                                                                                                                                                                                            |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى |                   |          |   |
|------------------------------------------------------------------|-------------------|----------|---|
| Prerequisite module                                              | None              | Semester |   |
| Co-requisites module                                             | Organic Chemistry | Semester | 2 |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Objectives</b><br>أهداف المادة الدراسية                                                                  | <p>The primary objective of this course is to acquire basic concepts, principles, and techniques of modern analytical chemistry that would empower students with an analytical mind set and the abilities to solve diverse analytical problems in an efficient and quantitative way that conveys the importance of accuracy and precision of the analytical results. On successful completion of this course, students will be able:</p> <ol style="list-style-type: none"> <li>1. to develop an understanding of the range and uses of analytical methods in chemistry.</li> <li>2. to establish an appreciation of the role of chemistry in quantitative analysis</li> <li>3. to develop an understanding of the broad role of the chemist in measurement and problem solving for analytical tasks.</li> <li>4. to provide an understanding of chemical methods employed for elemental and compound analysis.</li> <li>5. to provide experience in some scientific methods employed in analytical chemistry.</li> </ol> |

|                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                  | 6. to develop some understanding of the professional and safety responsibilities residing in working on chemical analysis.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية | <ul style="list-style-type: none"> <li>■ explain the fundamentals of analytical chemistry and steps of a characteristic analysis.</li> <li>■ analyze titration curves for complex acid / base systems.</li> <li>■ define titration curves for precipitation and complex formation titrimetry.</li> <li>■ solve the electrochemical analyses problems.</li> <li>■ calculate standard electrode potentials.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                | <p>This section introduces student to basic principles and practices in Analytical Chemistry. It covers functions and responsibilities of Analytical Chemists, analytical chemistry problems and their solutions in general. It also covers uses and application of the course in general. Learning unit 2 : Laboratory Practice and Safety (5 periods) This section introduces student to good laboratory practices, maintenance of laboratory safety and health standards. It also covers use of various laboratory apparatus and their calibration. A large portion of this unit is practical and students are expected to put in practice what they learn in class on their laboratory daily routine work. Learning unit 3: Titrimetric methods of analysis (14 periods) This section introduces student to basic nomenclature and titrimetric methods of analysis. The focus for this section is on acid-base reactions only. Students will also be introduced to various concentration units and how these units can be used in titrimetry. It will also induct students on hands on practical work as they apply theoretical knowledge in the laboratory sessions. Learning unit 4: Gravimetric methods of analysis (14 periods) This section introduces student to general principles of gravimetry. The focus for this section is on formation of different types of precipitates, processes involved in precipitation formation. It also covers post-treatment techniques of both inorganic and organic precipitates in order to obtain analytical data. It also covers application of gravimetric technique in chemical analysis. Learning unit 5: Sampling and sample preparation (8 periods) This section of the course introduces students the concept of sampling and various sampling techniques. It discusses various types of samples and how they are prepared for analysis. It covers various sample preparation methods and the nature of materials used for both organic and inorganic samples.</p> |

| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                      | Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students. |

|                                                                           |
|---------------------------------------------------------------------------|
| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطالب محسوب لـ 15 اسبوعاً |
|---------------------------------------------------------------------------|

## Semester One

|                                                                         |     |                                                                     |     |
|-------------------------------------------------------------------------|-----|---------------------------------------------------------------------|-----|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 78  | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعياً       | 5.2 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 72  | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعياً | 4.8 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل              | 150 |                                                                     |     |

### Module Evaluation

#### تقييم المادة الدراسية

|                      |                 | Time/Number | Weight (Marks)   | Week Due       | Relevant Learning Outcome |
|----------------------|-----------------|-------------|------------------|----------------|---------------------------|
| Formative assessment | Quizzes         | 2           | 10% (10)         | 5 and 10       | LO #1, #2 and #10, #11    |
|                      | Assignments     | 2           | 10% (10)         | 2 and 12       | LO #3, #4 and #6, #7      |
|                      | Projects / Lab. | 1           | 10% (10)         | Continuou<br>s | All                       |
|                      | Report          | 1           | 10% (10)         | 13             | LO #5, #8 and #10         |
| Summative assessment | Midterm Exam    | 2hr         | 10% (10)         | 7              | LO #1 - #7                |
|                      | Final Exam      | 3hr         | 50% (50)         | 16             | All                       |
| Total assessment     |                 |             | 100% (100 Marks) |                |                           |

### Delivery Plan (Weekly Syllabus)

#### المنهاج الأسبوعي النظري

|                | Material Covered                                                             |
|----------------|------------------------------------------------------------------------------|
| <b>Week 1</b>  | Introduction to analytical chemistry                                         |
| <b>Week 2</b>  | Solutions and classification of solutions                                    |
| <b>Week 3</b>  | Express concentrations of solutions                                          |
| <b>Week 4</b>  | Density and specific gravity of solution                                     |
| <b>Week 5</b>  | The relationship between molarity or normality with percentage concentration |
| <b>Week 6</b>  | Diluting solutions                                                           |
| <b>Week 7</b>  | Solve of some Problems                                                       |
| <b>Week 8</b>  | Concentration by percent                                                     |
| <b>Week 9</b>  | P -functions                                                                 |
| <b>Week 10</b> | Volumetric analysis                                                          |
| <b>Week 11</b> | Standard solution                                                            |
| <b>Week 12</b> | Acid –Base equilibrium                                                       |
| <b>Week 13</b> | Buffer solution                                                              |
| <b>Week 14</b> | Enthalpy                                                                     |
| <b>Week 15</b> | Type of enthalpy                                                             |
| <b>Week 16</b> | Energy of bonds                                                              |

### Delivery Plan (Weekly Lab. Syllabus)

#### المنهاج الأسبوعي للمختبر

|  | Material Covered |
|--|------------------|
|--|------------------|

## Semester One

|                |                                                                                       |
|----------------|---------------------------------------------------------------------------------------|
| <b>Week 1</b>  | Lab safety                                                                            |
| <b>Week 2</b>  | Laboratory equipment                                                                  |
| <b>Week 3</b>  | Laboratory techniques: distillation, filtration, centrifugation                       |
| <b>Week 4</b>  | Vaporization, chromatography, decantation                                             |
| <b>Week 5</b>  | Pipets and pipet pumps,                                                               |
| <b>Week 6</b>  | Volumetric analysis ( titration)                                                      |
| <b>Week 7</b>  | Methods expressing concentration of solutions and calculations of volumetric analysis |
| <b>Week 8</b>  | Preparation of (0.1 N ) NaOH solution and standardization with (0.1 N) HCL            |
| <b>Week 9</b>  | Preparation of (0.1 N ) HCL solution and standardization with sodium carbonate        |
| <b>Week 10</b> | Determination of carbonate and bicarbonate in mixture                                 |
| <b>Week 11</b> | Determination acidity of Vinegar                                                      |
| <b>Week 12</b> | Determination of hardness of water                                                    |
| <b>Week 13</b> | Preparation and standardization of (0.1 N ) AgNO <sub>3</sub> solution                |
| <b>Week 14</b> | Determination of chloride according to modified Volhard method                        |
| <b>Week 15</b> | Complex formation reactions                                                           |

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

|                   | Text                                                                                                                                                                                                                        | Available in the Library? |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| Required Texts    | Alam, M., Akhtar, M., & Asif, H. (2012). Textbook of Practical Analytical Chemistry-E-Book. Elsevier Health Sciences.<br>Christian, G. D., Dasgupta, P. K., & Schug, K. A. (2013). Analytical chemistry. John Wiley & Sons. | Yes                       |
| Recommended Texts | Hussain, M. (2023). CHEM 221-001: Analytical Methods.                                                                                                                                                                       | No                        |
| Websites          | <a href="https://edu.rsc.org/teacher-pd/in-person/analytical-chemistry/classroom-resources">https://edu.rsc.org/teacher-pd/in-person/analytical-chemistry/classroom-resources</a>                                           |                           |

### Grading Scheme

#### مخطط الدرجات

| Group                       | Grade            | التقدير             | Marks %  | Definition                            |
|-----------------------------|------------------|---------------------|----------|---------------------------------------|
| Success Group<br>(50 - 100) | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                             | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                             | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                             | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                             | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)      | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                             | F – Fail         | راسب                | (0-44)   | Considerable amount of work required  |

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

## Semester One

| Module Information<br>معلومات المادة الدراسية |                           |                     |                                                                                                                                                                                                                                                                                                        |                           |     |
|-----------------------------------------------|---------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----|
| Module Title                                  | General Mathematics       |                     | Module Delivery                                                                                                                                                                                                                                                                                        |                           |     |
| Module Type                                   | Basic                     |                     | <div><input checked="" type="checkbox"/> Theory</div> <div><input checked="" type="checkbox"/> Lecture</div> <div><input type="checkbox"/> Lab</div> <div><input checked="" type="checkbox"/> Tutorial</div> <div><input type="checkbox"/> Practical</div> <div><input type="checkbox"/> Seminar</div> |                           |     |
| Module Code                                   | Bio-1103                  |                     |                                                                                                                                                                                                                                                                                                        |                           |     |
| ECTS Credits                                  | 5                         |                     |                                                                                                                                                                                                                                                                                                        |                           |     |
| SWL (hr/sem)                                  | 125                       |                     |                                                                                                                                                                                                                                                                                                        |                           |     |
| Module Level                                  |                           | 1                   | Semester of Delivery                                                                                                                                                                                                                                                                                   |                           | 1   |
| Administering Department                      |                           | Dept. of Biology    | College                                                                                                                                                                                                                                                                                                | College of Science        |     |
| Module Leader                                 | Dr. Anwar Nouruddin Imran |                     | e-mail                                                                                                                                                                                                                                                                                                 | anwarmath@uodiyala.edu.iq |     |
| Module Leader’s Acad. Title                   |                           | Assistant Professor | Module Leader’s Qualification                                                                                                                                                                                                                                                                          |                           |     |
| Module Tutor                                  | Name (if available)       |                     | e-mail                                                                                                                                                                                                                                                                                                 | E-mail                    |     |
| Peer Reviewer Name                            |                           | Name                | e-mail                                                                                                                                                                                                                                                                                                 | E-mail                    |     |
| Scientific Committee Approval Date            |                           | 1/11/2023           | Version Number                                                                                                                                                                                                                                                                                         |                           | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى |      |          |  |
|------------------------------------------------------------------|------|----------|--|
| Prerequisite module                                              | None | Semester |  |
| Co-requisites module                                             | None | Semester |  |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Module Objectives<br>أهداف المادة الدراسية                                                                         | The aim of the General Mathematics course is to prepare students for tertiary study in a variety of areas where an ability to critically analyse information and work with data is inherent. Students with tertiary pathways into areas such as Health, Science, Psychology and Commerce would benefit from studying this course.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية                                                          | After successfully completing this subject students should be able to: <ol style="list-style-type: none"> <li>1. Have knowledge of content and understanding of mathematical concepts and relationships.</li> <li>2. Use mathematical algorithms and techniques (implemented electronically where appropriate) to find solutions to routine and complex questions.</li> <li>3. Apply knowledge and skills to answer questions in applied and theoretical contexts.</li> <li>4. Apply mathematical models to data in order to make predictions.</li> <li>5. Develop solutions to mathematical problems set in applied and theoretical contexts.</li> <li>6. Interpret mathematical results in the context of the problem.</li> <li>7. Understand the reasonableness and possible limitations of the interpreted results, and recognise any assumptions made.</li> <li>8. Develop and test conjectures.</li> <li>9. Communicate mathematical ideas and reasoning to develop logical arguments.</li> <li>10. Use appropriate mathematical notation, representations, and terminology.</li> </ol> |

## Semester One

|                                            |                                                                                                                                                 |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Indicative Contents<br>المحتويات الإرشادية | 1. Improving the student's ability to observe<br>2. To learn how to imitate and imitate: Imitation<br>3. To learn the method of experimentation |
|                                            |                                                                                                                                                 |

| <b>Learning and Teaching Strategies</b><br><b>استراتيجيات التعلم والتعليم</b> |                                                                                                                                                                       |
|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Strategies                                                                    | Conducting fun scientific competitions (individual or team).<br>Organizing lectures prepared by students.<br>Formation of volunteer work groups.<br>Scientific trips. |

| <b>Student Workload (SWL)</b><br><b>الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا</b> |     |                                                                    |     |
|---------------------------------------------------------------------------------|-----|--------------------------------------------------------------------|-----|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطلاب خلال الفصل               | 60  | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 5   |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل         | 65  | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 4.3 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطلاب خلال الفصل                      | 125 |                                                                    |     |

| <b>Module Evaluation</b><br><b>تقييم المادة الدراسية</b> |                 |             |                  |                |                           |
|----------------------------------------------------------|-----------------|-------------|------------------|----------------|---------------------------|
|                                                          |                 | Time/Number | Weight (Marks)   | Week Due       | Relevant Learning Outcome |
| Formative assessment                                     | Quizzes         | 2           | 10% (10)         | 5 and 10       | LO #1, #2 and #10, #11    |
|                                                          | Assignments     | 2           | 10% (10)         | 2 and 12       | LO #3, #4 and #6, #7      |
|                                                          | Projects / Lab. | 0           | 10% (10)         | Continuou<br>s | All                       |
|                                                          | Report          | 2           | 10% (10)         | 13             | LO #5, #8 and #10         |
| Summative assessment                                     | Midterm Exam    | 2hr         | 10% (10)         | 7              | LO #1 - #7                |
|                                                          | Final Exam      | 3hr         | 50% (50)         | 16             | All                       |
| Total assessment                                         |                 |             | 100% (100 Marks) |                |                           |

| <b>Delivery Plan (Weekly Syllabus)</b><br><b>المنهاج الاسبوعي النظري</b> |                                                            |
|--------------------------------------------------------------------------|------------------------------------------------------------|
|                                                                          | Material Covered                                           |
| 1                                                                        | laws of derivative                                         |
| 2                                                                        | higher derivative and Implicit deferential                 |
| 3                                                                        | chain Rule                                                 |
| 4                                                                        | derivative of triangle function                            |
| 5                                                                        | derivative of hyperbolic function and derivative of invers |
| 6                                                                        | derivative of inverse hyperbolic function                  |
| 7                                                                        | derivative of logarithms and exponential                   |

## Semester One

|    |                                                                            |
|----|----------------------------------------------------------------------------|
| 8  | laws of Integral                                                           |
| 9  | the integration of triangle function                                       |
| 10 | the integration of invers triangle function                                |
| 11 | the integration of hyperbolic function                                     |
| 12 | the integration of invers hyperbolic function                              |
| 13 | the integration of logarithms and exponential function                     |
| 14 | The methods of integration                                                 |
| 15 | tabular integration, Trigonometric integration, Trigonometric substitution |

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

|                   | Text                                                                                                                                                                                                               | Available in the Library? |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| Required Texts    | 1. "Discrete Mathematics and Its Applications" by Kenneth H. Rosen, 2007.<br>2. "Discrete Mathematics Demystified" by Steven G. Krantz, 2009.<br>3. "Fundamental Concepts of Modern Mathematics" by Max D. Larsen. | Yes                       |
| Recommended Texts | 4. "Discrete Mathematics- Schaum's Outline" by S. Lipschutz and M. Lipson, 2007.                                                                                                                                   | No                        |
| Websites          | <a href="https://www.syriamath.net/library">https://www.syriamath.net/library</a>                                                                                                                                  |                           |

### Grading Scheme

#### مخطط الدرجات

| Group                       | Grade            | التقدير             | Marks %  | Definition                            |
|-----------------------------|------------------|---------------------|----------|---------------------------------------|
| Success Group<br>(50 - 100) | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                             | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                             | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                             | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                             | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| Fail Group<br>(0 - 49)      | FX - Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                             | F - Fail         | راسب                | (0-44)   | Considerable amount of work required  |
|                             |                  |                     |          |                                       |

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

| Module Information                 |                     |                 |                                                                                                                                                                                                                                                                                                        |                       |       |
|------------------------------------|---------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------|
| معلومات المادة الدراسية            |                     |                 |                                                                                                                                                                                                                                                                                                        |                       |       |
| Module Title                       | Biophysics          |                 | Module Delivery                                                                                                                                                                                                                                                                                        |                       |       |
| Module Type                        | Basic               |                 | <div><input checked="" type="checkbox"/> Theory</div> <div><input checked="" type="checkbox"/> Lecture</div> <div><input checked="" type="checkbox"/> Lab</div> <div><input type="checkbox"/> Tutorial</div> <div><input type="checkbox"/> Practical</div> <div><input type="checkbox"/> Seminar</div> |                       |       |
| Module Code                        | Bio-1104            |                 |                                                                                                                                                                                                                                                                                                        |                       |       |
| ECTS Credits                       | 6                   |                 |                                                                                                                                                                                                                                                                                                        |                       |       |
| SWL (hr/sem)                       | 167                 |                 |                                                                                                                                                                                                                                                                                                        |                       |       |
| Module Level                       |                     | 1               | Semester of Delivery                                                                                                                                                                                                                                                                                   |                       | 1     |
| Administering Department           |                     | Type Dept. Code | College                                                                                                                                                                                                                                                                                                | Type College Code     |       |
| Module Leader                      | Amera Kanan         |                 | e-mail                                                                                                                                                                                                                                                                                                 | amera@uodiyala.edu.iq |       |
| Module Leader’s Acad. Title        |                     | Lecturer        | Module Leader’s Qualification                                                                                                                                                                                                                                                                          |                       | M Sc. |
| Module Tutor                       | Name (if available) |                 | e-mail                                                                                                                                                                                                                                                                                                 | E-mail                |       |
| Peer Reviewer Name                 |                     | Name            | e-mail                                                                                                                                                                                                                                                                                                 | E-mail                |       |
| Scientific Committee Approval Date |                     | 1/11/2023       | Version Number                                                                                                                                                                                                                                                                                         |                       | 1.0   |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى |      |          |  |
|------------------------------------------------------------------|------|----------|--|
| Prerequisite module                                              | None | Semester |  |
| Co-requisites module                                             | None | Semester |  |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Module Objectives<br>أهداف المادة الدراسية                                                                         | <p>In this module we will review in detail several important modern physical science concepts, models, laws, tools and techniques that can be applied to addressing real biological questions, with a thorough discussion of the underlying physics.</p> <p>Physical science methods historically have been key to providing enormous breakthroughs in our understanding of fundamental biology - stemming from the early development of optical microscopy in understanding the cellular nature of life, through to complex structural biology techniques to elucidate the shape of vital biomolecules including proteins and DNA.</p> <p>In the first half of this module we will introduce the key biological macromolecules, the forces that are involved in maintaining their structure and how structure is determined. We will next discuss key physical science developments that have involved methods to study single cells in their native context, single- molecule biophysical methods that permit dynamic and mechanistic information to be extracted with unprecedented precision, and ground-breaking developments in areas of super-resolution imaging and biosensing.</p> <p>In the second half of the module we will discuss tools and techniques that, broadly, permit the detection and characterization of biological material using</p> |

|                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                         | non-visible electromagnetic radiation, and methods used to manipulate and quantify biological forces, with particular emphasis throughout placed on real applications. Examples of such tools discussed include electron microscopy, nuclear magnetic resonance spectroscopy and atomic force microscopy.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Module Learning Outcomes</b><br><b>مخرجات التعلم للمادة الدراسية</b> | <p>The module will focus on a number of concepts, models, laws, tools and techniques of physical science that underpin biophysical methods. It will address a broad range of challenging biological questions. During this module students will:</p> <ol style="list-style-type: none"> <li>1. Comprehend the use of physical concepts and laws to produce models of biological systems, and quantitatively analyse these models.</li> <li>2. Critically analyse the validity of assumptions made in these models and assess their impact on the validity of the results.</li> <li>3. Understand the physical basis of experimental techniques used to study the biological systems introduced and explain the key results.</li> <li>4. Assess the key features and biological significance of the systems introduced.</li> <li>5. Demonstrate an understanding of the key physical principles behind several important biological processes underpinning living matter.</li> <li>6. Apply modern biophysical tools and techniques to real applications</li> </ol>                                                                                                                                                                                                                                                                                                      |
| <b>Indicative Contents</b><br><b>المحتويات الإرشادية</b>                | <p>The lecture course will discuss the scope of modern biophysics, and introduce students to the fundamentals of chemical bonding, and the structure and function of biological molecules including sugars, lipids, proteins, nucleic acids and molecular machines. Biophysical techniques including optical spectroscopy, dynamic light scattering, fluorescence spectroscopy and the basics of light microscopy will then be discussed in detail. Insights into single-molecule imaging and spectroscopy will then be provided, before a series of lectures on super-resolution approaches. Next, students will encounter techniques which use non-optical waves in their mode of operation, including electron microscopy, X-ray spectroscopy and nuclear magnetic resonance spectroscopy. Experimental techniques which rely on forces, including atomic force microscopy and optical tweezers will then be discussed in detail. Complementary and emerging experimental techniques will also be presented, as well as detailed analysis of molecular dynamics simulations. The lecture course will also include revision of the course material and guest research lectures from specialists in the field. Examples of guest research lectures include, but are not limited to: Digital Holographic Microscopy, Biofilms, Biophotonics and Raman Spectroscopy.</p> |

### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

|            |                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Strategies | Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students. |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Student Workload (SWL)

#### الحمل الدراسي للطالب محسوب لـ 15 اسبوعا

|                        |    |                      |   |
|------------------------|----|----------------------|---|
| Structured SWL (h/sem) | 77 | Structured SWL (h/w) | 5 |
|------------------------|----|----------------------|---|

## Semester One

|                                                                         |     |                                                                    |   |
|-------------------------------------------------------------------------|-----|--------------------------------------------------------------------|---|
| الحمل الدراسي المنتظم للطالب خلال الفصل                                 |     | الحمل الدراسي المنتظم للطالب أسبوعيا                               |   |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 90  | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل              | 150 |                                                                    |   |

### Module Evaluation

#### تقييم المادة الدراسية

|                      |                 | Time/Number | Weight (Marks)   | Week Due       | Relevant Learning Outcome |
|----------------------|-----------------|-------------|------------------|----------------|---------------------------|
| Formative assessment | Quizzes         | 2           | 10% (10)         | 5 and 10       | LO #1, #2 and #10, #11    |
|                      | Assignments     | 2           | 10% (10)         | 2 and 12       | LO #3, #4 and #6, #7      |
|                      | Projects / Lab. | 1           | 10% (10)         | Continuou<br>s | All                       |
|                      | Report          | 1           | 10% (10)         | 13             | LO #5, #8 and #10         |
| Summative assessment | Midterm Exam    | 2hr         | 10% (10)         | 7              | LO #1 - #7                |
|                      | Final Exam      | 3hr         | 50% (50)         | 16             | All                       |
| Total assessment     |                 |             | 100% (100 Marks) |                |                           |

### Delivery Plan (Weekly Syllabus)

#### المنهاج الأسبوعي النظري

|         | Material Covered                                                                                                               |
|---------|--------------------------------------------------------------------------------------------------------------------------------|
| Week 1  | The lecture course will discuss the scope of modern biophysics, and introduce students to the fundamentals of chemical bonding |
| Week 2  | The structure and function of biological molecules including sugars, lipids, proteins, nucleic acids and molecular machines.   |
| Week 3  | Biophysical techniques including optical spectroscopy, dynamic light scattering                                                |
| Week 4  | Fluorescence spectroscopy and the basics of light microscopy will then be discussed in detail.                                 |
| Week 5  | properties of fluids: pressure, buoyancy, Archimedes' rule, ideal fluid flow , Bernoulli equation, Venturi tube,               |
| Week 6  | Medical needles, Pitot tube                                                                                                    |
| Week 7  | real fluid viscosity and flow, Viscosity modulus, viscosity changes with degree Heat, Brazier's law,                           |
| Week 8  | flow rate the blood and its relationship with pressure slope, velocity sedimentation                                           |
| Week 9  | fluid properties: fluid diffusion, Vic's Fluid Law, Maturity, Laws Maturity, boiling point of solutions                        |
| Week 10 | fluid properties: surface tensile, Surface tensile modulus, some live applications                                             |
| Week 11 | Vibratory motion, force constant, motion Simple harmonic, potential energy and kinematics in simple harmonic motion            |
| Week 12 | fading or fading, resonance                                                                                                    |
| Week 13 | wave motion, sine wave equation, wave velocity in elastic media, sedentary pats, strikes,                                      |
| Week 14 | ear and hearing distress, hearing mechanism, Pitch and loudness, optics                                                        |
| Week 15 | Preparatory week before the final Exam                                                                                         |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الأسبوعي للمختبر |                                                                                                                                           |
|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                  | Material Covered                                                                                                                          |
| Week 1                                                           | Lab 1: Ohm's Law                                                                                                                          |
| Week 2                                                           | Lab 2: Balance of power                                                                                                                   |
| Week 3                                                           | Lab 3: Finding the ground acceleration using a simple pendulum                                                                            |
| Week 4                                                           | Lab 4: Find the melting point of the wax from its cooling curve                                                                           |
| Week 5                                                           | Lab 5: Determination of the specific heat of a poor conductor of heat (elastic)                                                           |
| Week 6                                                           | Lab 6: Find the density of a liquid                                                                                                       |
| Week 7                                                           | Lab 7: Boyle's Law investigation                                                                                                          |
| Week 8                                                           | Lab 8: Joule equivalent                                                                                                                   |
| Week 9                                                           | Lab 9: Finding the relationship between the current passing through the tungsten thread and the potential difference between its two ends |
| Week 10                                                          | Lab 10: Determination of the specific heat of graphite                                                                                    |
| Week 11                                                          | Lab 11: Study of the relationship between temperature and electromotive force of a                                                        |
| Week 12                                                          | Lab 12: Resistance changes with temperature                                                                                               |
| Week 13                                                          | Lab 13: Set the flame temperature                                                                                                         |
| Week 14                                                          | Lab 14: Determination of the coefficient of thermal conductivity of a rubber tube                                                         |
| Week 15                                                          | Lab 15: The coefficient of volumetric expansion of liquids                                                                                |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس |                                                                                                                                               |                           |
|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                                          | Text                                                                                                                                          | Available in the Library? |
| Required Texts                                           | Leake MC: Biophysics: tools and techniques (CRC Press, 1st Ed, 2016)<br><br>Leake MC: Single-Molecule Cellular Biophysics (CUP, 1st Ed, 2013) | No                        |
| Recommended Texts                                        | Alberts A et al: Molecular Biology of the Cell (Garland Science, 6th Ed, 2014).                                                               | No                        |
| Websites                                                 | <a href="https://www.coursera.org/browse/physical-science/">https://www.coursera.org/browse/physical-science/</a>                             |                           |

| Grading Scheme<br>مخطط الدرجات |                  |                     |          |                                       |
|--------------------------------|------------------|---------------------|----------|---------------------------------------|
| Group                          | Grade            | التقدير             | Marks %  | Definition                            |
| Success Group<br>(50 - 100)    | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| Fail Group<br>(0 - 49)         | FX - Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                | F - Fail         | راسب                | (0-44)   | Considerable amount of work required  |
|                                |                  |                     |          |                                       |

## Semester One

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Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

## MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                                   |                               |                                                                                                                                                                                                                                            |
|------------------------------------|-----------------------------------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                                   |                               |                                                                                                                                                                                                                                            |
| Module Title                       | <b>Human Rights and Democracy</b> |                               | Module Delivery                                                                                                                                                                                                                            |
| Module Type                        | <b>Basic</b>                      |                               | <input checked="" type="checkbox"/> Theory<br><input checked="" type="checkbox"/> Lecture<br><input type="checkbox"/> Lab<br><input type="checkbox"/> L Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | <b>UD04</b>                       |                               |                                                                                                                                                                                                                                            |
| ECTS Credits                       | <b>2</b>                          |                               |                                                                                                                                                                                                                                            |
| SWL (hr/sem)                       | <b>50</b>                         |                               |                                                                                                                                                                                                                                            |
| Module Level                       |                                   |                               |                                                                                                                                                                                                                                            |
| Administering Department           | جميع اقسام الكلية                 | College                       | College of Engineering                                                                                                                                                                                                                     |
| Module Leader                      |                                   |                               | e-mail                                                                                                                                                                                                                                     |
| Module Leader's Acad. Title        | لجنة حقوق الانسان والديمقراطية    | Module Leader's Qualification | MSc.                                                                                                                                                                                                                                       |
| Module Tutor                       |                                   |                               | e-mail                                                                                                                                                                                                                                     |
| Peer Reviewer Name                 |                                   |                               | e-mail                                                                                                                                                                                                                                     |
| Scientific Committee Approval Date | 12/06/2023                        | Version Number                | 1.0                                                                                                                                                                                                                                        |

| Relation with other Modules       |      |          |  |
|-----------------------------------|------|----------|--|
| العلاقة مع المواد الدراسية الأخرى |      |          |  |
| Prerequisite module               | None | Semester |  |
| Co-requisites module              | None | Semester |  |

| Module Aims, Learning Outcomes and Indicative Contents    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Module Objectives<br>أهداف المادة الدراسية                | <p>1. يتعلم الطالب خلال السنة الدراسية أساسيات حقوق الانسان والديمقراطية ما حقوقه كيف يدافع عنها بالطرق القانونية وماهي ضماناتها الداخلية والدولية.</p> <p>2. استحضار المعرفة في مجال الديمقراطية وأنواع أنظمتها واثرها على حقوق الانسان .</p> <p>3. تنمية شخصية الطالب وتعزيز وعيهم في الأنظمة السياسية الديمقراطية وتفصيلها وكيفية تطبيقها على ارض الواقع واهمية ان يكون فعال في المجتمع من خلال احترامه لحقوق الآخرين ومعرفة ان الحقوق والحريات تنتهي عند بداية حقوقهم وحرياتهم ويؤدي واجباته بدلا من اكتساب الحقوق فقط.</p> <p>4. تعزيز ثقافة السلام القائمة على العدل والمساواة.</p>                                                                                                                                                                                                                                                                                                 |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | <p>1. تمكين الطالب من معرفة أساسيات الدفاع عن حقوقه وحقوق الآخرين بعد معرفتها ومعرفة أهميتها له وللمجتمع بصورة عامة وأيضا معرفه كل شخص حدود حقوقه وحريته .</p> <p>2. تمكين الطالب في المشاركة السياسية وذلك من خلال معرفته بأهمية مشاركته في الانتخابات وتأثير هذه المشاركة على سير الانتخابات وتشكيل السلطة فيما بعد.</p> <p>3. معرفة الطالب ضمانات حقوقه وحرياته وماهي مصادرهما.</p> <p>4. معرفة الفرق بين الحقوق والحريات.</p> <p>5. تمكين الطالب من معرفة ماهي المفهوم العلمي للديمقراطية وماهي جذورها وانواعها واشكالها.</p> <p>6. يتعلم الطالب كيف يؤثر النظام الديمقراطي على حقوق الانسان وماهي العلاقة بينها.</p> <p>7. ادراك الطالب ضرورة ان يكون مواطن فعال في المجتمع ايضاً معرفه شروط الناخب وشروط المرشح للانتخابات.</p> <p>8. معرفة أنظمة الانتخابات وايهما افضل.</p> <p>9. فهم الطالب للقانون الدولي لحقوق الانسان وايضاً معرفة مختصرة عن المنظمات الدولية والية عملها</p> |

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indicative Contents</b><br>المحتويات الإرشادية | كالأمم المتحدة ومنظمة الصليب الأحمر وغيرها.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                   | <p><b>الجزء الأول - تعريف حقوق الإنسان وحقوق الإنسان في الحضارات القديمة</b><br/>(تعريف الحق وتعريف الإنسان ومعرفة أهمية حقوق الإنسان بالنسبة للإنسان والمجتمع أيضا دراسة حقوق الإنسان في الحضارات كالحضارة المصرية والعراقية واليونانية والرومانية) (٤ ساعات)</p> <p><b>الجزء الثاني معرف حقوق الإنسان في الأديان السماوية وأهمها الإسلام (٢ ساعة)</b><br/>مصادر حقوق الإنسان تتضمن (مصادر دولية كالإعلان العالمي لحقوق الإنسان والعهدان الدوليان والمصادر الإقليمية التي تشمل الاتفاقيات الإقليمية كالاتفاقية الأوروبية والأمريكية والدستور (٢ ساعة)</p> <p>ضمانات حقوق الإنسان (كالضمانات الدستورية والقانونية) (٢ ساعة)</p> <p>الاتفاقيات الدولية والإقليمية لحقوق الإنسان (٢ ساعة)</p> <p>الحريات العامة وأنواعها والمقارنة فيما بينها (٢ ساعة)</p> <p>مستقبل حقوق الإنسان والعولمة وحقوق الإنسان (٢ ساعة)</p> <p>تعريف وتاريخ وأنواع الديمقراطية (دراسة تعريف ونشأة وتطور الديمقراطية مبادئها وأنواعها كالديمقراطية المباشرة وغير المباشرة والنظام الرئاسي والبرلماني) (٦ ساعات)</p> <p>تعريف الانتخاب وشروطه وأنواع النظم الانتخابية وتعريف المجلس النيابي (٦ ساعات)</p> <p>العلاقة بين الديمقراطية وحقوق الإنسان (٢ ساعة)</p> |

### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

|                   |                                                                                                                                                |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b> | 1. زيادة وعي الطالب بأهمية معرفه حقوقه وواجباته اتجاه المجتمع وعلاقة حقوق الإنسان بالنظام الديمقراطي                                           |
|                   | 2. ثقافة عامة في مجموعة من المجالات ومنها المجال القانوني و السياسي والاجتماعي ورفع ثقة الطالب بنفسه من خلال ربط المادة النظرية بالواقع العملي |

### Student Workload (SWL)

#### الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

|                                                                                |           |                                                                           |            |
|--------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------|------------|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | <b>33</b> | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | <b>2</b>   |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | <b>17</b> | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | <b>1.1</b> |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | <b>50</b> |                                                                           |            |

### Module Evaluation

#### تقييم المادة الدراسية

|                             |                        | Time/Number | Weight (Marks)          | Week Due | Relevant Learning Outcome |
|-----------------------------|------------------------|-------------|-------------------------|----------|---------------------------|
| <b>Formative assessment</b> | <b>Quizzes</b>         | 2           | 15% (10)                | 5 and 10 | LO #1, #2 #3, and #6 #7#8 |
|                             | <b>Assignments</b>     | 2           | 10% (10)                | 2 and 12 | LO #3, #4 and #6, #7      |
|                             | <b>Projects / Lab.</b> |             |                         |          |                           |
|                             | <b>Report</b>          | 1           | 15% (10)                | 13       | LO #5, #8 and #9          |
| <b>Summative assessment</b> | <b>Midterm Exam</b>    | 2hr         | 10% (10)                | 7        | LO #1 - #7                |
|                             | <b>Final Exam</b>      | 3hr         | 50% (50)                | 16       | All                       |
| <b>Total assessment</b>     |                        |             | <b>100% (100 Marks)</b> |          |                           |

## Delivery Plan (Weekly Syllabus)

## المناهج الاسبوعي النظري

|         | Material Covered                                                                                                                                         |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Week 1  | محاضرة تعريفية عن المادة واهميتها ..                                                                                                                     |
| Week 2  | تعريف الحق والانسان وحقوق الانسان واهمية حقوق الانسان ,حقوق الانسان في الدين الإسلامي والحضارات القديمة.                                                 |
| Week 3  | مصادر حقوق الانسان الدولية والإقليمية والمحلية.                                                                                                          |
| Week 4  | ضمانات حقوق الانسان الدستورية والقانونية وضمانات حقوق الانسان على الصعيد الدولي.                                                                         |
| Week 5  | ضمانات حقوق الانسان في الإسلام                                                                                                                           |
| Week 6  | دور المنظمات الإقليمية في حماية حقوق الانسان.                                                                                                            |
| Week 7  | خصائص حقوق الانسان وتعريف الحريات العامة وانواعه والمقارنة بينها وبين الحقوق القانون الدولي لحقوق الانسان والقانون الدولي الإنساني ومنظمة الصليب الأحمر. |
| Week 8  | مستقبل حقوق الانسان وسبل تطويرها .                                                                                                                       |
| Week 9  | العولمة وحقوق الانسان .                                                                                                                                  |
| Week 10 | تعريف الديمقراطية وتطورها التاريخي ومبادئها . الديمقراطية بين العالمية والخصوصية . اشكال الديمقراطية / الديمقراطية المباشرة.                             |
| Week 11 | الديمقراطية شبه المباشرة والديمقراطية التمثيلية / اركان النظام التمثيلي / اشكال النظام التمثيلي.                                                         |
| Week 12 | المجلس النيابي وانواعه / الانتخاب وشروطه / هيئة الناخبين.                                                                                                |
| Week 13 | تنظيم عملية الانتخاب / تحديد الدوائر الانتخابية / القوائم الانتخابية / المرشحات / الحملة الانتخابية / التصويت .                                          |
| Week 14 | نظم الانتخابات.                                                                                                                                          |
| Week 15 | علاقة الديمقراطية بحقوق الانسان وكيفية التأثير والتأثر فيما بينها.                                                                                       |
| Week 16 | الامتحان النهائي                                                                                                                                         |

## Learning and Teaching Resources

## مصادر التعلم والتدريس

|                   | Text                                                                                                                                                                                        | Available in the Library? |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| Required Texts    | حقوق الانسان والطفل والديمقراطية / تأليف ماهر صالح علاوي ورياض عزيز هادي وعلي عبد الرزاق محمد واخرون / العاتك / بيروت / ٢٠٠٩                                                                | نعم                       |
| Recommended Texts | عباس الدليمي / حقوق الانسان الفكر والممارسة<br>فخري رشيد ،صلاح ياسين /المنظمات الدولية / العاتك لصناعة الكتاب / بغداد<br>عصام العطية / القانون الدولي العام / المكتبة القانونية /بغداد/2012 | لا                        |
| Websites          |                                                                                                                                                                                             |                           |

## Grading Scheme

## مخطط الدرجات

| Group                       | Grade            | التقدير             | Marks %  | Definition                            |
|-----------------------------|------------------|---------------------|----------|---------------------------------------|
| Success Group<br>(50 - 100) | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                             | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                             | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                             | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                             | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| Fail Group<br>(0 - 49)      | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                             | F – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
|                             |                  |                     |          |                                       |

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.



## MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                        |                      |                                                                                                                                                                                                                                                     |                         |
|------------------------------------|------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| معلومات المادة الدراسية            |                        |                      |                                                                                                                                                                                                                                                     |                         |
| Module Title                       | <b>Arabic Language</b> |                      | Module Delivery                                                                                                                                                                                                                                     |                         |
| Module Type                        | Support                |                      | <input checked="" type="checkbox"/> Theory<br><input checked="" type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |                         |
| Module Code                        | <b>UD02</b>            |                      |                                                                                                                                                                                                                                                     |                         |
| ECTS Credits                       | 2                      |                      |                                                                                                                                                                                                                                                     |                         |
| SWL (hr/sem)                       | <b>50</b>              |                      |                                                                                                                                                                                                                                                     |                         |
| Module Level                       | 1                      | Semester of Delivery |                                                                                                                                                                                                                                                     | 2                       |
| Administering Department           | Type Dept. Code        | College              | Type College Code                                                                                                                                                                                                                                   |                         |
| Module Leader                      | Othman Khlan Farhan    |                      | e-mail                                                                                                                                                                                                                                              | othaman@uodiyala.edu.iq |
| Module Leader's Acad. Title        | Lecturer               |                      | Module Leader's Qualification                                                                                                                                                                                                                       | Ph.D.                   |
| Module Tutor                       | Name(if available)     |                      | e-mail                                                                                                                                                                                                                                              | E-mail                  |
| Peer Reviewer Name                 | Name                   |                      | e-mail                                                                                                                                                                                                                                              | E-mail                  |
| Scientific Committee Approval Date | 01/06/2023             |                      | Version Number                                                                                                                                                                                                                                      | 1.0                     |

| Relation with other Modules       |      |          |  |
|-----------------------------------|------|----------|--|
| العلاقة مع المواد الدراسية الأخرى |      |          |  |
| Prerequisite module               | None | Semester |  |
| Co-requisites module              | None | Semester |  |

| Module Aims, Learning Outcomes and Indicative Contents    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Module Objectives<br>أهداف المادة الدراسية                | 1- تعريف الطلبة اهم المفاتيح الأساس في التعامل بلغة عربية فصيحة خالية من اي خطأ أو لحن وكيفية التعلم فيما يخص الأدب والنحو والبلاغة والاملاء العربية وكل هذا لغير الاختصاص.<br>2- رفع القدرات التعبيرية للطلّاب، وزيادة ثروتهم اللغوية ، ومساعدتهم على استخدام العبارة المناسبة بشكل دلالي واضح.<br>3- تدريب الطلبة على التحدث، والتنظيم المنطقي للأفكار ، مع الحرص على التمسك باللغة العربية الفصحى .<br>4- رفع الأداء اللغوي العام لدى الطلبة.<br>5- تمكين الطلبة من الكتابة والتعبير والحديث بلغة عربية فصيحة وواضحة.<br>6- مساعدة الطلبة في التعبير عن افكارهم من خلال المناقشة والحوار بلغة سهلة وفصيحة .<br>7- جعل الطلبة قادرين على اكتساب خزين لغوي من الكلمات واللفاظ والتعابير الفصيحة.<br>8- تعلم الطلبة الحفاظ على لغة القرآن التراث العربي الاصيل. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | الاهداف المعرفية والمهارية:<br>1- يعرف اساليب اللغة العربية.<br>2- يوظف ادوات الترقيم عند الكتابة .<br>3- يتدرب على كيفية تحليل النصوص الادبية .<br>4- يعرب بعض الامثلة والتمارين عن الجملة الاسمية والفعلية .<br>5- يناقش بعض النصوص القرآنية والادبية .<br>6- يبين الفرق بين علامات الاعراب الاصلية والفرعية.<br>7- يميز بين الافعال والاسماء في الجمل.<br>8- يتدرب على القراءة الواضحة والإلقاء .<br>9- يتدرب على الكتابة بخط حسن من خلال التعريف بأنواع الخطوط العربية، وكتابة كل حرف، ثم                                                                                                                                                                                                                                                                   |

|                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                            | <p>كتاب الجمل والعبارات بخط الرقعة.</p> <p>10- يميز بين حمزة القطع وهمزة الوصل عند الكتابة .</p> <p>11- يميز بين حرفي الضاد والطاء في الكتابة والنطق.</p> <p>12- يميز بين التاء المربوطة والمفتوحة أثناء الكتابة.</p> <p>13- أحكام كتابة الضاد والطاء.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Indicative Contents<br>المحتويات الإرشادية | <p>توضيح أهمية اللغة العربية وفوائدها بالنسبة للطالب الجامعي (2 ساعة).</p> <p>اللغة، تفسير وتحليل أول عشرة آيات من سورة الكهف مع بيان فضل السورة وسبب تسميتها وأهم الأوجه البلاغية والنحوية . (2 ساعة)</p> <p>اللغة، تفسير وتحليل ثلاثة آيات من سورة الحجرات مع بيان فضل السورة وسبب تسميتها وأهم الأوجه البلاغية والنحوية. (2 ساعة)</p> <p>الادب، تحليل ثلاثة عشر سطرًا من قصيدة سفر أيوب في الشعر الحر للشاعر العراقي بدر شاكر السياب مع حياة الشاعر وأهم الأوجه البلاغية والنحوية في القصيدة. (2 ساعة)</p> <p>الادب، تحليل ثمانية أبيات في الحماس للشاعر أبي الطيب المتنبي مع حياة الشاعر مع أهم الأوجه البلاغية والنحوية في القصيدة. (2 ساعة)</p> <p>قواعد اللغة العربية وأهميتها</p> <p>معرفة أقسام الكلام (الاسم والفعل والحرف) وأهم علاماتها.</p> <p>قواعد اللغة العربية :- النكرة والمعرفة، أنواع المعارف ( العلم ) شرح موضوع (اسم العلم والاسم المركب) مع الأمثلة. (2 ساعة)</p> <p>قواعد اللغة العربية، (الضمائر) شرح موضوع (الضمائر الرفع والنصب والجر) مع الأمثلة. (2 ساعة)</p> <p>اللغة، حفظ وتفسير وتحليل سورة الأعلى مع بيان فضل السورة وسبب تسميتها وأهم الأوجه البلاغية والنحوية.</p> <p>الادب، تحليل ثمانية أبيات من قصيدة (كن بلسمًا) للشاعر (إيليا أبي ماضي) مع حياة الشاعر مع أهم الحالات الاعرابية والبلاغية. (2 ساعة)</p> <p>قواعد اللغة العربية، شرح موضوع (أسماء الإشارة) مع الأمثلة وحالات الاعراب، شرح موضوع (المعرف بالإضافة) مع الأمثلة وحالات الاعراب. (2 ساعة)</p> <p>قواعد اللغة العربية، شرح موضوع (الحال) معرفة الحال وصاحبها وما هي أنواع الحال مع الأمثلة وحالات الاعراب. (2 ساعة)</p> <p>الأملاء في اللغة العربية، علامات الترقيم وأهميتها في اللغة العربية. (2 ساعة)</p> <p>قواعد اللغة العربية، شرح موضوع (العدد) معرفة تميز العدد وماهي أقسام العدد مع الأمثلة وحالات الاعراب.</p> |

### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

|            |                                                                                                                                                                                                 |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Strategies | <ul style="list-style-type: none"> <li>- المحاضرة والمشاركة.</li> <li>- المناقشة والحوار.</li> <li>- العصف الذهني.</li> <li>- كتابة التقارير عن الموضوع.</li> <li>- السؤال والجواب .</li> </ul> |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Student Workload (SWL)

#### الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

|                                                                         |    |                                                                    |   |
|-------------------------------------------------------------------------|----|--------------------------------------------------------------------|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 30 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 7 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 30 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل              | 60 |                                                                    |   |

## Module Evaluation

تقييم المادة الدراسية

|                      |              | Time/Number | Weight (Marks)   | Week Due | Relevant Learning Outcome |
|----------------------|--------------|-------------|------------------|----------|---------------------------|
| Formative assessment | Quizzes      | 2           | 10% (10)         | 5 and 10 | LO #1, #2 and #10, #11    |
|                      | Assignments  | 2           | 10% (10)         | 2 and 12 | LO #3, #4 and #6, #7      |
|                      | Report       | 1           | 10% (10)         | 13       | LO #5, #8 and #10         |
| Summative assessment | Midterm Exam | 2hr         | 20% (10)         | 7        | LO #1 - #7                |
|                      | Final Exam   | 3hr         | 50% (50)         | 16       | All                       |
| Total assessment     |              |             | 100% (100 Marks) |          |                           |

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

|         | Material Covered                                                                                                                                     |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Week 1  | توضيح أهمية اللغة العربية وفوائدها بالنسبة للطالب الجامعي.                                                                                           |
| Week 2  | اللغة، تفسير وتحليل أول عشرة آيات من سورة الكهف مع بيان فضل السورة وسبب تسميتها وأهم الأوجه البلاغية والنحوية.                                       |
| Week 3  | اللغة، تفسير وتحليل ثلاثة آيات من سورة الحجرات مع بيان فضل السورة وسبب تسميتها وأهم الأوجه البلاغية والنحوية.                                        |
| Week 4  | الادب، تحليل ثلاثة عشر سطرًا من قصيدة سفر أيوب في الشعر الحر للشاعر العراقي بدر شاكر السياب مع حياة الشاعر وأهم الأوجه البلاغية والنحوية في القصيدة. |
| Week 5  | الادب، تحليل ثمانية أبيات في الحماس للشاعر أبي الطيب المتنبي مع حياة الشاعر مع أهم الأوجه البلاغية والنحوية في القصيدة.                              |
| Week 6  | قواعد اللغة العربية وأهميتها                                                                                                                         |
| Week 7  | معرفة أقسام الكلام (الاسم والفعل والحرف) وأهم علاماتها.                                                                                              |
| Week 8  | قواعد اللغة العربية :- النكرة والمعرفة، أنواع المعارف (العلم) شرح موضوع (اسم العلم والاسم المركب) مع الأمثلة.                                        |
| Week 9  | قواعد اللغة العربية، (الضمائر) شرح موضوع (الضمائر الرفع والنصب والجر) مع الأمثلة.                                                                    |
| Week 10 | اللغة، تفسير وتحليل سورة الأعلى مع بيان فضل السورة وسبب تسميتها وأهم الأوجه البلاغية والنحوية.                                                       |
| Week 11 | الادب، تحليل ثمانية أبيات من قصيدة (كن بلسمًا) للشاعر (إيليا أبي ماضي) مع حياة الشاعر مع أهم الحالات الاعرابية والبلاغية.                            |
| Week 12 | قواعد اللغة العربية، شرح موضوع (أسماء الإشارة) مع الأمثلة وحالات الاعراب، شرح موضوع (المعرف بالإضافة) مع الأمثلة وحالات الاعراب.                     |
| Week 13 | قواعد اللغة العربية، شرح موضوع (الحال) معرفة الحال وصاحبها وما هي أنواع الحال مع الأمثلة وحالات الاعراب.                                             |
| Week 14 | الأملاء في اللغة العربية، علامات الترفيع وأهميتها في اللغة العربية.                                                                                  |
| Week 15 | قواعد اللغة العربية، شرح موضوع (العدد) معرفة تميز العدد وماهي أقسام العدد مع الأمثلة وحالات الاعراب.                                                 |
| Week 16 | الأملاء في اللغة العربية، أحكام الهمزة (همزة الوصل، همزة القطع، كتابة الهمزة في وسط الكلمة).                                                         |
| Week 17 | الأملاء في اللغة العربية: أحكام كتابة التاء المربوطة والمفتوحة والالف الممدودة والمقصورة.                                                            |

## Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

|        | Material Covered |
|--------|------------------|
| Week 1 |                  |
| Week 2 |                  |
| Week 3 |                  |
| Week 4 |                  |
| Week 5 |                  |
| Week 6 |                  |
| Week 7 |                  |

## Learning and Teaching Resources

مصادر التعلم والتدريس

## Semester One

|                   | Text                                                                                                                                                                                                                                                                                                             | Available in the Library? |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| Required Texts    | 1. القرآن الكريم.<br>2. كتاب البلاغة والتطبيق.<br>3. كتاب الأملاء الواضح .<br>4. منهاج اللغة العربية لغير الاختصاص.<br>5. قواعد الإملاء الصحيحة لعبد السلام محمد هارون                                                                                                                                           | Yes                       |
| Recommended Texts | 1. كتاب شرح ابن عقيل على الفية ابن مالك/ ابن عقيل عبد الله بن عبد الرحمن.<br>2. كتاب الميسر في اللغة العربية لغير الاختصاص/ الدكتور زياد طارق شولي<br>3. منهاج اللغة العربية العامة لغير الاختصاص/ عبد القادر حسن امين<br>4. معاني النحو للدكتور فاضل السامرائي<br>5. إعراب القرآن وتفسيره وبيانه لمحمود الدرويش | Yes                       |
| Websites          | 1- <a href="http://www.al-mostafa.com/index.htm">http://www.al-mostafa.com/index.htm</a><br>2- <a href="http://www.almeshkat.net/books/index.php">http://www.almeshkat.net/books/index.php</a><br>3- <a href="http://www.imamu.edu.sa/arabiyah">http://www.imamu.edu.sa/arabiyah</a>                             |                           |

| Grading Scheme<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                       |                  |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير             | Marks %  | Definition                            |
| Success Group<br>(50 - 100)                                                                                                                                                                                                                                                                                                                                                          | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| Fail Group<br>(0 - 49)                                                                                                                                                                                                                                                                                                                                                               | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                                      |                  |                     |          |                                       |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |                     |          |                                       |

# **Semester Two**

## MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| Module Information                 |                          |                      |                                                                                                                                                                                                                                                     |                              |
|------------------------------------|--------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| معلومات المادة الدراسية            |                          |                      |                                                                                                                                                                                                                                                     |                              |
| Module Title                       | General Botany           |                      | Module Delivery                                                                                                                                                                                                                                     |                              |
| Module Type                        | Core                     |                      | <input checked="" type="checkbox"/> Theory<br><input checked="" type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |                              |
| Module Code                        | Bio-1201                 |                      |                                                                                                                                                                                                                                                     |                              |
| ECTS Credits                       | 7                        |                      |                                                                                                                                                                                                                                                     |                              |
| SWL (hr/sem)                       | 174                      |                      |                                                                                                                                                                                                                                                     |                              |
| Module Level                       | 1                        | Semester of Delivery |                                                                                                                                                                                                                                                     | 2                            |
| Administering Department           | Type Dept. Code          | College              | Type College Code                                                                                                                                                                                                                                   |                              |
| Module Leader                      | Khalid Dheyaa Abdulwahid |                      | e-mail                                                                                                                                                                                                                                              | chechanikd75@uodiyala.edu.iq |
| Module Leader's Acad. Title        | Assis. Prof.             |                      | Module Leader's Qualification                                                                                                                                                                                                                       | Ph.D.                        |
| Module Tutor                       | Khalid Dheyaa Abdulwahid |                      | e-mail                                                                                                                                                                                                                                              | chechanikd75@uodiyala.edu.iq |
| Peer Reviewer Name                 | Khalid Dheyaa Abdulwahid |                      | e-mail                                                                                                                                                                                                                                              | chechanikd75@uodiyala.edu.iq |
| Scientific Committee Approval Date | 08/06/2023               |                      | Version Number                                                                                                                                                                                                                                      | 1.0                          |

## Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

|                      |          |          |   |
|----------------------|----------|----------|---|
| Prerequisite module  | None     | Semester |   |
| Co-requisites module | Bio-2312 | Semester | 3 |

## Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

|                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Module Objectives<br>أهداف المادة الدراسية                | 5. Learn about plants in nature and how they are classified and developed.<br>6. Identify the plant cell and its various components.<br>7. Identify plant tissues and their functions.<br>8. Identify the different parts of the plant.<br>9. Studying photosynthesis in plants.<br>10. Granting the student a bachelor's degree in the theoretical and practical aspects.                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 7. Identify the science of Botany and learn about origin, development, and systematics, classification of plants as well as In addition to the location of the plant kingdom within the pyramid of life.<br>8. Learn about the differences photosynthetic organisms (plants1) and Vegetabilia kingdom (plants2), as well as fully parasitic plants.<br>9. Clarification the Cell theory and learn about Light, TEM, SEM microscopy and identification of the parts and organelles of plant cell.<br>10. Distinguish between eukaryotic and prokaryotic plants and identify the parts of the nucleus in a plant cell. As well as discussing the plant life cycle and the mechanisms of cell division in plant cells.<br>11. Distinguishing the important differences between mitochondria and |

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                   | <p>plastids, in addition to knowing a brief about their development from an evolutionary point of view.</p> <p>12. A detailed explanation of plant tissues, their types, locations in the plant and their functions.</p> <p>13. Identify the organs of plant and studied anatomically.</p> <p>14. Explain the process of photosynthesis in plants.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Indicative Contents</b><br>المحتويات الإرشادية | <p>Indicative content includes the following.</p> <p><b><u>A. Cognitive goals</u></b></p> <p><b>A1-The first level</b> // Knowledge development // Develop the student's ability to recall what he learned about scientific facts related to Botany and enable students to obtain knowledge and understanding of the intellectual and applied framework in the science of Botany.</p> <p><b>A2-The second level</b> // Improving comprehension level // Developing the ability to interpret, predict and deduce and enable students to obtain knowledge and understanding of the requirements in plant groups according to scientific standards.</p> <p><b>A3-The third level</b> // Developing applied abilities (Application) // Informing students of modern techniques in Botany through showing films and scientific research.</p> <p><b>A4-The fourth level</b> // provide the student with the ability to analyze (analysis) // enable students to gain knowledge in Botany.</p> <p><b><u>B. objectives and skills</u></b></p> <p>B1- Providing students with the additional basics related to the outputs of thinking and analysis.</p> <p>B2- Learn experimentation.</p> <p>B3- Improving the student's ability in observation.</p> <p>B4- Learn how to imitate and simulate.</p> <p><b><u>C. Emotional and value goals</u></b></p> <p>C1- Asking general questions during laboratory and theoretical lessons.</p> <p>C2- Assign students to report on various topics of Botany.</p> <p>C3- Enable students to conduct all experiments related to Botany.</p> <p>C4- Discussing and directing graduation research for fourth-year students.</p> |

### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b> | <p>Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.</p> |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Student Workload (SWL)

#### الحمل الدراسي للطالب محسوب لـ 15 اسبوعا

|                                                                          |    |                                                                     |     |
|--------------------------------------------------------------------------|----|---------------------------------------------------------------------|-----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل | 79 | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5.2 |
| <b>Unstructured SWL (h/sem)</b>                                          | 96 | <b>Unstructured SWL (h/w)</b>                                       | 6.4 |

|                                                                   |                                          |  |
|-------------------------------------------------------------------|------------------------------------------|--|
| الحمل الدراسي غير المنتظم للطالب خلال الفصل                       | الحمل الدراسي غير المنتظم للطالب أسبوعيا |  |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل | <b>175</b>                               |  |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |                               |                    |                       |                 |                                  |
|---------------------------------------------------|-------------------------------|--------------------|-----------------------|-----------------|----------------------------------|
|                                                   |                               | <b>Time/Number</b> | <b>Weight (Marks)</b> | <b>Week Due</b> | <b>Relevant Learning Outcome</b> |
| <b>Formative assessment</b>                       | <b>Quizzes</b>                | 2                  | 10% (10)              | 5 and 10        | LO #1, #2 and #10, #11           |
|                                                   | <b>Assignments</b>            | 2                  | 10% (10)              | 2 and 12        | LO #3, #4 and #6, #7             |
|                                                   | <b>Projects / Lab. Report</b> | 1                  | 10% (10)              | Continuous      | All                              |
|                                                   | <b>Report</b>                 | 1                  | 10% (10)              | 13              | LO #5, #8 and #10                |
| <b>Summative assessment</b>                       | <b>Midterm Exam</b>           | 2hr                | 10% (10)              | 7               | LO #1 - #7                       |
|                                                   | <b>Final Exam</b>             | 3hr                | 50% (50)              | 16              | All                              |
| <b>Total assessment</b>                           |                               |                    | 100% (100 Marks)      |                 |                                  |

| <b>Delivery Plan (Weekly Syllabus)</b><br>المنهاج الاسبوعي النظري |                                                                                             |
|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
|                                                                   | <b>Material Covered</b>                                                                     |
| <b>Week 1</b>                                                     | Introduction of Botany - Origin and development- Systematics and classification             |
| <b>Week 2</b>                                                     | The nature of plant - Photosynthetic organisms –Vegetabilia kingdom -Fully parasitic plants |
| <b>Week 3</b>                                                     | The plant cell : Introduction to Cells-Cell theory- Types of microscopy - Cell membrane and |
| <b>Week 4</b>                                                     | The plant cell: Nucleus- Nucleolus-Chromosomes.                                             |
| <b>Week 5</b>                                                     | The plant cell: Ribosomes- Protein Synthesis -Rough endoplasmic reticulum- Golgi            |
| <b>Week 6</b>                                                     | The plant cell: Life Cycle -karyokinesis, cytokinesis- Meiosis, Mitosis, Mitochondria and   |
| <b>Week 7</b>                                                     | The plant cell: Vacuoles and other Vesicles - Cellular Skeleton                             |
| <b>Week 8</b>                                                     | Mid exam                                                                                    |
| <b>Week 9</b>                                                     | Tissues of plant: Epidermis- Ground tissues- Supportive tissues- Meristems                  |
| <b>Week 10</b>                                                    | Tissues of plant: Vascular tissues- Periderm                                                |
| <b>Week 11</b>                                                    | Organs of plant: Roots - Roots forms- Modification of roots -Anatomy of root                |
| <b>Week 12</b>                                                    | Organs of plant: Stems- Modification of stems - Anatomy of stem                             |
| <b>Week 13</b>                                                    | Organs of plant: Leaves - Leaves form - Anatomy of leaves, Flowering plants                 |
| <b>Week 14</b>                                                    | Photosynthesis                                                                              |
| <b>Week 15</b>                                                    | Final exam                                                                                  |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br>المنهاج الاسبوعي للمختبر |                                                    |
|-------------------------------------------------------------------------|----------------------------------------------------|
|                                                                         | <b>Material Covered</b>                            |
| <b>Week 1</b>                                                           | Lab1 The Plant cell (Living & non-Living contents) |

|                |                                             |
|----------------|---------------------------------------------|
| <b>Week 2</b>  | Lab2 The Cell wall                          |
| <b>Week 3</b>  | Lab3 The cell division (Mitosis & Meiosis)  |
| <b>Week 4</b>  | Lab4 The Epidermis in Dicot & Monocot       |
| <b>Week 5</b>  | Lab5 The plant tissues: Parenchyma tissue   |
| <b>Week 6</b>  | Lab6 The plant tissues: Collenchyma tissue  |
| <b>Week 7</b>  | Lab7 The plant tissues: Sclerenchyma tissue |
| <b>Week 8</b>  | Mid exam                                    |
| <b>Week 9</b>  | Lab8 The plant tissues: Xylem & Phloem      |
| <b>Week 10</b> | Lab9 Organs of plant: The Root              |
| <b>Week 11</b> | Lab10 Organs of plant: The Stem             |
| <b>Week 12</b> | Lab11 Organs of plant: The Leaf             |
| <b>Week 13</b> | Lab12 Organs of plant: The Flower           |
| <b>Week 14</b> | Lab13 Organs of plant: The Fruit            |
| <b>Week 15</b> | Final exam                                  |

### Learning and Teaching Resources

مصادر التعلم والتدريس

|                          | Text                                                                                                                            | Available in the Library? |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Required Texts</b>    | Introduction to Botany, Alexey Shipunov<br>Shipunov, Alexey. Introduction to Botany. Lecture notes.<br>February 8, 2018 version | Yes                       |
| <b>Recommended Texts</b> | BOTANY ,TAMIL NADU TEXTBOOK CORPORATION<br>COLLEGE ROAD, CHENNAI - 600 006.Government of Tamil Nadu First edition – 2005.       | Yes                       |
| <b>Websites</b>          | <a href="http://ashipunov.info/shipunov/school/biol_154">http://ashipunov.info/shipunov/school/biol_154</a>                     |                           |

### Grading Scheme

مخطط الدرجات

| Group                           | Grade                   | التقدير             | Marks %  | Definition                            |
|---------------------------------|-------------------------|---------------------|----------|---------------------------------------|
| <b>Success Group (50 - 100)</b> | <b>A</b> - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                 | <b>B</b> - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                 | <b>C</b> - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                 | <b>D</b> - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                 | <b>E</b> - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group (0 – 49)</b>      | <b>FX</b> – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                 | <b>F</b> – Fail         | راسب                | (0-44)   | Considerable amount of work required  |

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

## MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                          |                               |                                                                                                                                                                                                                                                     |                              |
|------------------------------------|--------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| معلومات المادة الدراسية            |                          |                               |                                                                                                                                                                                                                                                     |                              |
| Module Title                       | <b>Organic Chemistry</b> |                               | Module Delivery                                                                                                                                                                                                                                     |                              |
| Module Type                        | <b>Core</b>              |                               | <input checked="" type="checkbox"/> Theory<br><input checked="" type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |                              |
| Module Code                        | <b>Bio-1212</b>          |                               |                                                                                                                                                                                                                                                     |                              |
| ECTS Credits                       | <b>7</b>                 |                               |                                                                                                                                                                                                                                                     |                              |
| SWL (hr/sem)                       | <b>175</b>               |                               |                                                                                                                                                                                                                                                     |                              |
| Module Level                       | 1                        | Semester of Delivery          |                                                                                                                                                                                                                                                     | 2                            |
| Administering Department           | Type Dept. Code          | College                       | Type College Code                                                                                                                                                                                                                                   |                              |
| Module Leader                      | Waseem Yousif Mohammed   |                               | e-mail                                                                                                                                                                                                                                              | WaseemYousif@uodiyala.edu.iq |
| Module Leader's Acad. Title        | Lecturer                 | Module Leader's Qualification | Ph.D.                                                                                                                                                                                                                                               |                              |
| Module Tutor                       | Name (if available)      |                               | e-mail                                                                                                                                                                                                                                              | E-mail                       |
| Peer Reviewer Name                 | Name                     |                               | e-mail                                                                                                                                                                                                                                              | E-mail                       |
| Scientific Committee Approval Date | 01/06/2023               |                               | Version Number                                                                                                                                                                                                                                      | 1.0                          |

## Relation with other Modules

## العلاقة مع المواد الدراسية الأخرى

|                      |                      |          |   |
|----------------------|----------------------|----------|---|
| Prerequisite module  | Analytical Chemistry | Semester | 1 |
| Co-requisites module |                      | Semester |   |

## Module Aims, Learning Outcomes and Indicative Contents

## أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

|                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Module Objectives<br>أهداف المادة الدراسية                | The students will acquire a broad understanding of the knowledge base in Organic Chemistry and its terminology or discourse. They will operate in a range of varied but predictable contexts that require the use of a specified range of techniques and information sources. The student will be required to identify principles and concepts underlying theoretical frameworks. The student will take responsibility for the nature and quality of outputs through defined problem classes.                                                                                                                                                                                        |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | At the end of this module students should be able to: <ul style="list-style-type: none"> <li>• Introduction to organic chemistry, bonding, hybridization, resonance and delocalization.</li> <li>• Functionality, nomenclature, structure of functional groups affecting their reactivity.</li> <li>• Conformation of straight chain alkanes, structural isomers.</li> <li>• Configuration, chirality, enantiomers/diastereomers, Cahn-Ingold-Prelog priority rules (R/S) and Fischer/Newman projections.</li> <li>• Hydrocarbon rings, strain energy and effect of substitution, chair and boat cyclohexane, conjugation and role of cyclization in benzene aromaticity.</li> </ul> |

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indicative Contents</b><br>المحتويات الإرشادية | <p>The module will include:</p> <ol style="list-style-type: none"> <li>1. General concepts in organic chemistry for predicting atom and electronic structure of molecules, stability, reactivity and molecular properties (bond strength, pH etc.)</li> <li>2. General concepts and mechanisms underlying organic reactions and ability to draw the mechanism for a given reaction or to give reagents required for an organic reaction.</li> </ol> <p>Throughout the course examples will be provided to link the underlying concepts and reactions with biological (e.g. metabolism) and pharmaceutical design (e.g. drugs).</p> |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                      | <p>Lessons of all units will be offered in an interactive lecture where student participation is mandatory either by forming small group discussion in class, exchange ideas and question one another. Where applicable students will be assigned problems to solve and encouraged to assess one another. Learning material will be supplied to students in class or uploaded on Blackboard learning management system. Students will also be regularly referred to relevant section of the prescribed text book. Most of the tutorial work will be done as self-study or with the assistance of a tutor. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.</p> |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا       |     |                                                                           |     |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|-----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 79  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 5.2 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 96  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6.4 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 175 |                                                                           |     |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |                 |             |                |                |                           |
|---------------------------------------------------|-----------------|-------------|----------------|----------------|---------------------------|
|                                                   |                 | Time/Number | Weight (Marks) | Week Due       | Relevant Learning Outcome |
| Formative assessment                              | Quizzes         | 2           | 10% (10)       | 5 and 10       | LO #1, #2 and #10, #11    |
|                                                   | Assignments     | 2           | 10% (10)       | 2 and 12       | LO #3, #4 and #6, #7      |
|                                                   | Projects / Lab. | 1           | 10% (10)       | Continuou<br>s | All                       |
|                                                   | Report          | 1           | 10% (10)       | 13             | LO #5, #8 and #10         |
| Summative                                         | Midterm         | 2hr         | 10% (10)       | 7              | LO #1 - #7                |

|                  |            |     |                  |    |     |
|------------------|------------|-----|------------------|----|-----|
| assessment       | Exam       |     |                  |    |     |
|                  | Final Exam | 3hr | 50% (50)         | 16 | All |
| Total assessment |            |     | 100% (100 Marks) |    |     |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري |                                                        |
|------------------------------------------------------------|--------------------------------------------------------|
|                                                            | Material Covered                                       |
| Week 1                                                     | Hydrocarbons                                           |
| Week 2                                                     | IUPAC name of alkanes                                  |
| Week 3-4                                                   | Coupling of alkyl halides with organometallic compound |
| Week 5-6                                                   | Preparation of alkenes                                 |
| Week 7                                                     | Addition of halogen bromide. Peroxide effect           |
| Week 8                                                     | Oxidation of tributylborane gives butanol .            |
| Week 9                                                     | Free – radical polymerization of alkene                |
| Week 10-                                                   | Mid exam                                               |
| Week 12                                                    | AROMATIC COMPOUND                                      |
| Week 13                                                    | Representation of benzene ring                         |
| Week 14                                                    | Polysubstituted Benzenes                               |
| Week 15                                                    | Determination of orientation:-                         |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر |                                                                        |
|------------------------------------------------------------------|------------------------------------------------------------------------|
|                                                                  | Material Covered                                                       |
| Week 1                                                           | Lab1 Boiling point Definition                                          |
| Week 2                                                           | Lab2 Experimental Procedures Boiling Point                             |
| Week 3                                                           | Lab3 Distillation                                                      |
| Week 4                                                           | Lab4 Types of Distillation:                                            |
| Week 5                                                           | Lab5 PROCEDURE Distillation                                            |
| Week 6                                                           | Lab6 Extraction                                                        |
| Week 7                                                           | Lab7 Procedure Extraction                                              |
| Week 8                                                           | Mid exam                                                               |
| Week 9                                                           | Lab8 Definition Melting Point                                          |
| Week 10                                                          | Lab9 Procedure: Melting Point                                          |
| Week 11                                                          | Lab10 Recrystallization: Purification of Crystalline Organic Compounds |
| Week 12                                                          | Lab11 Procedure: Recrystallization                                     |
| Week 13                                                          | Lab12 Sublimation                                                      |
| Week 14                                                          | Lab13 Procedure Sublimation                                            |
| Week 15                                                          | Final exam                                                             |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس |      |                  |
|----------------------------------------------------------|------|------------------|
|                                                          | Text | Available in the |

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                   | Library? |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>Required Texts</b>    | The foundations of analytical chemistry, part one and two, by Dr. Moayad Al-Abaiji                                                                                                                                                                                                                                                                                                                                                | Yes      |
| <b>Recommended Texts</b> | 1. Basset, J.et.al, Trans. By A Hadyana Pudjaatmaka dan L. Setiono, 1994,<br>2. Vogel, Quantitative Inorganic Analysis, 4th Ed., Jakarta: Penerbit Buku Kedokteran E G C. Svehla, G. & Vogel, A.L., Trans. By Setiono, 1985,<br>3. A Quantitative Inorganic Analysis, 3rd Ed., New York: John Wiley & Sons Inc. Skoog, D.A. & West, D.M., 1990<br>4. Analytical Chemistry, 5th Ed., Philadelphia: Saunders Golden Sunburst Series | YES      |
| <b>Websites</b>          | <a href="http://www.chemicalprocessing.com">www.chemicalprocessing.com</a>                                                                                                                                                                                                                                                                                                                                                        |          |

| <b>Grading Scheme</b><br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                |                         |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade                   | التقدير             | Marks %  | Definition                            |
| <b>Success Group (50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                      | <b>A</b> - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>B</b> - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>C</b> - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>D</b> - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>E</b> - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group (0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                           | <b>FX</b> – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>F</b> – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                                      |                         |                     |          |                                       |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                         |                     |          |                                       |

## MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                           |                      |                                                                                                                                                                                                                                          |                           |
|------------------------------------|---------------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| معلومات المادة الدراسية            |                           |                      |                                                                                                                                                                                                                                          |                           |
| Module Title                       | <b>Biostatistics</b>      |                      | Module Delivery                                                                                                                                                                                                                          |                           |
| Module Type                        | <b>Basic</b>              |                      | <input checked="" type="checkbox"/> Theory<br><input checked="" type="checkbox"/> Lecture<br><input type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |                           |
| Module Code                        | <b>Bio-1213</b>           |                      |                                                                                                                                                                                                                                          |                           |
| ECTS Credits                       | <b>5</b>                  |                      |                                                                                                                                                                                                                                          |                           |
| SWL (hr/sem)                       | <b>130</b>                |                      |                                                                                                                                                                                                                                          |                           |
| Module Level                       | UGx11 1                   | Semester of Delivery |                                                                                                                                                                                                                                          | 2                         |
| Administering Department           | Type Dept. Code           | College              | Type College Code                                                                                                                                                                                                                        |                           |
| Module Leader                      | Dr. Anwar Nouruddin Imran |                      | e-mail                                                                                                                                                                                                                                   | anwarmath@uodiyala.edu.iq |
| Module Leader's Acad. Title        | Assistant Professor       |                      | Module Leader's Qualification                                                                                                                                                                                                            | Ph.D.                     |
| Module Tutor                       | Name (if available)       |                      | e-mail                                                                                                                                                                                                                                   | E-mail                    |
| Peer Reviewer Name                 | Name                      |                      | e-mail                                                                                                                                                                                                                                   | E-mail                    |
| Scientific Committee Approval Date | 01/06/2023                |                      | Version Number                                                                                                                                                                                                                           | 1.0                       |

| Relation with other Modules       |                     |          |   |
|-----------------------------------|---------------------|----------|---|
| العلاقة مع المواد الدراسية الأخرى |                     |          |   |
| Prerequisite module               | General Mathematics | Semester | 1 |
| Co-requisites module              | None                | Semester |   |

| Module Aims, Learning Outcomes and Indicative Contents           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Module Objectives</b><br>أهداف المادة الدراسية                | <ul style="list-style-type: none"> <li>To discuss and critic reports and articles applying biostatistics to epidemiology</li> <li>To conduct preliminary/simple statistical analysis and to plan more sophisticated future statistical analyses</li> <li>To work with scientific experts including biostatisticians, epidemiologists and public health professionals</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية | <ol style="list-style-type: none"> <li>Extract the most useful/important information from scientific articles</li> <li>Interpret graphical summaries and statistical tables</li> <li>Criticize the statistics of simple epidemiological studies</li> <li>Describe the study population using the appropriate indicators</li> <li>Formulate statistical hypothesis according to the objective aimed by the study</li> <li>Apply the statistical test using the R or STATA software and to interpret the results</li> <li>Measure the strength of the association between two quantitative or qualitative variables and interpret it</li> <li>Summarize statistical results and to write the material, methods and result sections of a report/article.</li> </ol> |

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indicative Contents</b><br>المحتويات الإرشادية | Indicative content includes the following.<br>Introduction and Some Basic Concept, Statistical, Population, Sample, Random Sampling<br>View Data, Frequency Distribution Table<br>Measures of Central Tendency, Median, Mode<br>Scale of variance, rang, variance, Standard deviation, Standard error, coefficient of variance<br>Random Variable, discrete random variable, continuous random variable<br>Distribution, Binomial Distribution, Normal Distribution<br>Mathematical expectation concept<br>Significance difference test<br>Regression, correlation coefficient<br>Exercises and discussion<br>Type of distribution, discrete distribution, continuous distribution<br>What is the distribution theory<br>Preparatory week before the final Exam |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                      | The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students. |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطالب محسوب لـ 15 اسبوعا       |     |                                                                           |   |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|---|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 63  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 4 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 62  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 125 |                                                                           |   |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |                        |                  |          |                           |                        |
|---------------------------------------------------|------------------------|------------------|----------|---------------------------|------------------------|
|                                                   | Time/Number            | Weight (Marks)   | Week Due | Relevant Learning Outcome |                        |
| <b>Formative assessment</b>                       | <b>Quizzes</b>         | 2                | 10% (10) | 5 and 10                  | LO #1, #2 and #10, #11 |
|                                                   | <b>Assignments</b>     | 2                | 10% (10) | 2 and 12                  | LO #3, #4 and #6, #7   |
|                                                   | <b>Projects / Lab.</b> | 1                | 10% (10) | Continuous                | All                    |
|                                                   | <b>Report</b>          | 1                | 10% (10) | 13                        | LO #5, #8 and #10      |
| <b>Summative assessment</b>                       | <b>Midterm Exam</b>    | 2hr              | 10% (10) | 7                         | LO #1 - #7             |
|                                                   | <b>Final Exam</b>      | 3hr              | 50% (50) | 16                        | All                    |
| <b>Total assessment</b>                           |                        | 100% (100 Marks) |          |                           |                        |

**Delivery Plan (Weekly Syllabus)**

المنهاج الاسبوعي النظري

|                | <b>Material Covered</b>                                                                                                  |
|----------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>Week 1</b>  | Concepts Fundamental                                                                                                     |
| <b>Week 2</b>  | Presentation of Data                                                                                                     |
| <b>Week 3</b>  | Measures of Central Tendency                                                                                             |
| <b>Week 4</b>  | Measures of Dispersion                                                                                                   |
| <b>Week 5</b>  | The distributions, the binomial distribution, normal distribution                                                        |
| <b>Week 6</b>  | Statistical tests: T test, Z test, X test, F test                                                                        |
| <b>Week 7</b>  | Analysis of variance, experiment, unit experimental, treatment, refined, degrees of freedom, total squares, mean Squares |
| <b>Week 8</b>  | Regression, correlation coefficient                                                                                      |
| <b>Week 9</b>  | SPSS statistical program introduction and definition                                                                     |
| <b>Week 10</b> | Introducing SPSS tools                                                                                                   |
| <b>Week 11</b> | Application analysis examples of laboratory experiments using the SPSS program                                           |
| <b>Week 12</b> | Methods of expressing the statistical results of biological experiments Variance                                         |
| <b>Week 13</b> | Analysis of Variance                                                                                                     |
| <b>Week 14</b> | Some Special Probability distributions                                                                                   |
| <b>Week 15</b> | Final Exam                                                                                                               |

**Learning and Teaching Resources**

مصادر التعلم والتدريس

|                          | <b>Text</b>                                                                                                                                                       | <b>Available in the Library?</b> |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>Required Texts</b>    | Hogg, R. V., McKean, J. W., & Craig, A. T. (2019). Introduction to mathematical statistics. Pearson.                                                              | Yes                              |
| <b>Recommended Texts</b> | Antonisamy, B., Premkumar, P. S., & Christopher, S. (2017). Principles and Practice of Biostatistics-E-book. Elsevier Health Sciences.                            | Yes                              |
| <b>Websites</b>          | <a href="https://www.sciencedirect.com/topics/medicine-and-dentistry/biostatistics">https://www.sciencedirect.com/topics/medicine-and-dentistry/biostatistics</a> |                                  |

**Grading Scheme**

مخطط الدرجات

| <b>Group</b>                    | <b>Grade</b>            | <b>التقدير</b>      | <b>Marks %</b> | <b>Definition</b>                     |
|---------------------------------|-------------------------|---------------------|----------------|---------------------------------------|
| <b>Success Group (50 - 100)</b> | <b>A - Excellent</b>    | امتياز              | 90 - 100       | Outstanding Performance               |
|                                 | <b>B - Very Good</b>    | جيد جدا             | 80 - 89        | Above average with some errors        |
|                                 | <b>C - Good</b>         | جيد                 | 70 - 79        | Sound work with notable errors        |
|                                 | <b>D - Satisfactory</b> | متوسط               | 60 - 69        | Fair but with major shortcomings      |
|                                 | <b>E - Sufficient</b>   | مقبول               | 50 - 59        | Work meets minimum criteria           |
| <b>Fail Group (0 - 49)</b>      | <b>FX – Fail</b>        | راسب (قيد المعالجة) | (45-49)        | More work required but credit awarded |
|                                 | <b>F – Fail</b>         | راسب                | (0-44)         | Considerable amount of work required  |
|                                 |                         |                     |                |                                       |

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

## MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                               |                      |                                                                                                                                                                                                                                          |                               |
|------------------------------------|-------------------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| معلومات المادة الدراسية            |                               |                      |                                                                                                                                                                                                                                          |                               |
| Module Title                       | <b>Safety and Biosecurity</b> |                      | Module Delivery                                                                                                                                                                                                                          |                               |
| Module Type                        | <b>Supporter</b>              |                      | <input checked="" type="checkbox"/> Theory<br><input checked="" type="checkbox"/> Lecture<br><input type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |                               |
| Module Code                        | <b>Bio-1204</b>               |                      |                                                                                                                                                                                                                                          |                               |
| ECTS Credits                       | <b>3</b>                      |                      |                                                                                                                                                                                                                                          |                               |
| SWL (hr/sem)                       | <b>75</b>                     |                      |                                                                                                                                                                                                                                          |                               |
| Module Level                       | 1                             | Semester of Delivery |                                                                                                                                                                                                                                          | 2                             |
| Administering Department           | Type Dept. Code               | College              | Type College Code                                                                                                                                                                                                                        |                               |
| Module Leader                      | Ibtihal Hameed Mohsin         |                      | e-mail                                                                                                                                                                                                                                   | ibtihalhameed@uodiyala.edu.iq |
| Module Leader's Acad. Title        | Assistant Professor           |                      | Module Leader's Qualification                                                                                                                                                                                                            | Ph.D.                         |
| Module Tutor                       |                               |                      | e-mail                                                                                                                                                                                                                                   | E-mail                        |
| Peer Reviewer Name                 | Name                          |                      | e-mail                                                                                                                                                                                                                                   | E-mail                        |
| Scientific Committee Approval Date | 01/06/2023                    |                      | Version Number                                                                                                                                                                                                                           | 1.0                           |

| Relation with other Modules       |      |          |  |
|-----------------------------------|------|----------|--|
| العلاقة مع المواد الدراسية الأخرى |      |          |  |
| Prerequisite module               | None | Semester |  |
| Co-requisites module              | None | Semester |  |

| Module Aims, Learning Outcomes and Indicative Contents           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Module Objectives</b><br>أهداف المادة الدراسية                | <p>The basic objective of a biosafety program is the containment of potentially harmful biological agents. The purpose of containment is to reduce or eliminate exposure of laboratory workers, other persons, and the outside environment to potentially hazardous agents:</p> <ul style="list-style-type: none"> <li>Identify relevant biosafety regulations and documentation</li> <li>Apply biosafety and biosecurity concepts in the laboratory setting</li> <li>Organize laboratory space according to its biosafety level</li> <li>Select appropriate equipment for the biosafety level of their laboratory</li> <li>Manage biosafety-related risks in their laboratory</li> </ul> |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية | <p>Biosafety and biosecurity address the safe handling and containment of infectious microorganisms and hazardous biological materials in the laboratory setting. Whereas biosafety aims at protecting public health and the environment from accidental exposure to biological agents, biosecurity deals with the prevention of misuse through loss, theft, diversion, or intentional release of pathogens, toxins, and any other biological materials.</p>                                                                                                                                                                                                                              |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                | <p>Indicative content includes the following.</p> <p><b>A. Cognitive goals</b></p> <p><b>A1-The first level</b> // Knowledge development // Develop the student's ability to</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>recall what he learned about biosafety and enable students to obtain knowledge and understanding of the intellectual and applied framework in the biosafety and biosecurity.</p> <p><b>A2-The second level</b> // Improving comprehension level // Developing the ability to interpret, predict and deduce and enable students to obtain knowledge and understanding of the requirements in biological risks in lab.</p> <p><b>A3-The third level</b> // Developing applied abilities (Application) // Informing students of modern protocols in Biohazardous Waste and risk assessment.</p> <p><b>A4-The fourth level</b> // provide the student with the ability to analyze (analysis) // enable students to gain knowledge in safety.</p> <p><b><u>B. objectives and skills</u></b></p> <p>B1- Providing students with the additional basics related to the outputs of thinking and analysis.</p> <p>B2- Learn experimentation.</p> <p>B3- Improving the student's ability in observation.</p> <p>B4- Learn how to imitate and simulate.</p> <p><b><u>C. Emotional and value goals</u></b></p> <p>C1- Asking general questions during the theoretical lessons.</p> <p>C2- Assign students to report on various topics of biosafety.</p> <p>C3- Enable students to apply the protocols of biosecurity in lab.</p> |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| <b>Learning and Teaching Strategies</b><br><b>استراتيجيات التعلم والتعليم</b> |                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                             | <p>The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.</p> |

| <b>Student Workload (SWL)</b><br><b>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا</b> |    |                                                                           |   |
|---------------------------------------------------------------------------------|----|---------------------------------------------------------------------------|---|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل        | 48 | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 3 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل  | 27 | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 2 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل               | 75 |                                                                           |   |

| <b>Module Evaluation</b><br><b>تقييم المادة الدراسية</b> |                        |             |                |                |                           |
|----------------------------------------------------------|------------------------|-------------|----------------|----------------|---------------------------|
|                                                          |                        | Time/Number | Weight (Marks) | Week Due       | Relevant Learning Outcome |
| <b>Formative assessment</b>                              | <b>Quizzes</b>         | 2           | 10% (10)       | 5 and 10       | LO #1, #2 and #10, #11    |
|                                                          | <b>Assignments</b>     | 2           | 10% (10)       | 2 and 12       | LO #3, #4 and #6, #7      |
|                                                          | <b>Projects / Lab.</b> | 1           | 10% (10)       | Continuou<br>s | All                       |

|                             |                     |     |                  |    |                   |
|-----------------------------|---------------------|-----|------------------|----|-------------------|
|                             | <b>Report</b>       | 1   | 10% (10)         | 13 | LO #5, #8 and #10 |
| <b>Summative assessment</b> | <b>Midterm Exam</b> | 2hr | 10% (10)         | 7  | LO #1 - #7        |
|                             | <b>Final Exam</b>   | 3hr | 50% (50)         | 16 | All               |
| <b>Total assessment</b>     |                     |     | 100% (100 Marks) |    |                   |

| <b>Delivery Plan (Weekly Syllabus)</b><br>المنهاج الاسبوعي النظري |                                                          |
|-------------------------------------------------------------------|----------------------------------------------------------|
|                                                                   | <b>Material Covered</b>                                  |
| <b>Week 1</b>                                                     | Biohazard Definition                                     |
| <b>Week 2</b>                                                     | Rules, Regulations & Guidelines                          |
| <b>Week 3</b>                                                     | Risk Assessment                                          |
| <b>Week 4</b>                                                     | Biological Safety and Biosafety Levels                   |
| <b>Week 5</b>                                                     | The Biosafety Level 1 Laboratory                         |
| <b>Week 6</b>                                                     | The Biosafety Level 2 Laboratory                         |
| <b>Week 7</b>                                                     | Biological Safety Level 3 Laboratories                   |
| <b>Week 8</b>                                                     | <b>Mid Exam</b>                                          |
| <b>Week 9</b>                                                     | Laboratory Biosecurity                                   |
| <b>Week 10</b>                                                    | Safety Equipment                                         |
| <b>Week 11</b>                                                    | Decontamination and waste management                     |
| <b>Week 12</b>                                                    | Biohazardous Waste                                       |
| <b>Week 13</b>                                                    | Biohazard Spill Clean-Up Procedures                      |
| <b>Week 14</b>                                                    | Use of Animals, Human Subjects and Materials in Research |
| <b>Week 15</b>                                                    | <b>Final Exam</b>                                        |

| <b>Learning and Teaching Resources</b><br>مصادر التعلم والتدريس |                                                                                                                                                                                                                                                                                                                                                                                                           |                                  |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                                                                 | <b>Text</b>                                                                                                                                                                                                                                                                                                                                                                                               | <b>Available in the Library?</b> |
| <b>Required Texts</b>                                           | Salerno, R. M., & Gaudioso, J. (Eds.). (2015). <i>Laboratory biorisk management: biosafety and biosecurity</i> . CRC Press.                                                                                                                                                                                                                                                                               | Yes                              |
| <b>Recommended Texts</b>                                        | Burnette, R. (2013). <i>Biosecurity: understanding, assessing, and preventing the threat</i> . John Wiley & Sons.<br>Karus, A., Praakle, K., Saar, T., Must, K., Randoja, H., & Viltrop, A. (2018). Biosafety and biosecurity manual.<br>Zhou, D., Song, H., Wang, J., Li, Z., Xu, S., Ji, X., ... & Xu, J. (2019). Biosafety and biosecurity. <i>Journal of biosafety and biosecurity</i> , 1(1), 15-18. | No                               |
| <b>Websites</b>                                                 | <a href="https://www.cdc.gov/safelabs/resources-tools/biosafety-resources-and-tools.html">https://www.cdc.gov/safelabs/resources-tools/biosafety-resources-and-tools.html</a>                                                                                                                                                                                                                             |                                  |

| <b>Grading Scheme</b><br>مخطط الدرجات |
|---------------------------------------|
|---------------------------------------|

| Group                               | Grade                   | التقدير             | Marks %  | Definition                            |
|-------------------------------------|-------------------------|---------------------|----------|---------------------------------------|
| <b>Success Group<br/>(50 - 100)</b> | <b>A</b> - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                     | <b>B</b> - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                     | <b>C</b> - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                     | <b>D</b> - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                     | <b>E</b> - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b>      | <b>FX</b> – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                     | <b>F</b> – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
|                                     |                         |                     |          |                                       |

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

## MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية |                         |                               |                                                                                                                                                                                                                                          |
|-----------------------------------------------|-------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Module Title                                  | <b>Computer Skills</b>  |                               | Module Delivery                                                                                                                                                                                                                          |
| Module Type                                   | <b>Basic</b>            |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                                   | <b>UD03</b>             |                               |                                                                                                                                                                                                                                          |
| ECTS Credits                                  | <b>4</b>                |                               |                                                                                                                                                                                                                                          |
| SWL(hr/sem)                                   | <b>100</b>              |                               |                                                                                                                                                                                                                                          |
| Module Level                                  | 1                       | Semester of Delivery          |                                                                                                                                                                                                                                          |
| Administering Department                      | Science and Engineering | College                       | College of Engineering<br>College of Science                                                                                                                                                                                             |
| Module Leader                                 |                         | e-mail                        |                                                                                                                                                                                                                                          |
| Module Leader's Acad. Title                   |                         | Module Leader's Qualification |                                                                                                                                                                                                                                          |
| Module Tutor                                  |                         | e-mail                        |                                                                                                                                                                                                                                          |
| Peer Reviewer Name                            |                         | e-mail                        |                                                                                                                                                                                                                                          |
| Scientific Committee Approval Date            | 21/11/2023              | Version Number                | 1.0                                                                                                                                                                                                                                      |

## Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

|                      |      |          |  |
|----------------------|------|----------|--|
| Prerequisite module  | None | Semester |  |
| Co-requisites module | None | Semester |  |

## Module Aims, Learning Outcomes and Indicative Contents

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Objectives</b><br>أهداف المادة الدراسية | <ol style="list-style-type: none"> <li>1. Training students on the basics of using the computer and providing them with the necessary skills to deal with the computer with high efficiency.</li> <li>2. Assisting the student in distinguishing and developing his\ her scientific and artistic abilities.</li> <li>3. Enriching the student's skills to be able to deal with the computer with high efficiency.</li> <li>4. Providing students with away to use other modern technologies related to the educational process.</li> </ol> |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية | 1. Enabling the student to know the concepts of information technology by learning the basics of the computer.<br>2. Enabling the student to know about the use of GUI operating systems.<br>3. Enabling the student to deal with the skills of using the operating system (Windows operating system) through exploring, customizing, and controlling its settings.<br>4. Enabling the student to work on the word processing program (Microsoft Word).<br>5. Enabling the student to work on the spreadsheet program (Microsoft Excel).<br>6. Enabling the student to work on the presentation program (Microsoft PowerPoint).                                                                                                                                                                                                             |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                | <b>Indicative content includes the following.</b> <ul style="list-style-type: none"> <li>• Course introduction(4hrs)</li> <li>• Working with GUI operating systems with a focus on Microsoft Windows OS</li> <li>• Microsoft Office Word(MS Word)</li> <li>• Microsoft Office Excel(MS Excel)</li> <li>• Microsoft Office PowerPoint(MS PowerPoint)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>                                               | Overview of computers: basic components, applications. GUI operating systems: Microsoft Windows operating system. Microsoft Office Word: getting started with Word, editing a document and formatting text and paragraphs, adding tables and inserting graphic objects, controlling page appearance and proofing a document. Microsoft Office Excel: getting started with Excel, sorting, selecting and subtotaling data, formulas and functions, worksheet formatting and presentation. Microsoft Office PowerPoint: getting started with PowerPoint, developing a PowerPoint presentation, adding graphical elements to your presentation and modifying objects in your presentation, adding graphical elements, tables and charts to your presentation and modifying objects in your presentation, prepare to deliver your presentation. |

### Learning and Teaching Strategies

استراتيجيات التعلم و التعليم

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b> | <b>In this course, students are guided by:</b> <ul style="list-style-type: none"> <li>• Using different examples.</li> <li>• Using different styles of discussion that aim to connect the theoretical and practical sides.</li> <li>• Asking questions and giving exercises that require analysis and conclusions related to lectures.</li> <li>• Encourage students to participate in discussions and do the practical work.</li> <li>• Encourage students to work in groups.</li> </ul> |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Student Workload(SWL)

الحمل الدراسي للطلاب محسوبة لـ 15 اسبوع

|                                                                         |           |                                                                    |          |
|-------------------------------------------------------------------------|-----------|--------------------------------------------------------------------|----------|
| <b>Structured SWL(h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل | <b>64</b> | <b>Structured SWL(h/w)</b><br>الحمل الدراسي المنتظم للطلاب اسبوعيا | <b>4</b> |
|-------------------------------------------------------------------------|-----------|--------------------------------------------------------------------|----------|

|                                                                              |            |                                                                                   |            |
|------------------------------------------------------------------------------|------------|-----------------------------------------------------------------------------------|------------|
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي اللامنتظم للطالب خلال الفصل | <b>36</b>  | <b>Unstructured SWL(h/w)</b><br>الحمل الدراسي اللامنتظم للطالب خلال الفصل أسبوعيا | <b>2.4</b> |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل            | <b>100</b> |                                                                                   |            |

**Module Evaluation**

تقييم المادة الدراسية

|                             |                       | <b>Time/Number</b> | <b>Weight(Marks)</b>  | <b>Week Due</b> | <b>Relevant Learning Outcome</b> |
|-----------------------------|-----------------------|--------------------|-----------------------|-----------------|----------------------------------|
| <b>Formative assessment</b> | <b>Quizzes</b>        | 2                  | 10%(10)               | 6 and 12        |                                  |
|                             | <b>Assignments</b>    | 2                  | 10%(10)               | 2 and 13        |                                  |
|                             | <b>Projects/ Lab.</b> | 1                  | 10%(10)               | Continuous      | All                              |
|                             | <b>Report</b>         | 1                  | 10%(10)               | 13              |                                  |
| <b>Summative assessment</b> | <b>Midterm Exam</b>   | 2hr                | 10%(10)               | 9               |                                  |
|                             | <b>Final Exam</b>     | 3hr                | 50%(50)               | 16              | All                              |
| <b>Total assessment</b>     |                       |                    | <b>100%(100Marks)</b> |                 |                                  |

**Delivery Plan (Weekly Syllabus)**

المنهاج الأسبوعي النظري

|                | <b>Material Covered</b>                                                                                                                                       |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Week1</b>   | Overview of computers and their basic components and applications                                                                                             |
| <b>Week2</b>   | Introduction to windows operations system                                                                                                                     |
| <b>Week3</b>   | Operation System properties, Difference between OS,program ,software , application                                                                            |
| <b>Week4</b>   | Network and internet (setting ,www, Email, search Engine)                                                                                                     |
| <b>Week5</b>   | Microsoft Office Word: Editing a Document and Formatting Text and Paragraphs                                                                                  |
| <b>Week6</b>   | Microsoft Office Word: Adding Tables and Inserting Graphic Objects                                                                                            |
| <b>Week7</b>   | Microsoft Office Word: Controlling Page Appearance and Proofing a Document                                                                                    |
| <b>Week8</b>   | Microsoft Office Excel: Getting Started with Excel                                                                                                            |
| <b>Week9</b>   | Microsoft Office Excel: Sorting, Selecting and Sub totaling data                                                                                              |
| <b>Week 10</b> | Microsoft Office Excel: Formulas and Functions                                                                                                                |
| <b>Week 11</b> | Microsoft Office Excel: Worksheet Formatting and Presentation                                                                                                 |
| <b>Week 12</b> | Microsoft Office Power Point: Getting Started with Power Point                                                                                                |
| <b>Week 13</b> | Microsoft Office Power Point: Developing a PowerPoint Presentation, Adding Graphical Elements to Your Presentation and Modifying Objects in Your Presentation |
| <b>Week 14</b> | Microsoft Office Power Point: Adding Graphical Elements, tables and charts to Your Presentation and Modifying Objects in Your Presentation                    |
| <b>Week 15</b> | Microsoft Office Power Point: Prepare to deliver your presentation                                                                                            |

|                |                                        |
|----------------|----------------------------------------|
| <b>Week 16</b> | Preparatory week before the final exam |
|----------------|----------------------------------------|

| <b>Delivery Plan (Weekly-Lab Syllabus)</b><br>المنهاج الأسبوعي للمختبر |                                                                                                                                                               |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                        | Material Covered                                                                                                                                              |
| <b>Week1</b>                                                           | Overview of computers and their basic components and applications                                                                                             |
| <b>Week2</b>                                                           | Introduction to windows operations system                                                                                                                     |
| <b>Week3</b>                                                           | Operation System properties, Difference between OS,program ,software , application                                                                            |
| <b>Week4</b>                                                           | Network and internet (setting ,www, Email, search Engine)                                                                                                     |
| <b>Week5</b>                                                           | Microsoft Office Word: Editing a Document and Formatting Text and Paragraphs                                                                                  |
| <b>Week6</b>                                                           | Microsoft Office Word: Adding Tables and Inserting Graphic Objects                                                                                            |
| <b>Week7</b>                                                           | Microsoft Office Word: Controlling Page Appearance and Proofing a Document                                                                                    |
| <b>Week8</b>                                                           | Microsoft Office Excel: Getting Started with Excel                                                                                                            |
| <b>Week9</b>                                                           | Microsoft Office Excel: Sorting, Selecting and Sub totaling data                                                                                              |
| <b>Week 10</b>                                                         | Microsoft Office Excel: Formulas and Functions                                                                                                                |
| <b>Week 11</b>                                                         | Microsoft Office Excel: Worksheet Formatting and Presentation                                                                                                 |
| <b>Week 12</b>                                                         | Microsoft Office Power Point: Getting Started with Power Point                                                                                                |
| <b>Week 13</b>                                                         | Microsoft Office Power Point: Developing a PowerPoint Presentation, Adding Graphical Elements to Your Presentation and Modifying Objects in Your Presentation |
| <b>Week 14</b>                                                         | Microsoft Office Power Point: Adding Graphical Elements, tables and charts to Your Presentation and Modifying Objects in Your Presentation                    |
| <b>Week 15</b>                                                         | Microsoft Office Power Point: Prepare to deliver your presentation                                                                                            |
| <b>Week 16</b>                                                         | Preparatory week before the final exam                                                                                                                        |

| <b>Learning and Teaching Resources</b><br>مصادر التعلم والتدريس |                                                                                                                                                                                                                                              |                           |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                                                 | Text                                                                                                                                                                                                                                         | Available in the Library? |
| <b>Required Texts</b>                                           | <ul style="list-style-type: none"> <li>JoanLambertandSteveLambert,Windows10stepbystep, 1st Edition 2015.</li> <li>JoanLambertandCurtisFrye,MicrosoftOffice2016stepbystep,1stEdition2015.</li> </ul>                                          | Yes                       |
| <b>Recommended Texts</b>                                        | <ul style="list-style-type: none"> <li>Michael Miller, ABSOLUTE BEGINNER'S GUIDE TO COMPUTERBASICS,5thEDITION,QUEIndianapolis,Indiana 46240, 2010.</li> <li>PaulMcFedries,TEACHYOURSELFVISUALLY MICROSOFT WINDOWS 10, ANNIVERSARY</li> </ul> | No                        |
| <b>Websites</b>                                                 | <a href="https://support.microsoft.com/en-us/products">https://support.microsoft.com/en-us/products</a><br><a href="https://www.goskills.com/Microsoft-Office">https://www.goskills.com/Microsoft-Office</a>                                 |                           |

| Grading Scheme<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                       |                         |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade                   | التقدير             | Marks %  | Definition                            |
| <b>Success Group<br/>(50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                  | <b>A</b> - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>B</b> - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>C</b> - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>D</b> - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>E</b> - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                       | <b>FX</b> – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>F</b> – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                                      |                         |                     |          |                                       |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                         |                     |          |                                       |

## MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                                   |                               |                                                                                                                                                                                                                                            |
|------------------------------------|-----------------------------------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                                   |                               |                                                                                                                                                                                                                                            |
| Module Title                       | <b>New Headway Plus/ Beginner</b> |                               | Module Delivery                                                                                                                                                                                                                            |
| Module Type                        | <b>Basic</b>                      |                               | <input checked="" type="checkbox"/> Theory<br><input checked="" type="checkbox"/> Lecture<br><input type="checkbox"/> Lab<br><input type="checkbox"/> L Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | <b>UD01</b>                       |                               |                                                                                                                                                                                                                                            |
| ECTS Credits                       | <b>2</b>                          |                               |                                                                                                                                                                                                                                            |
| SWL (hr/sem)                       | <b>50</b>                         |                               |                                                                                                                                                                                                                                            |
| Module Level                       | UGI                               | Semester (s) offered          |                                                                                                                                                                                                                                            |
| Administering Department           | All Departments                   | College                       | College of Engineering                                                                                                                                                                                                                     |
| Module Leader                      |                                   | e-mail                        |                                                                                                                                                                                                                                            |
| Module Leader's Acad. Title        |                                   | Module Leader's Qualification | MSc.                                                                                                                                                                                                                                       |
| Module Tutor                       |                                   | e-mail                        |                                                                                                                                                                                                                                            |
| Peer Reviewer Name                 |                                   | e-mail                        |                                                                                                                                                                                                                                            |
| Scientific Committee Approval Date | 22/11/2023                        | Version Number                | 1.0                                                                                                                                                                                                                                        |

| Relation with Other Modules                                               |                                                                                                                                                                                                                                                                                                                                                                                |          |  |
|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--|
| العلاقة مع المواد الدراسية الأخرى                                         |                                                                                                                                                                                                                                                                                                                                                                                |          |  |
| Prerequisite module                                                       | None                                                                                                                                                                                                                                                                                                                                                                           | Semester |  |
| Co-requisites module                                                      | None                                                                                                                                                                                                                                                                                                                                                                           | Semester |  |
| Module Aims, Learning Outcomes, Indicative Contents and Brief Description |                                                                                                                                                                                                                                                                                                                                                                                |          |  |
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر     |                                                                                                                                                                                                                                                                                                                                                                                |          |  |
| Module Aims<br>أهداف المادة الدراسية                                      | The module aims to develop the students' English skills in reading, writing, listening and speaking.                                                                                                                                                                                                                                                                           |          |  |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية                 | 1. Read and understand simple texts in English.<br>2. Answer simple comprehension questions and match sentences about texts.<br>3. Reconstruct texts by reordering sentences.<br>4. Understand the main idea of a text.<br>5. Identify specific information in a text.<br>6. Writing and paraphrasing paragraphs.                                                              |          |  |
| Indicative Contents<br>المحتويات الإرشادية                                | Indicative content includes the following.<br>i) Grammar has a core place in language teaching and learning.<br>ii) A wide variety of practice tasks in all the four skills are essential to language learning.<br>iii) Everyday expressions, particularly of spoken English, also need a place in the syllabus. These can be functional, social, situational or idiomatic.    |          |  |
| Course Description                                                        | Each unit is organized to enhance students' basic knowledge of vocabulary and grammar through reading texts. The students will learn how to form simple sentences and use them in real life situations as well as in writing different assignments. By the end of the course, students will be able to produce basic sentences and communicate in simple real-life situations. |          |  |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Strategies                                                      | Headway's trusted methodology combines solid grammar and practice, vocabulary development, and integrated skills with communicative role-plays and personalization.<br>Authentic material from a variety of sources enables students to see new language in context, and a range of comprehension tasks, language and vocabulary exercises, and extension activities practice the four skills. 'Everyday English' and 'Spoken grammar' sections practice real-world speaking skills, and a writing section for each unit at the back of the book provides models for students to analyze and imitate. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب                                                                                                       |    |                                                                     |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------|----|---------------------------------------------------------------------|-----|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل<br>In class lectures 26<br>In class tests 5<br>Seminars 2                          | 33 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعياً       | 2   |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل<br>Library, dorm, home memorizing 5<br>Preparation for tests 8<br>Homework 4 | 17 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعياً | 1.1 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل                                                                                           | 50 |                                                                     |     |

| Module Evaluation<br>تقييم المادة الدراسية |              |           |                  |                    |                           |
|--------------------------------------------|--------------|-----------|------------------|--------------------|---------------------------|
|                                            |              | Time (hr) | Weight (Marks)   | Week Due           | Relevant Learning Outcome |
| Formative assessment                       | Quizzes      | 2         | 5% (5)           | 5, 10, 12, 15      | All                       |
|                                            | Assignments  | 6         | 20% (20)         | 2, 4, 6, 8, 10, 12 | LO # 1, 3, 4, 5 and 6     |
|                                            | Seminars     | 2         | 5% (5)           | Continuous         | LO # 1-5                  |
| Summative assessment                       | Midterm Exam | 2         | 20% (10)         | 7                  | LO # 1-3                  |
|                                            | Final Exam   | 3         | 50% (50)         | 16                 | All                       |
| Total assessment                           |              |           | 100% (100 Marks) |                    |                           |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الأسبوعي النظري |                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                            | Material Covered                                                                                                                                                                                                                                                                                                                        |
| Week 1                                                     | GRAMMAR, READING, MAIN COURSE SPEAKING, LISTENING, VOCABULARY<br>am/is/are my/your This is... Introduction dialogues, Everyday English dialogues<br>Introductions, Good morning! Practicing introduction dialogues. People meet each other and introduce someone else. How are you? What's this in English? Numbers 1-10 and plurals.   |
| Week 2                                                     | He/she/they His/her. Questions Where are they from? Two people are on holiday in New York. Students ask and answer questions about where people are from. Countries, Numbers 10-20, 11-30. A set of cities and countries: Brazil, Spain... Adjectives: awful, really good, fantastic, beautiful Nouns: centre, hospital, building, park |

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Week 3</b>  | Verb to be is recycled and extended to include negative and question forms. We're in Las Vegas! Roleplay: in a band. An interview with the band Metro 5. Jobs: a nurse, a doctor. Personal information: surname, first name, address, married ... Social expressions: I'm sorry, thanks, please...                                                                                                                                                                                              |
| <b>Week 4</b>  | Possessive adjectives. Possessive 's. Has/ have Adjective + noun Irregular Plurals Paddy McNab and his family, My best friend. The alphabet, On the phone, Saying email addresses. Who are they? Listen and identify the people. The family: mother, son. Describing a friend: very beautiful, really funny...                                                                                                                                                                                  |
| <b>Week 5</b>  | Present Simple: I/you/we/they a/an Adjective + noun Colin Brodie from Dundee. Role play: At a party. Where is Colin? Who is he with? At a party: Flavia and Terry are at a party in London. The lexical set of sports/food/drinks. Languages and nationalities.                                                                                                                                                                                                                                 |
| <b>Week 6</b>  | Present Simple: He/she Question and negatives Adverbs of frequency Prepositions of time Lois Maddox Talking about daily routines, Asking and answering questions about daily routines, Lifestyle questionnaire Listening a phone conversation between Lois and Elliot. Days of the week. The time. Words that go together: watch TV, get up early...                                                                                                                                            |
| <b>Week 7</b>  | Question words Subject Pronouns Object Pronouns Possessive Pronouns This and that A postcard from San Francisco, A holiday postcard. Describing lifestyles, preferences and places, Roleplay: conversations in town. Listening the requests with Can I.....? Adjectives: lovely, terrible, comfortable, friendly... Opposite adjectives: new/old, big/small Places: chemist, post office                                                                                                        |
| <b>Week 8</b>  | There is /are Prepositions: in, on, under, next to Vancouver-the best city in the world, What to do and where to go. Talking and asking about rooms and furniture, Giving directions. My home town, Steve talks about living in Vancouver. Rooms and furniture: living room, bedroom ... In and out of town: beach, mountain, sailing,...                                                                                                                                                       |
| <b>Week 9</b>  | Was/were born Past simple: irregular verbs It's a Jackson Pollock. Telling a story from pictures, Saying the dates in English. Magalie Dromand, Magalie dromand talks about her family. Saying years People and jobs Irregular verbs Have, do, go: have lunch, do homework, go shopping                                                                                                                                                                                                         |
| <b>Week 10</b> | Past simple: regular and irregular Questions Negatives Ago Dialogues with simple past. Did you have a good weekend? Asking about holidays, A questionnaire, My last holiday, Roleplay: asking and giving directions. Angie and Rick are at work, Jack and Millie's holiday. Weekend activities: go to the cinema, have a meal... Time expressions: on Monday, last night... Sports and leisure: tennis, skiing, windsurfing... Play or go: play tennis, go skiing... Seasons: winter, summer... |
| <b>Week 11</b> | Can / can't, Adverbs, Adjective + noun Requests and offers The Internet, what can you do on the internet? Talking about what you can do, talking about everyday problems, Five people talk about what they do on the internet. Verbs: draw, run, drive... Verb noun: Listen to the radio, chat to friends Adjective noun: fast car, busy city, dangerous sport Opposite adjectives: dangerous/ safe, old/modern, old/young.                                                                     |
| <b>Week 12</b> | I'd like, You are what you eat, Discussion-what is a good diet? Conversation with Adam, Shopping: bread, milk, fruit, Please and thank you Some /any, Like and would like People from different parts of the world describe what they eat. Roleplay: Ordering a meal. Birthday wishes, what people want on their birthday. stamps, cheese, ham... Food: cereal, salad, pasta, fish... In a restaurant: menu, starter, desert, soup, salmon                                                      |
| <b>Week 13</b> | Present continuous, Present simple and present continuous. This week is different, Colin, a millionaire, gives money to homeless teenagers What's the matter? Why don't you ....? What is Nigel wearing? Nigel is on holiday, What's the matter. Colors: blue, red, green... Clothes: jacket, trousers, shoes and socks... Opposite verbs: buy/sell, love/hate, open/close...                                                                                                                   |
| <b>Week 14</b> | Future plans, Revision: question words, tenses. Seven countries in seven days, Life's big events: three people talk about their family, education, work and ambitions. A mini                                                                                                                                                                                                                                                                                                                   |

|                |                                                                                                                                                          |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
|                | autobiography. Eddie is talking to a friend about his holiday plans, social expressions<br>Transport: travel by bus, coach, motorbike, plane... Revision |
| <b>Week 15</b> | Irregular verbs, phonetic symbols, consonants and vowels.                                                                                                |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br>المنهاج الاسبوعي للمختبر |                  |
|-------------------------------------------------------------------------|------------------|
|                                                                         | Material Covered |
| <b>Week 1</b>                                                           |                  |
| <b>Week 2</b>                                                           |                  |
| <b>Week 3</b>                                                           |                  |
| <b>Week 4</b>                                                           |                  |
| <b>Week 5</b>                                                           |                  |
| <b>Week 6</b>                                                           |                  |
| <b>Week 7</b>                                                           |                  |

| <b>Learning and Teaching Resources</b><br>مصادر التعلم والتدريس |                                                                                                                                                                                                                                                             |                           |
|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                                                 | Text                                                                                                                                                                                                                                                        | Available in the Library? |
| <b>Required Texts</b>                                           | New Headway Beginner, by lizand john soars                                                                                                                                                                                                                  | Yes                       |
| <b>Websites</b>                                                 | <a href="https://www.learnenglish.de/">https://www.learnenglish.de/</a><br><a href="https://www.englishgrammar.org/">https://www.englishgrammar.org/</a><br><a href="https://www.phrasebank.manchester.ac.uk/">https://www.phrasebank.manchester.ac.uk/</a> |                           |

| <b>GRADING SCHEME</b><br>مخطط الدرجات |                         |             |           |                                       |
|---------------------------------------|-------------------------|-------------|-----------|---------------------------------------|
| Group                                 | Grade                   | التقدير     | Marks (%) | Definition                            |
| <b>Success Group</b><br>(50 - 100)    | <b>A</b> - Excellent    | امتياز      | 90 - 100  | Outstanding Performance               |
|                                       | <b>B</b> - Very Good    | جيد جدا     | 80 - 89   | Above average with some errors        |
|                                       | <b>C</b> - Good         | جيد         | 70 - 79   | Sound work with notable errors        |
|                                       | <b>D</b> - Satisfactory | متوسط       | 60 - 69   | Fair but with major shortcomings      |
|                                       | <b>E</b> - Sufficient   | مقبول       | 50 - 59   | Work meets minimum criteria           |
| <b>Fail Group</b><br>(0 – 49)         | <b>FX</b> – Fail        | مقبول بقرار | (45-49)   | More work required but credit awarded |
|                                       | <b>F</b> – Fail         | راسب        | (0-44)    | Considerable amount of work required  |

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54). The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

**Ministry of Higher Education and Scientific Research  
University of Diyala  
College of Science  
Department of Biology**



**MODULE DESCRIPTION FORM  
FIRST CYCLE  
LEVEL TWO**

**وصف المقرر لمسار بولونيا  
المرحلة الثانية  
الدورة الاولى**

**2024/2025**

# **Semester Three**

## MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                     |                               |                                                                                                                                                                                                                                                     |
|------------------------------------|---------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                     |                               |                                                                                                                                                                                                                                                     |
| Module Title                       | <b>Entomology I</b> |                               | Module Delivery                                                                                                                                                                                                                                     |
| Module Type                        | <b>Core</b>         |                               | <input checked="" type="checkbox"/> Theory<br><input checked="" type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | <b>Bio-2311</b>     |                               |                                                                                                                                                                                                                                                     |
| ECTS Credits                       | <b>5</b>            |                               |                                                                                                                                                                                                                                                     |
| SWL (hr/sem)                       | <b>125</b>          |                               |                                                                                                                                                                                                                                                     |
| Module Level                       | 2                   | Semester of Delivery          |                                                                                                                                                                                                                                                     |
| Administering Department           | Dept. of Biology    | College                       | College of Science                                                                                                                                                                                                                                  |
| Module Leader                      | Sanaa Nagem Abed    | e-mail                        | sanaa.abed@uodiyala.edu.iq                                                                                                                                                                                                                          |
| Module Leader's Acad. Title        | Assist professor    | Module Leader's Qualification | Ph.D.                                                                                                                                                                                                                                               |
| Module Tutor                       | Sanaa Nagem Abed    | e-mail                        | sanaa.abed@uodiyala.edu.iq                                                                                                                                                                                                                          |
| Peer Reviewer Name                 |                     | e-mail                        |                                                                                                                                                                                                                                                     |
| Scientific Committee Approval Date | 01/09/2024          | Version Number                | 1.0                                                                                                                                                                                                                                                 |

| Relation with other Modules       |                 |          |   |
|-----------------------------------|-----------------|----------|---|
| العلاقة مع المواد الدراسية الأخرى |                 |          |   |
| Prerequisite module               | General Zoology | Semester | 1 |
| Co-requisites module              | Entomology II   | Semester | 4 |

| Module Aims, Learning Outcomes and Indicative Contents    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Module Objectives<br>أهداف المادة الدراسية                | 1. Introducing the basic concept of Entomology.<br>2. Exposing the importance of insects to our life and Environment.<br>3. Understanding the external morphology of a typical insect.<br>4. Understanding the internal anatomy of a representative insect.<br>5. Exposing the varied types of insect growth, development and metamorphosis                                                                                                                                                                                                                                                                                                                                                         |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. Make the students familiar with the concept Entomology and Arthropoda<br>2. Make the student able to recognize class Insecta<br>3. Identifying and Insects Integuments & Ecdysis<br>4. Recognizing insects<br>5. Recognizing insects body parts and head<br>6. Recognizing insects Thorax & appendages<br>7. Recognizing insects' Abdomen parts<br>8. Identifying and recognizing insects' digestive system parts<br>9. Identifying and recognizing insects' circulatory system parts and functions<br>10. Recognizing insects' Respiratory & circulatory systems<br>11. Recognizing insects' nervous system parts and functions<br>12. Identifying and recognizing insects' reproductive system |

|                                                   |                                                                                                              |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|                                                   | 13. Identifying and recognizing insects' growth & development<br>14. Recognizing how to control insects      |
| <b>Indicative Contents</b><br>المحتويات الإرشادية | Throughout the course examples will be provided to link the underlying concepts with insects and environment |

| <b>Learning and Teaching Strategies</b><br><b>استراتيجيات التعلم والتعليم</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                             | <ol style="list-style-type: none"> <li>1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another.</li> <li>2. Where applicable students will be assigned problems to solve and encouraged to assess one another.</li> <li>3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system.</li> <li>4. Students will also be regularly referred to relevant section of the prescribed text book.</li> <li>5. Most of the tutorial work will be done as self-study or with the assistance of a tutor.</li> <li>6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.</li> </ol> |

| <b>Student Workload (SWL)</b><br><b>الحمل الدراسي للطالب محسوب لـ 15 اسبوعا</b> |     |                                                                           |     |
|---------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|-----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل        | 79  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 5.2 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل  | 46  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6.4 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل               | 125 |                                                                           |     |

| <b>Module Evaluation</b><br><b>تقييم المادة الدراسية</b> |                        |             |                  |            |                           |
|----------------------------------------------------------|------------------------|-------------|------------------|------------|---------------------------|
|                                                          |                        | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| <b>Formative assessment</b>                              | <b>Quizzes</b>         | 2           | 10% (10)         | 5 and 10   | LO #1, #2 and #10, #11    |
|                                                          | <b>Assignments</b>     | 2           | 10% (10)         | 2 and 12   | LO #3, #4 and #6, #7      |
|                                                          | <b>Projects / Lab.</b> | 1           | 10% (10)         | Continuous | All                       |
|                                                          | <b>Report</b>          | 1           | 10% (10)         | 13         | LO #5, #8 and #10         |
| <b>Summative assessment</b>                              | <b>Midterm</b>         | 2hr         | 10% (10)         | 7          | LO #1 - #7                |
|                                                          | <b>Final Exam</b>      | 3hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>                                  |                        |             | 100% (100 Marks) |            |                           |

| <b>Delivery Plan (Weekly Syllabus)</b><br><b>المنهاج الاسبوعي النظري</b> |                                                                             |
|--------------------------------------------------------------------------|-----------------------------------------------------------------------------|
|                                                                          | <b>Material Covered</b>                                                     |
| <b>Week 1</b>                                                            | Introduction to Entomology, Arthropoda general Characteristic of Arthropoda |
| <b>Week 2</b>                                                            | Class Insecta and its characteristics, the importance of Insects            |
| <b>Week 3</b>                                                            | Insects Integuments & Ecdysis                                               |
| <b>Week 4</b>                                                            | Insect body parts: Head & appendages                                        |
| <b>Week 5</b>                                                            | Insect body parts: Thorax & appendages                                      |
| <b>Week 6</b>                                                            | Insect body parts: Abdomen & appendages                                     |
| <b>Week 7</b>                                                            | Mid-term Exam                                                               |
| <b>Week 8</b>                                                            | Insects Internal Anatomy: Digestive system                                  |
| <b>Week 9</b>                                                            | Circulatory system                                                          |
| <b>Week 10</b>                                                           | Respiratory system                                                          |
| <b>Week 11</b>                                                           | Nervous system                                                              |
| <b>Week 12</b>                                                           | Reproductive system                                                         |
| <b>Week 13</b>                                                           | Insects' growth and development (Metamorphosis)                             |
| <b>Week 14</b>                                                           | Insects control                                                             |
| <b>Week 15</b>                                                           | Preparatory week before the final Exam                                      |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                                                                    |
|--------------------------------------------------------------------------------|--------------------------------------------------------------------|
|                                                                                | <b>Material Covered</b>                                            |
| <b>Week 1</b>                                                                  | Lab 1: Collecting and preserving Insects                           |
| <b>Week 2</b>                                                                  | Lab 2: Killing and preserving methods                              |
| <b>Week 3</b>                                                                  | Lab 3: Insects head parts and orientations                         |
| <b>Week 4</b>                                                                  | Lab 4: Antennae parts and modifications                            |
| <b>Week 5</b>                                                                  | Lab 5: Insects mouth parts                                         |
| <b>Week 6</b>                                                                  | Lab 6: Modification of insects mouth parts                         |
| <b>Week 7</b>                                                                  | Lab 7: Mid-term Exam                                               |
| <b>Week 8</b>                                                                  | Lab 8: Insects thorax                                              |
| <b>Week 9</b>                                                                  | Lab 9: Insects legs and their modification                         |
| <b>Week 10</b>                                                                 | Lab 10: Insects wings and their modification                       |
| <b>Week 11</b>                                                                 | Lab 11: Insects Anatomy (Periplant amiricana)                      |
| <b>Week 12</b>                                                                 | Lab 12: Digestive system of Periplant (amiricana)                  |
| <b>Week 13</b>                                                                 | Lab 13: Circulatory and Respiratory systems of Periplant amiricana |
| <b>Week 14</b>                                                                 | Lab 14: Nervous system of Periplant amiricana                      |
| <b>Week 15</b>                                                                 | Lab 15: Reproductive systems of Periplant amiricana                |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                           |
|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                                          | Text                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Available in the Library? |
| <b>Required Texts</b>                                    | Dyer, L. A. (2023). Essential Entomology.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Yes                       |
| <b>Recommended Texts</b>                                 | Gullan, P.J & Cranston, P.S. (2010). The Insects, An outline of Entomology. 4th Ed. Wiley Blackwell<br>Goddard, J. (2022). Public health entomology. CRC Press.                                                                                                                                                                                                                                                                                                                                                     | Yes                       |
| <b>Websites</b>                                          | <a href="https://profiles.uonbi.ac.ke/foyeike/files/practical_training_manual_for_entomology.pdf">https://profiles.uonbi.ac.ke/foyeike/files/practical_training_manual_for_entomology.pdf</a><br><a href="https://shodhganga.inflibnet.ac.in/bitstream/10603/163876/9/09_chapter%206.pdf">https://shodhganga.inflibnet.ac.in/bitstream/10603/163876/9/09_chapter%206.pdf</a><br><a href="http://www.cassavabiz.org/production/proddocs/INSE-SCR.PDF">http://www.cassavabiz.org/production/proddocs/INSE-SCR.PDF</a> |                           |

| Grading Scheme<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                       |                  |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير             | Marks %  | Definition                            |
| <b>Success Group (50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                      | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group (0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                           | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |                     |          |                                       |

## MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| Module Information                 |                      |                               |                                                                                                                                                                                                                                                     |
|------------------------------------|----------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                      |                               |                                                                                                                                                                                                                                                     |
| Module Title                       | <b>Plant Anatomy</b> |                               | Module Delivery                                                                                                                                                                                                                                     |
| Module Type                        | <b>Core</b>          |                               | <input checked="" type="checkbox"/> Theory<br><input checked="" type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | <b>Bio-2312</b>      |                               |                                                                                                                                                                                                                                                     |
| ECTS Credits                       | <b>5</b>             |                               |                                                                                                                                                                                                                                                     |
| SWL (hr/sem)                       | <b>125</b>           |                               |                                                                                                                                                                                                                                                     |
| Module Level                       | 2                    | Semester of Delivery          | 3                                                                                                                                                                                                                                                   |
| Administering Department           | Dept. of Biology     | College                       | College of Science                                                                                                                                                                                                                                  |
| Module Leader                      | Khazal Dh. Wadi      | e-mail                        | dr.khazal@uodiyala.edu.iq                                                                                                                                                                                                                           |
| Module Leader's Acad. Title        | Professor            | Module Leader's Qualification | PhD                                                                                                                                                                                                                                                 |
| Module Tutor                       | Khazal Dh. Wadi      | e-mail                        | dr.khazal@uodiyala.edu.iq                                                                                                                                                                                                                           |
| Peer Reviewer Name                 |                      | e-mail                        |                                                                                                                                                                                                                                                     |
| Scientific Committee Approval Date | 01/09/2024           | Version Number                | 1.0                                                                                                                                                                                                                                                 |

| Relation with other Modules       |                |          |   |
|-----------------------------------|----------------|----------|---|
| العلاقة مع المواد الدراسية الأخرى |                |          |   |
| Prerequisite module               | General Botany | Semester | 2 |
| Co-requisites module              | Plant Taxonomy | Semester | 4 |

| Module Aims, Learning Outcomes and Indicative Contents    |                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية  |                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Module Objectives<br>أهداف المادة الدراسية                | 1. The study of plant anatomy seeks to clarify the differences in the composition of plant tissues that occur as a result of the different plant environment<br>2. This course deals with all types of plant tissues in each part of the plant.<br>3. Students learned to prepare anatomical sections from plant parts.<br>4. Developing skills in distinguishing between plant tissues through the use of a microscope. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | <b>At the end of this module students should be able to:</b><br>1. Recognize the plant anatomy and plant body.<br>2. Recognition the plant cell.<br>3. Recognition the meristematic tissues and permanent tissues.<br>4. Recognition secretory cell & tissues.<br>5. Recognition the internal structure of plant body.<br>6. Recognition secondary growth.<br>7. Recognition the Complex stomata and Trichomes           |
| Indicative Contents<br>المحتويات الإرشادية                | <b>Indicative content includes the following:</b><br>▪ Plant anatomy is one of the sciences specialized in studying plant tissues and determining the differences in the nature of the tissue depending on the                                                                                                                                                                                                           |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>nature of the environmental conditions in which the plant lives. It also studies its relationship to other sciences, such as ecology, cellular science, plant taxonomy, and others.</p> <ul style="list-style-type: none"> <li>▪ In plant anatomy, scientists classify tissues into two main divisions: meristematic tissues and permanent tissues. The classification was based on the basis of origin, location within the plant, and physiological function.</li> <li>▪ Explains the basic theories that show the origin of the developing meristematic peaks The indicative content of plant anatomy includes the study of the types of tissues, their function, and their location in the plant, as well as the study of the differences between the tissues of plant parts such as the root, stem, leaf, flower, seed, and fruit. And study the effects of the environment on the tissues</li> </ul> |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

|                   |                                                                                                                                                                                                                                                                                                                                                          |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b> | Introducing the student to the internal structure of the plant body by dissecting its various organs, studying their sites, constituent tissues, adapting them to carry out their various functions, studying the types of cells that make them up and the function of each type. This science is in fact the study of the internal morphology of plant. |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Student Workload (SWL)

#### الحمل الدراسي للطالب محسوب لـ 15 اسبوعا

|                                                                                |     |                                                                           |   |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|---|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 4 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 61  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 125 |                                                                           |   |

### Module Evaluation

#### تقييم المادة الدراسية

|                             |                        | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
|-----------------------------|------------------------|-------------|------------------|------------|---------------------------|
| <b>Formative assessment</b> | <b>Quizzes</b>         | 2           | 10% (10)         | 5 and 10   | LO #1, #2 and #10, #11    |
|                             | <b>Assignments</b>     | 2           | 10% (10)         | 2 and 12   | LO #3, #4 and #6, #7      |
|                             | <b>Projects / Lab.</b> | 1           | 10% (10)         | Continuous | All                       |
|                             | <b>Report</b>          | 1           | 10% (10)         | 13         | LO #5, #8 and #10         |
| <b>Summative assessment</b> | <b>Midterm</b>         | 2hr         | 10% (10)         | 7          | LO #1 - #7                |
|                             | <b>Final Exam</b>      | 3hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>     |                        |             | 100% (100 Marks) |            |                           |

| <b>Delivery Plan (Weekly Syllabus)</b><br><b>المنهاج الاسبوعي النظري</b> |                                                                                                                                     |
|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
|                                                                          | <b>Material Covered</b>                                                                                                             |
| <b>Week 1</b>                                                            | Plant anatomy, importance and objectives, identification of the primary plant body and its growth and secondary body and its growth |
| <b>Week 2</b>                                                            | Plant cell: its living and non-living components                                                                                    |
| <b>Week 3</b>                                                            | Cell wall, Pits and its types                                                                                                       |
| <b>Week 4</b>                                                            | Meristematic tissues, theories of shoot & root apex                                                                                 |
| <b>Week 5</b>                                                            | Permanent tissue - Dermal tissue                                                                                                    |
| <b>Week 6</b>                                                            | Parenchyma, collenchyma and sclerenchyma                                                                                            |
| <b>Week 7</b>                                                            | Exam 1                                                                                                                              |
| <b>Week 8</b>                                                            | Xylem & Phloem                                                                                                                      |
| <b>Week 9</b>                                                            | Secretory cells and tissues                                                                                                         |
| <b>Week 10</b>                                                           | Complex stomata and Trichomes                                                                                                       |
| <b>Week 11</b>                                                           | The internal structure of plant body                                                                                                |
| <b>Week 12</b>                                                           | Secondary growth in plant body                                                                                                      |
| <b>Week 13</b>                                                           | Vascular cambium                                                                                                                    |
| <b>Week 14</b>                                                           | Periderm, cork cambium and bark.                                                                                                    |
| <b>Week 15</b>                                                           | Exam 2                                                                                                                              |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                                             |
|--------------------------------------------------------------------------------|---------------------------------------------|
|                                                                                | <b>Material Covered</b>                     |
| <b>Week 1</b>                                                                  | Lab 1: Introduction to plant body.          |
| <b>Week 2</b>                                                                  | Lab 2: Plant cell                           |
| <b>Week 3</b>                                                                  | Lab 3: Plant cell                           |
| <b>Week 4</b>                                                                  | Lab 4: Types of pith, Stomata and Trichomes |
| <b>Week 5</b>                                                                  | Lab 5: Meristematic tissues                 |
| <b>Week 6</b>                                                                  | Lab 6: Permanent tissues                    |
| <b>Week 7</b>                                                                  | Lab 7: Dermal tissues                       |
| <b>Week 8</b>                                                                  | Lab 8: Vascular tissues                     |
| <b>Week 9</b>                                                                  | Lab 9 : Secretory tissues                   |
| <b>Week 10</b>                                                                 | Lab 10: Internal Structure of root          |
| <b>Week 11</b>                                                                 | Lab 11: Internal Structure of stem          |
| <b>Week 12</b>                                                                 | Lab 12: Internal Structure of leaf          |
| <b>Week 13</b>                                                                 | Lab 13: Secondary growth                    |
| <b>Week 14</b>                                                                 | Lab 14: Exam                                |
| <b>Week 15</b>                                                                 | Lab 15: Review of previous laboratories     |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس |                                                                                                                                                                                                                                                                                                                                                                                        |                           |
|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                                          | Text                                                                                                                                                                                                                                                                                                                                                                                   | Available in the Library? |
| <b>Required Texts</b>                                    | Rudall, P. J. (2020). Anatomy of flowering plants: An introduction to plant structure and development. Cambridge university press.                                                                                                                                                                                                                                                     | Yes                       |
| <b>Recommended Texts</b>                                 | De Craene, L. P. R. (2022). Floral diagrams: an aid to understanding flower morphology and evolution. Cambridge University Press.                                                                                                                                                                                                                                                      | Yes                       |
| <b>Websites</b>                                          | <a href="https://www.botanicalartandartists.com/plant-forms-and-anatomy.html">https://www.botanicalartandartists.com/plant-forms-and-anatomy.html</a><br><a href="https://www.khanacademy.org/science/up-class-11th-biology/x6cdb38ba1d131d88:anatomy-of-flowering-plants">https://www.khanacademy.org/science/up-class-11th-biology/x6cdb38ba1d131d88:anatomy-of-flowering-plants</a> |                           |

| Grading Scheme<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                       |                  |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير             | Marks %  | Definition                            |
| <b>Success Group (50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                      | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group (0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                           | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |                     |          |                                       |

## MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| Module Information                 |                     |                               |                                                                                                                                                                                                                                                     |
|------------------------------------|---------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                     |                               |                                                                                                                                                                                                                                                     |
| Module Title                       | <b>Invertebrate</b> |                               | Module Delivery                                                                                                                                                                                                                                     |
| Module Type                        | <b>Core</b>         |                               | <input checked="" type="checkbox"/> Theory<br><input checked="" type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | <b>Bio-2313</b>     |                               |                                                                                                                                                                                                                                                     |
| ECTS Credits                       | <b>5</b>            |                               |                                                                                                                                                                                                                                                     |
| SWL (hr/sem)                       | <b>125</b>          |                               |                                                                                                                                                                                                                                                     |
| Module Level                       | <b>2</b>            | Semester of Delivery          |                                                                                                                                                                                                                                                     |
| Administering Department           | Dept. of Biology    | College                       | College of Science                                                                                                                                                                                                                                  |
| Module Leader                      | Asraa Dawod Farhan  | e-mail                        | asraa@uodiyala.edu.iq                                                                                                                                                                                                                               |
| Module Leader's Acad. Title        | Lecturer            | Module Leader's Qualification | Ph.D.                                                                                                                                                                                                                                               |
| Module Tutor                       | Asraa Dawod Farhan  | e-mail                        | asraa@uodiyala.edu.iq                                                                                                                                                                                                                               |
| Peer Reviewer Name                 |                     | e-mail                        |                                                                                                                                                                                                                                                     |
| Scientific Committee Approval Date | 01/09/2024          | Version Number                | 1.0                                                                                                                                                                                                                                                 |

| Relation with other Modules       |                 |          |   |
|-----------------------------------|-----------------|----------|---|
| العلاقة مع المواد الدراسية الأخرى |                 |          |   |
| Prerequisite module               | General Zoology | Semester | 1 |
| Co-requisites module              | Parasitology    | Semester | 4 |

| Module Aims, Learning Outcomes and Indicative Contents    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Module Objectives<br>أهداف المادة الدراسية                | 1- To understand the basic principles of Invertebrate.<br>2. Identifying and studying Invertebrate that infect humans and animals in detail<br>3. Studying Classification of each Invertebrate in terms of external appearance, life cycle, pathological and epidemiological causes, and methods of diagnosis and prevention.                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | At the end of this module students should be able to: <ul style="list-style-type: none"> <li>• Student Learning Outcome.</li> <li>• By the end of the course, the students are being able to.</li> <li>• Develop advanced academic knowledge about the concepts and principles of Invertebrate.</li> <li>• List the different terms associated with Invertebrate.</li> <li>• Detail knowledge about the Invertebrate and its applications.</li> <li>• Conducting discussions that enable the student to link causes with natural causes.</li> <li>• Having knowledge about the up-to-date advancing and development in this field of subject</li> <li>• In addition to learning practically the technique of examining, using, how to</li> </ul> |

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                   | collect the different type of specimens and how to prepare it for examinations and be familiar with the results and writing reports.<br>• Define the relationships between<br>• Identify the most important phyla and species that infect humans and animals.<br>• Discuss the different characteristics of Invertebrata.                                                                                                                                |
| <b>Indicative Contents</b><br>المحتويات الإرشادية | Emotional and value goals<br>1. Enable students to cooperate with each other in solving practical assignments.<br>2. Enabling students to focus on the topic of the lesson and harmony and interaction with it.<br>3. Enabling students to organize the information and data they receive during the lesson.<br>4. Enabling the students to recreate their way of thinking towards living beings and appreciating the greatness of the Almighty Creator. |

| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                  |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                      | Evaluation modalities:<br>1- Practical tests<br>2- Theoretical tests<br>3- Reports and studies<br>4- Daily exams with self-solving questions<br>5- Grades determined by homework |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا       |     |                                                                           |   |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|---|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 4 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 61  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 4 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل              | 125 |                                                                           |   |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |                        |             |                  |            |                           |
|---------------------------------------------------|------------------------|-------------|------------------|------------|---------------------------|
|                                                   |                        | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| <b>Formative assessment</b>                       | <b>Quizzes</b>         | 2           | 10% (10)         | 5 and 10   | LO #1, #2 and #10, #11    |
|                                                   | <b>Assignments</b>     | 2           | 10% (10)         | 2 and 12   | LO #3, #4 and #6, #7      |
|                                                   | <b>Projects / Lab.</b> | 1           | 10% (10)         | Continuous | All                       |
|                                                   | <b>Report</b>          | 1           | 10% (10)         | 13         | LO #5, #8 and #10         |
| <b>Summative assessment</b>                       | <b>Midterm</b>         | 2hr         | 10% (10)         | 7          | LO #1 - #7                |
|                                                   | <b>Final Exam</b>      | 3hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>                           |                        |             | 100% (100 Marks) |            |                           |

| <b>Delivery Plan (Weekly Syllabus)</b><br><b>المنهاج الاسبوعي النظري</b> |                                                                      |
|--------------------------------------------------------------------------|----------------------------------------------------------------------|
|                                                                          | <b>Material Covered</b>                                              |
| <b>Week 1</b>                                                            | General introduction, history of science Invertebrate and importance |
| <b>Week 2</b>                                                            | Classification of Invertebrate                                       |
| <b>Week 3</b>                                                            | Kingdom: Protista                                                    |
| <b>Week 4</b>                                                            | Class: Ciliophora                                                    |
| <b>Week 5</b>                                                            | Class: Sporozoa                                                      |
| <b>Week 6</b>                                                            | Phylum: Porifera                                                     |
| <b>Week 7</b>                                                            | Radiata: The Phylum Cnidaria (Pron: Nee- daria).                     |
| <b>Week 8</b>                                                            | Mid Exam                                                             |
| <b>Week 9</b>                                                            | Platyhelminthes (Flatworm)( Acoelomates)                             |
| <b>Week 10</b>                                                           | Round worms (Nematodes)                                              |
| <b>Week 11</b>                                                           | Enterobius vermicularis (Pinworm)                                    |
| <b>Week 12</b>                                                           | Phylum Mollusca                                                      |
| <b>Week 13</b>                                                           | Phylum: Aschelminthes                                                |
| <b>Week 14</b>                                                           | Phylum: Annelida                                                     |
| <b>Week 15</b>                                                           | Final Exam                                                           |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                                                              |
|--------------------------------------------------------------------------------|--------------------------------------------------------------|
|                                                                                | <b>Material Covered</b>                                      |
| <b>Week 1</b>                                                                  | Introduction and importance of Invertebrates and             |
| <b>Week 2</b>                                                                  | Classification Protozoa                                      |
| <b>Week 3</b>                                                                  | Introduction of Kingdom Protista and Classification Protozoa |
| <b>Week 4</b>                                                                  | Class: flagellates (Euglena)                                 |
| <b>Week 5</b>                                                                  | Class: Sporozoa (malaria)                                    |
| <b>Week 6</b>                                                                  | Class: Ciliata (paramecium)                                  |
| <b>Week 7</b>                                                                  | Class: Sarcodina ( amoeba)                                   |
| <b>Week 8</b>                                                                  | Phylum: Porifera and Classification                          |
| <b>Week 9</b>                                                                  | Mid exam                                                     |
| <b>Week 10</b>                                                                 | The Phylum Cnidaria characteristic and Classification        |
| <b>Week 11</b>                                                                 | Class: Hydrpzoa                                              |
| <b>Week 12</b>                                                                 | Phylum Platyhelminthes                                       |
| <b>Week 13</b>                                                                 | Class: Trematoda                                             |
| <b>Week 14</b>                                                                 | Phylum: Annelida                                             |
| <b>Week 15</b>                                                                 | Final exam                                                   |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس |                                                                                                                                                                                                                                                                                    |                           |
|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                                          | Text                                                                                                                                                                                                                                                                               | Available in the Library? |
| <b>Required Texts</b>                                    | Arumugan, N., & Murugan, T. (2019). A textbook of invertebrates. Saras Publication.                                                                                                                                                                                                | Yes                       |
| <b>Recommended Texts</b>                                 | Lewbart, G. A. (Ed.). (2011). Invertebrate medicine. John Wiley & Sons.                                                                                                                                                                                                            | YES                       |
| <b>Websites</b>                                          | <a href="https://www.nwf.org/Educational-Resources/Wildlife-Guide/Invertebrates">https://www.nwf.org/Educational-Resources/Wildlife-Guide/Invertebrates</a><br><a href="https://www.amnh.org/research/invertebrate-zoology">https://www.amnh.org/research/invertebrate-zoology</a> |                           |

| Grading Scheme<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                              |                  |                     |          |                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                       | Grade            | التقدير             | Marks %  | Definition                            |
| <b>Success Group (50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                             | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                             | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                             | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                             | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                             | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group (0 - 49)</b>                                                                                                                                                                                                                                                                                                                                                                  | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                             | F – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
| <p><b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.</p> |                  |                     |          |                                       |

## MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| Module Information                 |                          |                               |                                                                                                                                                                                                                                                     |
|------------------------------------|--------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                          |                               |                                                                                                                                                                                                                                                     |
| Module Title                       | <b>Plant Groups</b>      |                               | Module Delivery                                                                                                                                                                                                                                     |
| Module Type                        | <b>Core</b>              |                               | <input checked="" type="checkbox"/> Theory<br><input checked="" type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | <b>Bio-2314</b>          |                               |                                                                                                                                                                                                                                                     |
| ECTS Credits                       | <b>5</b>                 |                               |                                                                                                                                                                                                                                                     |
| SWL (hr/sem)                       | <b>125</b>               |                               |                                                                                                                                                                                                                                                     |
| Module Level                       | 2                        | Semester of Delivery          |                                                                                                                                                                                                                                                     |
| Administering Department           | Dept. of Biology         | College                       | College of Science                                                                                                                                                                                                                                  |
| Module Leader                      | Khalid Dheyaa Abdulwahid | e-mail                        | chechanikd75@uodiyala.edu.iq                                                                                                                                                                                                                        |
| Module Leader's Acad. Title        | Assistant Professor      | Module Leader's Qualification | Ph.D.                                                                                                                                                                                                                                               |
| Module Tutor                       | Khalid Dheyaa Abdulwahid | e-mail                        | chechanikd75@uodiyala.edu.iq                                                                                                                                                                                                                        |
| Peer Reviewer Name                 |                          | e-mail                        |                                                                                                                                                                                                                                                     |
| Scientific Committee Approval Date | 01/09/2024               | Version Number                | 1.0                                                                                                                                                                                                                                                 |

| Relation with other Modules       |                |          |   |
|-----------------------------------|----------------|----------|---|
| العلاقة مع المواد الدراسية الأخرى |                |          |   |
| Prerequisite module               | General Botany | Semester | 2 |
| Co-requisites module              |                | Semester |   |

| Module Aims, Learning Outcomes and Indicative Contents    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Module Objectives<br>أهداف المادة الدراسية                | 1. Learn about the basics and systems of plant classification.<br>2. Identify the ecosystems and taxa of algae and classify them.<br>3. Identifying and classifying the ecosystems and taxa of archegoniate.<br>4. Identifying and classifying the ecosystems and taxa of gymnosperm.<br>5. Identifying and classifying the ecosystems and taxa of angiosperm.<br>6. Granting the student a bachelor's degree in the theoretical and practical aspects.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks.<br>1. Identify the science of Introduction to plant groups and know the basis of their classification. And take an evolutionary view at plant groups.<br>2. Learn about the general outline of plant kingdom.<br>3. Definition of algae and the science of Algology. And its discipline deals with the morphology, taxonomy, phylogeny, biology, and ecology of algae.<br>4. Clarification of plant groups belonging cryptogams in terms of habitat, classification, vegetative and reproductive forms, and life cycles.<br>5. A detailed explanation of the types of algae, their classification, environment, methods of reproduction, environmental importance, as well as the risks posed by some types of algae.<br>6. A detailed explanation about archegonia - Bryophyta - Pteridophyta , , their classification, Habitat, methods of reproduction.<br>7. Clarification of plant groups belonging phanerogams in terms of habitat, |

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                   | classification, and life cycles.<br>8. A detailed explanation about flowering plants- Gymnosperms and Angiosperms, their classification and Habitat.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Indicative Contents</b><br>المحتويات الإرشادية | <p>Indicative content includes the following.</p> <p><b>A. Cognitive goals</b></p> <p><b>A1-The first level</b> // Knowledge development // Develop the student's ability to recall what he learned about scientific facts related to algae, <b>Archegoniate</b>, and gymnosperms, angiosperms and enable students to obtain knowledge and understanding of the intellectual and applied framework in the science of botanical groups.</p> <p><b>A2-The second level</b> // Improving comprehension level // Developing the ability to interpret, predict and deduce and enable students to obtain knowledge and understanding of the requirements in plant groups according to scientific standards.</p> <p><b>A3-The third level</b> // Developing applied abilities (Application) // Informing students of modern techniques in algae and archegoniate through showing films and scientific research.</p> <p><b>A4-The fourth level</b> // provide the student with the ability to analyze (analysis) // enable students to gain knowledge in algae and archegoniate.</p> <p><b>A5-The fifth level</b> // Enabling students to gain knowledge about the role of algae and archegonia in the ecosystem and their importance in the periodic monitoring of the causes of pollution in the aquatic ecosystems.</p> <p><b>B. objectives and skills</b></p> <p>B1- Providing students with the additional basics related to the outputs of thinking and analysis.</p> <p>B2- Learn experimentation.</p> <p>B3- Improving the student's ability in observation.</p> <p>B4- Learn how to imitate and simulate.</p> <p><b>C. Emotional and value goals</b></p> <p>C1- Asking general questions during laboratory and theoretical lessons.</p> <p>C2- Assign students to report on various topics of algae, archegonia , gymnosperms, and angiosperms.</p> <p>C3- Enable students to conduct all experiments related to isolating, diagnosing and classifying algae and archegonia.</p> <p>C4- Discussing and directing graduation research for fourth-year students.</p> |

| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                      | Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students. |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطالب محسوب لـ 15 اسبوعا       |     |                                                                           |   |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|---|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 4 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 61  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 125 |                                                                           |   |

| Module Evaluation<br>تقييم المادة الدراسية |                        |             |                  |            |                           |
|--------------------------------------------|------------------------|-------------|------------------|------------|---------------------------|
|                                            |                        | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| Formative assessment                       | Quizzes                | 2           | 10% (10)         | 5 and 10   | LO #1, #2 and #10, #11    |
|                                            | Assignments            | 2           | 10% (10)         | 2 and 12   | LO #3, #4 and #6, #7      |
|                                            | Projects / Lab. Report | 1           | 10% (10)         | Continuous | All                       |
|                                            |                        | 1           | 10% (10)         | 13         | LO #5, #8 and #10         |
| Summative assessment                       | Midterm Exam           | 2hr         | 10% (10)         | 7          | LO #1 - #7                |
|                                            | Final Exam             | 3hr         | 50% (50)         | 16         | All                       |
| Total assessment                           |                        |             | 100% (100 Marks) |            |                           |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري |                                                                                                                       |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
|                                                            | Material Covered                                                                                                      |
| Week 1                                                     | Introduction to plant groups: Basis of classification-Five Kingdom System-Kingdom Plantae                             |
| Week 2                                                     | Algology (Phycology): Introduction to Phycology (definition and characteristics of algae)                             |
| Week 3                                                     | Division: Cyanophyta -Habitat and general characteristics- Classification of blue green algae                         |
| Week 4                                                     | Division: Chlorophyta-Habitat and general characteristics- Classification of green algae.                             |
| Week 5                                                     | Division: Chlorophyta- Growth, reproduction and life cycles in Chlorophyta.                                           |
| Week 6                                                     | Division: Euglenophyta -Habitat and general characteristics- Classification of Euglenophyta.                          |
| Week 7                                                     | Division: Chrysophyta- Habitat and general characteristics- Classification of Chrysophyta.                            |
| Week 8                                                     | Division: Phaeophyta- Habitat and general characteristics- Classification of Phaeophyta.                              |
| Week 9                                                     | Division: Phaeophyta-Characteristics and life cycle of <i>Ectocarpus</i> sp., <i>Laminaria</i> sp. & <i>Fucus</i> sp. |
| Week 10                                                    | Division: Rhodophyta - Habitat and general characteristics- Classification of Rhodophyta.                             |
| Week 11                                                    | Division : Rhodophyta - Characteristics and life cycle of <i>Bangia</i> sp. and <i>Nemalion</i> sp.                   |
| Week 12                                                    | Archegoniate: Division: Bryophyta-Habitat and general characteristics-Classification of mosses.                       |
| Week 13                                                    | Archegoniate: Bryophyta- Characteristics and life cycle of <i>Anthoceros</i> sp. and <i>Sphagnum</i> sp.              |
| Week 14                                                    | Archegoniate: Division: Pteridophyta - Habitat and general characteristics- Classification of ferns.                  |
| Week 15                                                    | Phanerogams: Habitat and general characteristics of Gymnosperm and Angiosperm.                                        |
| Week 16                                                    | Preparatory week before the final Exam                                                                                |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر |                                                                                                  |
|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
|                                                                  | Material Covered                                                                                 |
| Week 1                                                           | Lab 1: General Student Lab Guidelines                                                            |
| Week 2                                                           | Lab 2: Introduction to plant groups-The basis of their classification, an evolutionary view.     |
| Week 3                                                           | Lab 3: Cyanophyta (Blue-green algae)- General characteristics, Diversity of vegetative forms.    |
| Week 4                                                           | Lab 4: Chlorophyta (Green algae)- Unicellular and colonial forms-General characteristics.        |
| Week 5                                                           | Lab 5: Chlorophyta- Filamentous forms- General characteristics- classification and reproduction. |
| Week 6                                                           | Lab 6: Charophyta - General characteristics, Principles of classification.                       |
| Week 7                                                           | Lab 7: Euglenophyta - General characteristics, Principles of classification.                     |

## Semester Three

|                |                                                                                                  |
|----------------|--------------------------------------------------------------------------------------------------|
| <b>Week 8</b>  | Lab 8: Chrysophyta, Diatoms - General characteristics, Principles of classification.             |
| <b>Week 9</b>  | Lab 9: Phaeophyta and Giant brown algae- General characteristics, Principles of classification.  |
| <b>Week 10</b> | Lab 10: Rhodophyta (red algae) - General characteristics, Principles of classification.          |
| <b>Week 11</b> | Lab 11: Bryophyta (Mosses)- Hepaticae -Characteristics and development.                          |
| <b>Week 12</b> | Lab 12: Anthocerotophyta -Sphenopsida- General characteristics, Principles of classification.    |
| <b>Week 13</b> | Lab 13: Low vascular plants -Psilophyta - General characteristics, Principles of classification. |
| <b>Week 14</b> | Lab 14: Arthropophyta - Equisetum - General characteristics, Principles of classification.       |
| <b>Week 15</b> | Lab 15: Pteridophyta -Ferns - General characteristics, Principles of classification.             |

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

|                          | Text                                                                                                                                            | Available in the Library? |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Required Texts</b>    | Kushwaha, A. K., & Shukla, M. K. (2020). Algae: A textbook of botany.                                                                           | Yes                       |
| <b>Recommended Texts</b> | Bellinger, E. G., & Sige, D. C. (2010). Freshwater Algae: Identification and Use as Bioindicators John Wiley & Sons. Ltd. 1th edition. pp, 284. | Yes                       |
| <b>Websites</b>          | <a href="https://www.britannica.com/science/algae/Classification-of-algae">https://www.britannica.com/science/algae/Classification-of-algae</a> |                           |

### Grading Scheme

#### مخطط الدرجات

| Group                               | Grade            | التقدير             | Marks %  | Definition                            |
|-------------------------------------|------------------|---------------------|----------|---------------------------------------|
| <b>Success Group<br/>(50 - 100)</b> | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                     | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                     | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                     | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                     | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 - 49)</b>      | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                     | F – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
|                                     |                  |                     |          |                                       |

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

## MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| Module Information                 |                        |                  |                               |                                                                                                                                                                                                                                                                                                        |       |
|------------------------------------|------------------------|------------------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| معلومات المادة الدراسية            |                        |                  |                               |                                                                                                                                                                                                                                                                                                        |       |
| Module Title                       | Biochemistry I         |                  |                               | Module Delivery                                                                                                                                                                                                                                                                                        |       |
| Module Type                        | Core                   |                  |                               | <div><input checked="" type="checkbox"/> Theory</div> <div><input checked="" type="checkbox"/> Lecture</div> <div><input checked="" type="checkbox"/> Lab</div> <div><input type="checkbox"/> Tutorial</div> <div><input type="checkbox"/> Practical</div> <div><input type="checkbox"/> Seminar</div> |       |
| Module Code                        | Bio-2315               |                  |                               |                                                                                                                                                                                                                                                                                                        |       |
| ECTS Credits                       | 5                      |                  |                               |                                                                                                                                                                                                                                                                                                        |       |
| SWL (hr/sem)                       | 125                    |                  |                               |                                                                                                                                                                                                                                                                                                        |       |
| Module Level                       |                        | 2                | Semester of Delivery          |                                                                                                                                                                                                                                                                                                        | 3     |
| Administering Department           |                        | Dept. of Biology | College                       | College of Science                                                                                                                                                                                                                                                                                     |       |
| Module Leader                      | Waseem Yousif Mohammed |                  | e-mail                        | waseemyousif@uodiyala.edu.iq                                                                                                                                                                                                                                                                           |       |
| Module Leader’s Acad. Title        |                        | Assist. Prof.    | Module Leader’s Qualification |                                                                                                                                                                                                                                                                                                        | Ph.D. |
| Module Tutor                       | Waseem Yousif Mohammed |                  | e-mail                        | waseemyousif@uodiyala.edu.iq                                                                                                                                                                                                                                                                           |       |
| Peer Reviewer Name                 |                        |                  | e-mail                        |                                                                                                                                                                                                                                                                                                        |       |
| Scientific Committee Approval Date |                        | 01/09/2024       | Version Number                |                                                                                                                                                                                                                                                                                                        | 1.0   |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى |                   |          |   |
|------------------------------------------------------------------|-------------------|----------|---|
| Prerequisite module                                              | Organic Chemistry | Semester | 2 |
| Co-requisites module                                             | Biochemistry II   | Semester | 4 |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Module Objectives<br>أهداف المادة الدراسية                                                                         | This module aims to teach you core biochemistry concepts including the structure of Carbohydrates, Lipids, Amino acids, proteins, and nucleic acids. The module will also provide a background to fundamental aspects of chemistry. This module provides you with the core knowledge and skills to enhance your performance in biological chemistry. It is a pre-requisite for second-year modules in Biochemistry II related to metabolism.                                                                                                                                                                                                                        |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية                                                          | On completing the module, you will be able to...<br>1. Explain the basic concepts of biochemistry<br>2. Recall the range and structures of biological molecules<br>3. Summarise the relationship between chemical structure and biological function<br>4. Communicate key practical skills relating specifically to biochemistry<br>5. Illustrate essential elementary chemistry or structural organic chemistry<br>6. Describe the basic principles of biochemistry/chemical biology<br>7. Evaluate essential key facts and theory in a subdiscipline of the biosciences<br>8. Describe and begin to evaluate aspects of biochemistry concerning textbook material |
| Indicative Contents<br>المحتويات الإرشادية                                                                         | As part of this module, you will undertake Not less than thirteen laboratory sessions in the teaching laboratory (of up to 30 students) that are of 2 hrs in duration. These sessions will be undertaken in groups, and some sessions involve fine laboratory work.                                                                                                                                                                                                                                                                                                                                                                                                 |

Breaks are possible and students can leave the laboratory for short periods.

### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b> | Lessons of all units will be offered in an interactive lecture where student participation is mandatory either by forming small group discussions in class, exchanging ideas, and questioning another. Where applicable students will be assigned problems to solve and encouraged to assess one another. Learning material will be supplied to students in class or uploaded on the Blackboard learning management system. Students will also be regularly referred to relevant sections of the prescribed textbook. Most of the tutorial work will be done as self-study or with the assistance of a tutor. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to an assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessments given to students for grading such as theory tests, practical tests, and examinations. |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Student Workload (SWL)

#### الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا

|                                                                                |     |                                                                           |   |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|---|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 4 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 61  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 4 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل              | 125 |                                                                           |   |

### Module Evaluation

#### تقييم المادة الدراسية

|                             |                        | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
|-----------------------------|------------------------|-------------|------------------|------------|---------------------------|
| <b>Formative assessment</b> | <b>Quizzes</b>         | 2           | 10% (10)         | 5 and 10   | LO #1, #2 and #10, #11    |
|                             | <b>Assignments</b>     | 2           | 10% (10)         | 2 and 12   | LO #3, #4 and #6, #7      |
|                             | <b>Projects / Lab.</b> | 1           | 10% (10)         | Continuous | All                       |
|                             | <b>Report</b>          | 1           | 10% (10)         | 13         | LO #5, #8 and #10         |
| <b>Summative assessment</b> | <b>Midterm Exam</b>    | 2hr         | 10% (10)         | 7          | LO #1 - #7                |
|                             | <b>Final Exam</b>      | 3hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>     |                        |             | 100% (100 Marks) |            |                           |

### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

|               | Material Covered                             |
|---------------|----------------------------------------------|
| <b>Week 1</b> | Introduction to biochemistry, cell chemistry |
| <b>Week 2</b> | Carbohydrates: sugars monosaccharides        |
| <b>Week 3</b> | disaccharides                                |
| <b>Week 4</b> | polysaccharides                              |
| <b>Week 5</b> | Lipids, fatty acids.                         |
| <b>Week 6</b> | other compounds lipids                       |
| <b>Week 7</b> | Amino acids, Classification of Amino Acids   |

## Semester Three

|                |                                        |
|----------------|----------------------------------------|
| <b>Week 8</b>  | Exam                                   |
| <b>Week 9</b>  | Amino acid reactions                   |
| <b>Week 10</b> | Peptides & Proteins                    |
| <b>Week 11</b> | Classification of Proteins             |
| <b>Week 12</b> | nucleic acids, synthesis chemistry     |
| <b>Week 13</b> | Pyrimid and purines bases              |
| <b>Week 14</b> | nucleotides, nucleosides, DNA is RNA   |
| <b>Week 15</b> | Preparatory week before the final Exam |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                                                         |
|--------------------------------------------------------------------------------|---------------------------------------------------------|
|                                                                                | <b>Material Covered</b>                                 |
| <b>Week 1</b>                                                                  | Molisch,s Test                                          |
| <b>Week 2</b>                                                                  | Benedict's test                                         |
| <b>Week 3</b>                                                                  | Barfoed's Test                                          |
| <b>Week 4</b>                                                                  | Bial's Test                                             |
| <b>Week 5</b>                                                                  | Seliwanoff's Test                                       |
| <b>Week 6</b>                                                                  | Sucrose Hydrolysis Test                                 |
| <b>Week 7</b>                                                                  | Iodine Test                                             |
| <b>Week 8</b>                                                                  | Exam                                                    |
| <b>Week 9</b>                                                                  | Qualitative tests of lipids: Solubility test            |
| <b>Week 10</b>                                                                 | Saponification test                                     |
| <b>Week 11</b>                                                                 | Detecting desaturation by copper acetate) & Iodine Test |
| <b>Week 12</b>                                                                 | Salkowski Test & Liberman-Burchards Test                |
| <b>Week 13</b>                                                                 | Acrolin Test                                            |
| <b>Week 14</b>                                                                 | Rancidity                                               |
| <b>Week 15</b>                                                                 | Exam                                                    |

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس</b> |                                                                                                                                                                                                                                                                                                                                                    |                                  |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                                                                        | <b>Text</b>                                                                                                                                                                                                                                                                                                                                        | <b>Available in the Library?</b> |
| <b>Required Texts</b>                                                  | Nelson, D. L. (2021). Lehninger Principles of Biochemistry 5th Edition. Proteins, 5, 6.                                                                                                                                                                                                                                                            | Yes                              |
| <b>Recommended Texts</b>                                               | Rodwell, V. W., Bender, D., & Botham, K. M. (2018). Harper's illustrated biochemistry. McGraw-Hill.                                                                                                                                                                                                                                                | No                               |
| <b>Websites</b>                                                        | <a href="https://ocw.mit.edu/courses/5-111-principles-of-chemical-science-fall-2008/">https://ocw.mit.edu/courses/5-111-principles-of-chemical-science-fall-2008/</a><br><a href="https://ocw.mit.edu/courses/7-012-introduction-to-biology-fall-2004/download/">https://ocw.mit.edu/courses/7-012-introduction-to-biology-fall-2004/download/</a> |                                  |

| Grading Scheme<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                       |                  |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير             | Marks %  | Definition                            |
| <b>Success Group<br/>(50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                  | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                       | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                                      |                  |                     |          |                                       |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |                     |          |                                       |

## MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                       |                               |                                                                                                                                                                                                                                                     |
|------------------------------------|-----------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                       |                               |                                                                                                                                                                                                                                                     |
| Module Title                       | <b>Microbiology I</b> |                               | Module Delivery                                                                                                                                                                                                                                     |
| Module Type                        | <b>Core</b>           |                               | <input checked="" type="checkbox"/> Theory<br><input checked="" type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | <b>Bio-2316</b>       |                               |                                                                                                                                                                                                                                                     |
| ECTS Credits                       | <b>5</b>              |                               |                                                                                                                                                                                                                                                     |
| SWL (hr/sem)                       | <b>125</b>            |                               |                                                                                                                                                                                                                                                     |
| Module Level                       | 2                     | Semester of Delivery          | 3                                                                                                                                                                                                                                                   |
| Administering Department           | Dept. of Biology      | College                       | College of Science                                                                                                                                                                                                                                  |
| Module Leader                      | Zainab Mohammed Nsaif | e-mail                        | dr.zainab@uodiyala.edu.iq                                                                                                                                                                                                                           |
| Module Leader's Acad. Title        | Professor             | Module Leader's Qualification | PhD                                                                                                                                                                                                                                                 |
| Module Tutor                       | Zainab Mohammed Nsaif | e-mail                        | dr.zainab@uodiyala.edu.iq                                                                                                                                                                                                                           |
| Peer Reviewer Name                 |                       | e-mail                        |                                                                                                                                                                                                                                                     |
| Scientific Committee Approval Date | 01/09/2024            | Version Number                | 1.0                                                                                                                                                                                                                                                 |

| Relation with other Modules       |                 |          |   |
|-----------------------------------|-----------------|----------|---|
| العلاقة مع المواد الدراسية الأخرى |                 |          |   |
| Prerequisite module               |                 | Semester |   |
| Co-requisites module              | Microbiology II | Semester | 4 |

| Module Aims, Learning Outcomes and Indicative Contents   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Module Objectives</b><br>أهداف المادة الدراسية        | <p>Clinical microbiology deals with microorganisms such as pathogenic bacteria, viruses, fungi and parasites which are medically important and cause human diseases. Generally, microorganisms can cause a tremendous change on our planet and our life, there is a scientific speech says if “there is no microorganism on our earth there is no life on our planet” otherwise is also true because there are some dangerous and infectious microorganism which cause a dangerous airborne, foodborne and waterborne diseases that some of them are fatal and threaten human life. Evolution in the field of Clinical microbiology and exactly about identification of pathogenic microorganisms and the methods of chemotherapy and prophylaxes has saved the life of millions of peoples on our planet.</p> <p>Students will acquire a broad understanding of the basics of microbiology laboratories in terms of sterilization methods and the rules that must be adhered to when dealing with the tools and equipment used, in addition to using the laboratory techniques necessary to isolate these organisms and identify their shapes and characteristics. The student will also learn the techniques necessary to identify the types of these organisms and their groups, methods of counting, isolating and staining them.</p> |

|                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                  | <b>Course Objective:</b> <ol style="list-style-type: none"> <li>1. To understand the basic principles of Clinical Microbiology.</li> <li>2. To provide the student with the basic knowledge of microorganisms in general</li> <li>3. To study the main characteristics of microbes of medical importance and their identification.</li> <li>4. To teach aseptic techniques.</li> <li>5. To provide an understanding of antimicrobial agents and infectious diseases.</li> <li>6. To teach the basic immunological principles and methods for the study of immunological disorders.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية | <b>At the end of this module students should be able to:</b> <ul style="list-style-type: none"> <li>• Develop advanced academic knowledge about the concepts and principles of Medical Microbiology.</li> <li>• Cover the importance of Microbiology and the history background of this subject.</li> <li>• Detail knowledge about the Medical Microbiology and its applications.</li> <li>• Having knowledge about the up-to-date advancing and development in this field of subject</li> <li>• They could be familiar with the modest instruments in the medical labs like PCR and ELISA.</li> <li>• In addition to learning practically the technique of examining, using, how to collect the different type of specimens and how to prepare it for examinations and be familiar with the results and writing reports.</li> <li>• Recognition the methods of sterilization in the laboratory.</li> <li>• Tools and equipment used in the laboratory.</li> <li>• Staining methods and types of dyes used to identify the types of microorganisms.</li> <li>• Methods of counting bacteria.</li> <li>• Techniques for the process of culturing on plates.</li> </ul> |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                | The module will include: <ul style="list-style-type: none"> <li>• Class attendance is regularly 85-90% of lectures each week 5 minutes before the lecture is a must. The students should also submit homework and assignments, accomplish extra classroom requirements such as preparing scientific reports, presentation and seminars and also be ready for performing quizzes, mid-term and final exams, participate in the laboratory works (practical labs) in order to pass successfully.</li> <li>• Basics of working in the laboratory.</li> <li>• Methods of dealing with tools and equipment in the laboratory.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                      | Every student or small grouping students must prepare a report about a subject regarding clinical microbiology. Each report must include the following information: the logo of university or the Institute, the name of college or department, student's name, the title of the report, short description and brief introduction about the subject, aims of the report, short review literature, prospects and overviews and finally the references. Each student or small group is present his/her/there reports as a seminar (presentation) to confirm their capability to speak about a scientific subject in front of gathering in a teaching hall. |

|  |                                                                                                                                                                                                                                                                                                                 |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | All lessons held in the laboratory will be practical, with the participation of all students, who will be distributed into small groups to obtain the required results and encourage the spirit of competition among students and encouragement among groups to complete the experiment in the required manner. |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ 15 اسبوعا              |     |                                                                           |   |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|---|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 64  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 4 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 61  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 125 |                                                                           |   |

| Module Evaluation<br>تقييم المادة الدراسية |                        |             |                  |            |                           |
|--------------------------------------------|------------------------|-------------|------------------|------------|---------------------------|
|                                            |                        | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| <b>Formative assessment</b>                | <b>Quizzes</b>         | 2           | 10% (10)         | 5 and 10   | LO #1, #2 and #10, #11    |
|                                            | <b>Assignments</b>     | 2           | 10% (10)         | 2 and 12   | LO #3, #4 and #6, #7      |
|                                            | <b>Projects / Lab.</b> | 1           | 10% (10)         | Continuous | All                       |
|                                            | <b>Report</b>          | 1           | 10% (10)         | 13         | LO #5, #8 and #10         |
| <b>Summative assessment</b>                | <b>Midterm</b>         | 2hr         | 10% (10)         | 7          | LO #1 - #7                |
|                                            | <b>Final Exam</b>      | 3hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>                    |                        |             | 100% (100 Marks) |            |                           |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري |                                                                              |
|------------------------------------------------------------|------------------------------------------------------------------------------|
|                                                            | Material Covered                                                             |
| <b>Week 1</b>                                              | Introduction to Microbiology                                                 |
| <b>Week 2</b>                                              | The Relevance and Scope of Microbiology, Microscopy and Specimen Preparation |
| <b>Week 3</b>                                              | A Brief Survey of Microbes as Friends and Foes, General Characteristics of   |
| <b>Week 4</b>                                              | General Characteristics of Bacteria                                          |
| <b>Week 5</b>                                              | First Monthly exam                                                           |
| <b>Week 6</b>                                              | General Characteristics of Fungi, General Characteristics of Viruses         |
| <b>Week 7</b>                                              | General Characteristics of Algae                                             |
| <b>Week 8</b>                                              | General Characteristics of Protozoa                                          |
| <b>Week 9</b>                                              | Microbial Growth, Reproduction and Control, Microbial Growth                 |
| <b>Week 10</b>                                             | Measurement of Microbial Growth                                              |
| <b>Week 11</b>                                             | Second Monthly exam                                                          |
| <b>Week 12</b>                                             | Physical Methods of Controlling Microbial Growth                             |
| <b>Week 13</b>                                             | Chemical Methods of Controlling Microbial Growth                             |
| <b>Week 14</b>                                             | Systematic Classification of Microorganisms                                  |

|                |        |
|----------------|--------|
| <b>Week 15</b> | Review |
|----------------|--------|

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br>المنهاج الاسبوعي للمختبر |                                                                    |
|-------------------------------------------------------------------------|--------------------------------------------------------------------|
|                                                                         | <b>Material Covered</b>                                            |
| <b>Week 1</b>                                                           | Lab1 An introduction to microbiology, aseptic technique and safety |
| <b>Week 2</b>                                                           | Lab2 Tools and Equipment used in Microbiology Lab                  |
| <b>Week 3</b>                                                           | Lab3 Culture Media                                                 |
| <b>Week 4</b>                                                           | Lab4 Bacterial Staining                                            |
| <b>Week 5</b>                                                           | Lab5 Type of the Stains/ Differential stain                        |
| <b>Week 6</b>                                                           | Lab6 Selective stain                                               |
| <b>Week 7</b>                                                           | Lab7 Antibiotics                                                   |
| <b>Week 8</b>                                                           | Mid exam                                                           |
| <b>Week 9</b>                                                           | Lab8 Bacterial Count                                               |
| <b>Week 10</b>                                                          | Lab9 Turbidimetry Determinations                                   |
| <b>Week 11</b>                                                          | Lab10 Pour Plate Method                                            |
| <b>Week 12</b>                                                          | Lab11 Bacterial Culture Techniques                                 |
| <b>Week 13</b>                                                          | Lab12 Colony morphology                                            |
| <b>Week 14</b>                                                          | Lab13 Yeast and molds                                              |
| <b>Week 15</b>                                                          | Final exam                                                         |

| <b>Learning and Teaching Resources</b><br>مصادر التعلم والتدريس |                                                                                                                                                                                                                |                                  |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                                                                 | <b>Text</b>                                                                                                                                                                                                    | <b>Available in the Library?</b> |
| <b>Required Texts</b>                                           | Dubey, R. C., & Maheshwari, D. K. (2023). A textbook of microbiology. S. Chand Publishing.                                                                                                                     | Yes                              |
| <b>Recommended Texts</b>                                        | Green, L. H., & Goldman, E. (Eds.). (2021). Practical handbook of microbiology. CRC press.<br>Parija, S. C. (2023). Textbook of microbiology and immunology. Berlin, Heidelberg, Germany: Springer.            | Yes                              |
| <b>Websites</b>                                                 | <a href="https://microbiologyinfo.com/">https://microbiologyinfo.com/</a><br><a href="https://microbe.net/resources/microbiology-web-resources/">https://microbe.net/resources/microbiology-web-resources/</a> |                                  |

| <b>Grading Scheme</b><br>مخطط الدرجات |                  |                |                |                                  |
|---------------------------------------|------------------|----------------|----------------|----------------------------------|
| <b>Group</b>                          | <b>Grade</b>     | <b>التقدير</b> | <b>Marks %</b> | <b>Definition</b>                |
| <b>Success Group (50 - 100)</b>       | A - Excellent    | امتياز         | 90 - 100       | Outstanding Performance          |
|                                       | B - Very Good    | جيد جدا        | 80 - 89        | Above average with some errors   |
|                                       | C - Good         | جيد            | 70 - 79        | Sound work with notable errors   |
|                                       | D - Satisfactory | متوسط          | 60 - 69        | Fair but with major shortcomings |

## Semester Three

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|                                |                |                     |         |                                       |
|--------------------------------|----------------|---------------------|---------|---------------------------------------|
|                                | E - Sufficient | مقبول               | 50 - 59 | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b> | FX – Fail      | راسب (قيد المعالجة) | (45-49) | More work required but credit awarded |
|                                | F – Fail       | راسب                | (0-44)  | Considerable amount of work required  |

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

# Semester Four

## MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                      |                               |                                                                                                                                                                                                                                                     |
|------------------------------------|----------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                      |                               |                                                                                                                                                                                                                                                     |
| Module Title                       | <b>Entomology II</b> |                               | Module Delivery                                                                                                                                                                                                                                     |
| Module Type                        | <b>Core</b>          |                               | <input checked="" type="checkbox"/> Theory<br><input checked="" type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | <b>Bio-2411</b>      |                               |                                                                                                                                                                                                                                                     |
| ECTS Credits                       | <b>5</b>             |                               |                                                                                                                                                                                                                                                     |
| SWL (hr/sem)                       | <b>143</b>           |                               |                                                                                                                                                                                                                                                     |
| Module Level                       | 2                    | Semester of Delivery          |                                                                                                                                                                                                                                                     |
| Administering Department           | Dept. of Biology     | College                       | College of Science                                                                                                                                                                                                                                  |
| Module Leader                      | Sanaa Nagem Abed     | e-mail                        | sanaa.abed@uodiyala.edu.iq                                                                                                                                                                                                                          |
| Module Leader's Acad. Title        | Assist professor     | Module Leader's Qualification | Ph.D.                                                                                                                                                                                                                                               |
| Module Tutor                       | Sanaa Nagem Abed     | e-mail                        | sanaa.abed@uodiyala.edu.iq                                                                                                                                                                                                                          |
| Peer Reviewer Name                 |                      | e-mail                        |                                                                                                                                                                                                                                                     |
| Scientific Committee Approval Date | 01/09/2024           | Version Number                | 1.0                                                                                                                                                                                                                                                 |

| Relation with other Modules       |              |          |   |
|-----------------------------------|--------------|----------|---|
| العلاقة مع المواد الدراسية الأخرى |              |          |   |
| Prerequisite module               | Entomology I | Semester | 3 |
| Co-requisites module              |              | Semester |   |

| Module Aims, Learning Outcomes and Indicative Contents    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Module Objectives<br>أهداف المادة الدراسية                | 1. Providing basic concepts of taxonomic hierarchy, identification, taxonomic characters, variations, taxonomic keys.<br>2. Expose the student to the concepts of Insect collection, identification and preservation.<br>3. Introduce the students to the main orders and families of insects                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. Make the students familiar with Insects Divisions and orders<br>2. Make the student able to recognize insects of Subclass : Apterygota<br>3. Make the student able to recognize insects of Subclass: Pterygota<br>4. Make the student able to recognize insects of orders: Odonata, Plecoptera, Grylloblatodea and their characteristics<br>5. Make the student able to recognize insects of orders: Orthoptera, Phasmodia, Dermaptera<br>6. Recognizing insects of orders Embioptera, Dictyoptera, Isoptera<br>7. Recognizing insects of order: Pseoptera, Anoplura, Mallophaga<br>8. Recognizing insects of order Thysanoptera<br>9. Recognizing insects of order Neuroptera<br>10. Recognizing insects of order Lepidoptera<br>11. Recognizing insects of order Coleoptera<br>12. Recognizing insects of order Diptera |

## Semester Four

|                                                   |                                                                                                                   |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
|                                                   | 13. Recognizing insects of order Hymenoptera                                                                      |
| <b>Indicative Contents</b><br>المحتويات الإرشادية | Throughout the course examples will be provided to link the underlying concepts with insects and the environment. |

| <b>Learning and Teaching Strategies</b><br><b>استراتيجيات التعلم والتعليم</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                             | <ol style="list-style-type: none"> <li>1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another.</li> <li>2. Where applicable students will be assigned problems to solve and encouraged to assess one another.</li> <li>3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system.</li> <li>4. Students will also be regularly referred to relevant section of the prescribed text book.</li> <li>5. Most of the tutorial work will be done as self-study or with the assistance of a tutor.</li> <li>6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.</li> </ol> |

| <b>Student Workload (SWL)</b><br><b>الحمل الدراسي للطالب محسوب لـ 15 اسبوعا</b> |     |                                                                           |     |
|---------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|-----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل        | 65  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 4.3 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل  | 78  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5.2 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل               | 143 |                                                                           |     |

| <b>Module Evaluation</b><br><b>تقييم المادة الدراسية</b> |                        |             |                  |            |                           |
|----------------------------------------------------------|------------------------|-------------|------------------|------------|---------------------------|
|                                                          |                        | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| <b>Formative assessment</b>                              | <b>Quizzes</b>         | 2           | 10% (10)         | 5 and 10   | LO #1, #2 and #10,        |
|                                                          | <b>Assignments</b>     | 2           | 10% (10)         | 2 and 12   | LO #3, #4 and #6, #7      |
|                                                          | <b>Projects / Lab.</b> | 1           | 10% (10)         | Continuous | All                       |
|                                                          | <b>Report</b>          | 1           | 10% (10)         | 13         | LO #5, #8 and #10         |
| <b>Summative assessment</b>                              | <b>Midterm</b>         | 2hr         | 10% (10)         | 7          | LO #1 - #7                |
|                                                          | <b>Final Exam</b>      | 3hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>                                  |                        |             | 100% (100 Marks) |            |                           |

| <b>Delivery Plan (Weekly Syllabus)</b><br><b>المنهاج الأسبوعي النظري</b> |
|--------------------------------------------------------------------------|
|--------------------------------------------------------------------------|

## Semester Four

|                | Material Covered                                                        |
|----------------|-------------------------------------------------------------------------|
| <b>Week 1</b>  | Introdection to Taxonomy of Insects                                     |
| <b>Week 2</b>  | Division: Apterygota ( orders: Thysanura, Diplura, Protura, Collembola) |
| <b>Week 3</b>  | Divisin: Pterygota (Endopterygota & Exopterygota)                       |
| <b>Week 4</b>  | Taxonomy of Orders Odonata, Pleceptera, Grylloblatodea                  |
| <b>Week 5</b>  | Taxonomy of Orders Orthoptera, Phasmodia, Dermaptera                    |
| <b>Week 6</b>  | Taxonomy of orders Embioptera, Dictyoptera, Isoptera                    |
| <b>Week 7</b>  | Mid-term Exam                                                           |
| <b>Week 8</b>  | Taxonomy of order: Pseoptera, Anoplura, Mallophaga                      |
| <b>Week 9</b>  | Taxonomy of order Thysanoptera                                          |
| <b>Week 10</b> | Taxonomy of order: Pseoptera, Anoplura, Mallophaga                      |
| <b>Week 11</b> | Taxonomy of order Neuropter                                             |
| <b>Week 12</b> | Taxonomy of order Lepidoptera                                           |
| <b>Week 13</b> | Taxonomy of order Coleoptera                                            |
| <b>Week 14</b> | Taxonomy of order Diptera                                               |
| <b>Week 15</b> | Preparatory week before the final Exam                                  |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                                                                                         |
|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
|                                                                                | Material Covered                                                                        |
| <b>Week 1</b>                                                                  | Lab 1: Examining insects collections                                                    |
| <b>Week 2</b>                                                                  | Lab 2: Introducing the student to insects of subclass : Apterygota                      |
| <b>Week 3</b>                                                                  | Lab 3: Introducing the student to subclass: Pterygota                                   |
| <b>Week 4</b>                                                                  | Lab 4: Introducing the student to order: Odonata, Pleceptera, Grylloblatodea and their  |
| <b>Week 5</b>                                                                  | Lab 5: Introducing the student to orders Orthoptera, Phasmodia, Dermaptera and their    |
| <b>Week 6</b>                                                                  | Lab 6: Examining orders Embioptera, Dictyoptera, Isoptera and their characteristics     |
| <b>Week 7</b>                                                                  | Lab 7: Mid-term Exam                                                                    |
| <b>Week 8</b>                                                                  | Lab 8: Examining orders order: Pseoptera, Anoplura, Mallophaga                          |
| <b>Week 9</b>                                                                  | Lab 9: Examining orders order Thysanoptera                                              |
| <b>Week 10</b>                                                                 | Lab 10: Examining order Neuropter                                                       |
| <b>Week 11</b>                                                                 | Lab 11: Examining order Lepidoptera                                                     |
| <b>Week 12</b>                                                                 | Lab 12: Examining order Coleoptera                                                      |
| <b>Week 13</b>                                                                 | Lab 13: Examining order Diptera                                                         |
| <b>Week 14</b>                                                                 | Lab 14: Examining order Hymenoptera                                                     |
| <b>Week 15</b>                                                                 | Lab 15: Reexamining all the slides and insects collection to prepare for the final exam |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                           |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                                          | Text                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Available in the Library? |
| <b>Required Texts</b>                                    | McGavin, G. C., & Davranoglou, L. R. (2023). Essential entomology. Oxford University Press.                                                                                                                                                                                                                                                                                                                                                                                                                       | Yes                       |
| <b>Recommended Texts</b>                                 | Rivers, D. B., & Dahlem, G. A. (2022). The science of forensic entomology. John Wiley & Sons.<br>Kimball, J. A. (2023). Entomology and Nematology. Guide to Sources for Agricultural and Biological                                                                                                                                                                                                                                                                                                               | No                        |
| <b>Websites</b>                                          | <a href="https://profiles.uonbi.ac.ke/foyeke/files/practical_training_manual_for_entomology.pdf">https://profiles.uonbi.ac.ke/foyeke/files/practical_training_manual_for_entomology.pdf</a><br><a href="https://shodhganga.inflibnet.ac.in/bitstream/10603/163876/9/09_chapter%206.pdf">https://shodhganga.inflibnet.ac.in/bitstream/10603/163876/9/09_chapter%206.pdf</a><br><a href="http://www.cassavabiz.org/production/proddocs/INSE-SCR.PDF">http://www.cassavabiz.org/production/proddocs/INSE-SCR.PDF</a> |                           |

| Grading Scheme<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                       |                  |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير             | Marks %  | Definition                            |
| <b>Success Group (50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                      | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group (0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                           | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |                     |          |                                       |

## MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية |                 |                      |                                                                                                                                                                                                                                                     |                           |
|-----------------------------------------------|-----------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| Module Title                                  | Plant Taxonomy  |                      | Module Delivery                                                                                                                                                                                                                                     |                           |
| Module Type                                   | Core            |                      | <input checked="" type="checkbox"/> Theory<br><input checked="" type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |                           |
| Module Code                                   | Bio-2412        |                      |                                                                                                                                                                                                                                                     |                           |
| ECTS Credits                                  | 5               |                      |                                                                                                                                                                                                                                                     |                           |
| SWL (hr/sem)                                  | 143             |                      |                                                                                                                                                                                                                                                     |                           |
| Module Level                                  | 2               | Semester of Delivery |                                                                                                                                                                                                                                                     | 4                         |
| Administering Department                      |                 | Dept. of Biology     | College                                                                                                                                                                                                                                             | College of Science        |
| Module Leader                                 | Khazal Dh. Wadi |                      | E-mail                                                                                                                                                                                                                                              | dr.khazal@uodiyala.edu.iq |
| Module Leader's Acad. Title                   |                 | Professor            | Module Leader's Qualification                                                                                                                                                                                                                       | Ph.D.                     |
| Module Tutor                                  |                 | Khazal Dh. Wadi      | E-mail                                                                                                                                                                                                                                              | dr.khazal@uodiyala.edu.iq |
| Peer Reviewer Name                            |                 | Khazal Dh. Wadi      | E-mail                                                                                                                                                                                                                                              | dr.khazal@uodiyala.edu.iq |
| Scientific Committee Approval Date            |                 | 01/09/2024           | Version Number                                                                                                                                                                                                                                      | 1.0                       |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى |               |          |   |
|------------------------------------------------------------------|---------------|----------|---|
| Prerequisite module                                              | Plant Anatomy | Semester | 3 |
| Co-requisites module                                             |               | Semester |   |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Module Objectives<br>أهداف المادة الدراسية                                                                         | <p><b>A- Cognitive goals</b></p> <p>A1- Level 1 Knowledge Development: Developing the student's ability to recall what he learned about morphology of plant body.</p> <p>A 2- The second level is to improve the level of understanding (comprehension) and to develop the ability to interpret, predict and draw conclusions.</p> <p>A 3- The third level is the development of applied capabilities ((Application).</p> <p>A 4- The fourth level gives the student the ability to analyze</p> <p>A5- Level 5 Developing the student's ability to integrate ideas and information (synthesis level), which is the opposite of analysis</p> <p>A6- Level Six: Evaluation (Developing the student's ability to judge the value of the learned material.</p> <p><b>B - The soft skills objectives of the course.</b></p> <p>B1 - Improving the student's ability to observe (Observation).</p> <p>B 2 - To learn how to imitate and imitate (Imitation)</p> <p>B 3 - To learn the method of experimentation</p> |
| Module Learning Outcomes                                                                                           | <p>Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks.</p> <p>1. Recognize the main fields of plant taxonomy.</p> <p>2. List the general terms of plant.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## Semester Four

|                                            |                                                                                                                                                                                           |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| مخرجات التعلم للمادة الدراسية              | 3. Recognition the parts of plant.<br>4. Recognition pollination and its types.<br>5. Recognition the taxonomic categories<br>6. Recognition herbarium<br>7. Recognition botanical garden |
| Indicative Contents<br>المحتويات الإرشادية | Indicative content includes the following.                                                                                                                                                |

### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

|            |                                                                                                                                                                                                                                                                                                                                                                                               |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Strategies | The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students. |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

#### Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

|                                                                         |     |                                                                    |     |
|-------------------------------------------------------------------------|-----|--------------------------------------------------------------------|-----|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 65  | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 4.3 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 78  | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5.2 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل              | 143 |                                                                    |     |

### Module Evaluation

#### تقييم المادة الدراسية

|                      |                        | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
|----------------------|------------------------|-------------|------------------|------------|---------------------------|
| Formative assessment | Quizzes                | 2           | 5% (5)           | 5          | LO #1, #2 and #10, #11    |
|                      | Assignments            |             |                  |            |                           |
|                      | Projects / Lab. Report | 1           | 15% (15)         | Continuous | All                       |
|                      |                        | 1           | 5% (5)           | 5          | LO #5, #8 and #10         |
| Summative assessment | Midterm Exam           | 2hr         | 25 % (25)        | 2          | LO #1 - #7                |
|                      | Final Exam             | 3hr         | 50% (50)         | 16         | All                       |
| Total assessment     |                        |             | 100% (100 Marks) |            |                           |

### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

| Week   | Material Covered                                     |
|--------|------------------------------------------------------|
| Week 1 | Introduction – plant taxonomy, importance, history   |
| Week 2 | General plant terms                                  |
| Week 3 | The Fields of plant taxonomy, classification Systems |
| Week 4 | Morphological study of Roots, stems, Leaves          |
| Week 5 | Morphological study of Flower                        |
| Week 6 | Androecium and Gynoecium                             |
| Week 7 | Exam 1                                               |
| Week 8 | Inflorescence                                        |
| Week 9 | Fruits & Seeds                                       |

## Semester Four

|                |                                                     |
|----------------|-----------------------------------------------------|
| <b>Week 10</b> | pollination                                         |
| <b>Week 11</b> | Taxonomic Categories                                |
| <b>Week 12</b> | The evolutionary importance of reproductive systems |
| <b>Week 13</b> | Herbarium& Herbarium specimens                      |
| <b>Week 14</b> | Botanical garden                                    |
| <b>Week 15</b> | Exam 2                                              |
| <b>Week 16</b> | <b>Preparatory week before the final Exam</b>       |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                                                   |
|--------------------------------------------------------------------------------|---------------------------------------------------|
|                                                                                | Material Covered                                  |
| <b>Week 1</b>                                                                  | Lab 1: Introduction to plant taxonomy.            |
| <b>Week 2</b>                                                                  | Lab 2: preparing plant specimens.                 |
| <b>Week 3</b>                                                                  | Lab 3: scientific description of a plant specimen |
| <b>Week 4</b>                                                                  | Lab 4: Floral formula                             |
| <b>Week 5</b>                                                                  | Lab 5: taxonomic keys                             |
| <b>Week 6</b>                                                                  | Lab 6: plant families                             |
| <b>Week 7</b>                                                                  | Lab 7: plant families                             |
| <b>Week 8</b>                                                                  | Lab 8: Scientific trip                            |
| <b>Week 9</b>                                                                  | Lab9: plant families                              |
| <b>Week 10</b>                                                                 | Lab 10: plant families                            |
| <b>Week 11</b>                                                                 | Lab 11: plant families                            |
| <b>Week 12</b>                                                                 | Lab 12: plant families                            |
| <b>Week 13</b>                                                                 | Lab 13: plant families                            |
| <b>Week 14</b>                                                                 | Lab 14: Exam                                      |
| <b>Week 15</b>                                                                 | Lab 15: Review of previous laboratories.          |

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس</b> |                                                                                                                                                                  |                           |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                                                        | Text                                                                                                                                                             | Available in the Library? |
| Required Texts                                                         | Singh, G. (2019). Plant systematics: an integrated approach. CRC Press.                                                                                          | Yes                       |
| Recommended Texts                                                      | Pandey, A. K., & Kasana, S. (2021). Plant Systematics. CRC Press.<br>Uddin, M. Z., & Rahman, M. O. Plant Taxonomy and Systematics. Centennial Special Book, 197. | Yes                       |
| Websites                                                               | <a href="https://www.ipni.org/">https://www.ipni.org/</a><br><a href="https://www.aspt.net/">https://www.aspt.net/</a>                                           |                           |

## Semester Four

| Grading Scheme<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                       |                  |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير             | Marks %  | Definition                            |
| Success Group<br>(50 - 100)                                                                                                                                                                                                                                                                                                                                                          | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)                                                                                                                                                                                                                                                                                                                                                               | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                                      |                  |                     |          |                                       |
| <p>Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.</p> |                  |                     |          |                                       |

## MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية |                    |                  |                                                                                                                                                                                                                                                                                                        |                       |       |
|-----------------------------------------------|--------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------|
| Module Title                                  | Parasitology       |                  | Module Delivery                                                                                                                                                                                                                                                                                        |                       |       |
| Module Type                                   | Core               |                  | <div><input checked="" type="checkbox"/> Theory</div> <div><input checked="" type="checkbox"/> Lecture</div> <div><input checked="" type="checkbox"/> Lab</div> <div><input type="checkbox"/> Tutorial</div> <div><input type="checkbox"/> Practical</div> <div><input type="checkbox"/> Seminar</div> |                       |       |
| Module Code                                   | Bio-2413           |                  |                                                                                                                                                                                                                                                                                                        |                       |       |
| ECTS Credits                                  | 5                  |                  |                                                                                                                                                                                                                                                                                                        |                       |       |
| SWL (hr/sem)                                  | 143                |                  |                                                                                                                                                                                                                                                                                                        |                       |       |
| Module Level                                  |                    | 2                | Semester of Delivery                                                                                                                                                                                                                                                                                   |                       | 4     |
| Administering Department                      |                    | Dept. of Biology | College                                                                                                                                                                                                                                                                                                | College of Science    |       |
| Module Leader                                 | Asraa Dawod Farhan |                  | e-mail                                                                                                                                                                                                                                                                                                 | asraa@uodiyala.edu.iq |       |
| Module Leader's Acad. Title                   |                    | Lecturer         | Module Leader's Qualification                                                                                                                                                                                                                                                                          |                       | Ph.D. |
| Module Tutor                                  | Asraa Dawod Farhan |                  | e-mail                                                                                                                                                                                                                                                                                                 | asraa@uodiyala.edu.iq |       |
| Peer Reviewer Name                            |                    |                  | e-mail                                                                                                                                                                                                                                                                                                 |                       |       |
| Scientific Committee Approval Date            |                    | 01/09/2024       | Version Number                                                                                                                                                                                                                                                                                         |                       | 1.0   |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى |               |          |   |
|------------------------------------------------------------------|---------------|----------|---|
| Prerequisite module                                              | Invertebrates | Semester | 3 |
| Co-requisites module                                             |               | Semester |   |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Module Objectives<br>أهداف المادة الدراسية                                                                         | 1. To understand the basic principles of parasitology.<br>2. Identifying and studying parasites that infect humans and animals in detail.<br>3. Studying aspects of the life of each parasite in terms of external appearance, life cycle, pathological and epidemiological causes, and methods of diagnosis and prevention.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية                                                          | At the end of this module students should be able to: <ul style="list-style-type: none"> <li>▪ Student Learning Outcome.</li> <li>▪ By the end of the course, the students are being able to.</li> <li>▪ Develop advanced academic knowledge about the concepts and principles of parasitology.</li> <li>▪ List the different terms associated with parasitology.</li> <li>▪ Detail knowledge about the parasitology and its applications.</li> <li>▪ Conducting discussions that enable the student to link causes with natural causes.</li> <li>▪ Having knowledge about the up-to-date advancing and development in this field of subject.</li> <li>▪ In addition to learning practically the technique of examining, using, how to collect the different type of specimens and how to prepare it for examinations and be familiar with the results and writing reports.</li> </ul> |

## Semester Four

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                   | <ul style="list-style-type: none"> <li>Define the relationships between the parasite and the host.</li> <li>Identify the most important phylums and species that infect humans and animals.</li> <li>Discuss the different characteristics of parasites.</li> </ul>                                                                                                                                                                                       |
| <b>Indicative Contents</b><br>المحتويات الإرشادية | Emotional and value goals:<br>1. Enable students to cooperate with each other in solving practical assignments.<br>2. Enabling students to focus on the topic of the lesson and harmony and interaction with it.<br>3. Enabling students to organize the information and data they receive during the lesson.<br>4. Enabling the students to recreate their way of thinking towards living beings and appreciating the greatness of the Almighty Creator. |

## Learning and Teaching Strategies

### استراتيجيات التعلم والتعليم

|                   |                                                                                                                                                                                 |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b> | Evaluation modalities<br>1- Practical tests<br>2- Theoretical tests<br>3- Reports and studies<br>4- Daily exams with self-solving questions<br>5- Grades determined by homework |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Student Workload (SWL)

### الحمل الدراسي للطلاب محسوب لـ 15 أسبوعا

|                                                                                |     |                                                                           |     |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|-----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | 65  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 4.3 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 78  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 5.2 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل              | 143 |                                                                           |     |

## Module Evaluation

### تقييم المادة الدراسية

|                             |                        | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
|-----------------------------|------------------------|-------------|------------------|------------|---------------------------|
| <b>Formative assessment</b> | <b>Quizzes</b>         | 2           | 10% (10)         | 5 and 10   | LO #1, #2 and #10, #11    |
|                             | <b>Assignments</b>     | 2           | 10% (10)         | 2 and 12   | LO #3, #4 and #6, #7      |
|                             | <b>Projects / Lab.</b> | 1           | 10% (10)         | Continuous | All                       |
|                             | <b>Report</b>          | 1           | 10% (10)         | 13         | LO #5, #8 and #10         |
| <b>Summative assessment</b> | <b>Midterm</b>         | 2hr         | 10% (10)         | 7          | LO #1 - #7                |
|                             | <b>Final Exam</b>      | 3hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>     |                        |             | 100% (100 Marks) |            |                           |

## Delivery Plan (Weekly Syllabus)

### المنهاج الأسبوعي النظري

|                         |
|-------------------------|
| <b>Material Covered</b> |
|-------------------------|

## Semester Four

|                |                                                                                                                                               |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Week 1</b>  | General introduction, history of science Parasites and public relations among animals                                                         |
| <b>Week 2</b>  | Parasitism features, types Parasitism, types parasites, and hosts                                                                             |
| <b>Week 3</b>  | Protozoa and Protozoan diseases and life cycle                                                                                                |
| <b>Week 4</b>  | Complementing the genera belonging to the Phylum Protozoa                                                                                     |
| <b>Week 5</b>  | Tissue and Blood flagellates ( <i>Leishmania</i> spp.)                                                                                        |
| <b>Week 6</b>  | Flagellate: Family Trypanosomatida, Genus <i>Trypanosoma</i> (African trypanosomiasis/African sleeping sickness and American trypanosomiasis) |
| <b>Week 7</b>  | Phylum Ciliophora                                                                                                                             |
| <b>Week 8</b>  | Mid Exam                                                                                                                                      |
| <b>Week 9</b>  | Phylum Sporozoa (blood and tissue protozoan parasites) ( <i>Plasmodium</i> species)                                                           |
| <b>Week 10</b> | <i>Toxoplasma gondii</i> (toxoplasmosis)                                                                                                      |
| <b>Week 11</b> | Phylum Platyhelminthes                                                                                                                        |
| <b>Week 12</b> | <i>Heterophyes heterophyes</i> (Heterophyiasis)                                                                                               |
| <b>Week 13</b> | Liver and lung trematodes (Flukes)                                                                                                            |
| <b>Week 14</b> | <i>Fasciola hepatica</i> (Sheep liver fluke infection/fascioliasis)                                                                           |
| <b>Week 15</b> | Final Exam                                                                                                                                    |

### Delivery Plan (Weekly Lab. Syllabus)

#### المنهاج الاسبوعي للمختبر

|                | Material Covered                                                                                                        |
|----------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Week 1</b>  | Introduction of parasite: Properties of phylum Protozoa:<br>1- Class: Flagellata; 2- Sarcodina; 3- Ciliata; 4- Sporozoa |
| <b>Week 2</b>  | Class of Sarcodina, study of pathogenic genera such as <i>Entamoeba histolytica</i>                                     |
| <b>Week 3</b>  | Class of Flagellates, study of pathogenic genera such as <i>Giardia lamblia</i> , <i>Trichomonas</i>                    |
| <b>Week 4</b>  | Complement of class flagellates, Tissue and Blood flagellates                                                           |
| <b>Week 5</b>  | Class of Ciliata study of pathogenic genera such as <i>Balantidium coli</i>                                             |
| <b>Week 6</b>  | Class of Sporozoa study of pathogenic genera such as <i>Plasmodium</i> , <i>Toxoplasma</i>                              |
| <b>Week 7</b>  | Mid exam                                                                                                                |
| <b>Week 8</b>  | Phylum: Platyhelminthes, properties and classification                                                                  |
| <b>Week 9</b>  | Class 1 of Platyhelminthes; Cestoda and his pathogenic genera                                                           |
| <b>Week 10</b> | Class 2 of Platyhelminthes; Nematoda and his pathogenic genera                                                          |
| <b>Week 11</b> | Phylum Nemathelminthes, properties and classification                                                                   |
| <b>Week 12</b> | Pathogenic genera of Phylum Nemathelminthes, such as <i>Enterobius</i>                                                  |
| <b>Week 13</b> | Phylum Annelida, properties and classification                                                                          |
| <b>Week 14</b> | Classes of Annelida such as Oligochaeta, Hirudinea                                                                      |
| <b>Week 15</b> | Final exam                                                                                                              |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس |                                                                                                                                                                     |                           |
|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                                          | Text                                                                                                                                                                | Available in the Library? |
| <b>Required Texts</b>                                    | Gardner, S. L., & Gardner, S. A. (2024). Concepts in Animal Parasitology.                                                                                           | Yes                       |
| <b>Recommended Texts</b>                                 | Mathison, B. A., & Pritt, B. S. (2022). Medical parasitology. Henry's Clinical Diagnosis and Management by Laboratory Methods. 24th ed. Philadelphia, PA: Elsevier. | YES                       |
| <b>Websites</b>                                          | <a href="https://www.cdc.gov/parasites/index.html">https://www.cdc.gov/parasites/index.html</a><br><a href="https://bsp.uk.net/Home">https://bsp.uk.net/Home</a>    |                           |

| Grading Scheme<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                              |                  |                     |          |                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                       | Grade            | التقدير             | Marks %  | Definition                            |
| <b>Success Group (50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                             | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                             | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                             | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                             | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                             | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group (0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                                  | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                             | F – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
| <p><b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.</p> |                  |                     |          |                                       |

## MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                            |                   |                                                                                                                                                                                                                                                       |                             |      |
|------------------------------------|----------------------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------|
| معلومات المادة الدراسية            |                            |                   |                                                                                                                                                                                                                                                       |                             |      |
| Module Title                       | جرائم نظام البعث في العراق |                   | Module Delivery                                                                                                                                                                                                                                       |                             |      |
| Module Type                        | Basic learning activities  |                   | <input checked="" type="checkbox"/> Theory<br><input checked="" type="checkbox"/> Lecture<br><input type="checkbox"/> Lab<br><input type="checkbox"/> L Tutorial<br><input type="checkbox"/> Practical<br><input checked="" type="checkbox"/> Seminar |                             |      |
| Module Code                        | UD05                       |                   |                                                                                                                                                                                                                                                       |                             |      |
| ECTS Credits                       | 2                          |                   |                                                                                                                                                                                                                                                       |                             |      |
| SWL (hr/sem)                       | 50                         |                   |                                                                                                                                                                                                                                                       |                             |      |
| Module Level                       |                            | 2                 | Semester of Delivery                                                                                                                                                                                                                                  |                             | 4    |
| Administering Department           |                            | جميع اقسام الكلية | College                                                                                                                                                                                                                                               | College of Science          |      |
| Module Leader                      | Kamal Sabbar Breseem       |                   | e-mail                                                                                                                                                                                                                                                | kamalsabbar@uodiyala.edu.iq |      |
| Module Leader's Acad. Title        |                            |                   | Module Leader's Qualification                                                                                                                                                                                                                         |                             | MSc. |
| Module Tutor                       | Kamal Sabbar Breseem       |                   | e-mail                                                                                                                                                                                                                                                | kamalsabbar@uodiyala.edu.iq |      |
| Peer Reviewer Name                 |                            |                   | e-mail                                                                                                                                                                                                                                                |                             |      |
| Scientific Committee Approval Date |                            | 9/09/2024         | Version Number                                                                                                                                                                                                                                        |                             | 1.0  |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى |      |          |  |
|------------------------------------------------------------------|------|----------|--|
| Prerequisite module                                              | None | Semester |  |
| Co-requisites module                                             | None | Semester |  |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Module Objectives<br>أهداف المادة الدراسية                                                                         | <ol style="list-style-type: none"> <li>1. التعرف على ماهية الجريمة لغة واصطلاحاً وماهية أقسام الجرائم.</li> <li>2. التعرف على جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام 2005م.</li> <li>3. تنمية وعي الطالب بجرائم نظام البعث وفق توثيق قانون المحكمة الجنائية العراقية العليا لسنة 2005م.</li> <li>4. دراسة الجرائم التي ارتكبتها نظام البعث على مدى سنوات طويلة واثارها النفسية والاجتماعية.</li> <li>5. التعرف على صور انتهاكات حقوق الانسان وجرائم السلطة والتعرف على الجرائم البيئية لنظام البعث في العراق.</li> <li>6. تعزيز الوعي بحقيقة ما جرى من مآسي المقابر الجماعية المرتكبة من النظام البعثي في العراق.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية                                                          | <ol style="list-style-type: none"> <li>1. تمكين الطالب من معرفة المفاهيم النظرية للجرائم وأركان الجرم.</li> <li>2. تمكين الطالب من معرفة أقسام الجرائم.</li> <li>3. تمكين الطالب من معرفة قانون المحكمة الجنائية العراقية العليا لسنة 2005.</li> <li>4. فهم تشكيل المحكمة الجنائية العراقية العليا لسنة 2005 والتعرف على تشكيل المحكمة إجراءات التقاضي امام المحكمة.</li> <li>5. يتعلم الطالب أنواع الجرائم الدولية على وفق النظام الاساسي للمحكمة الجنائية الدولية.</li> <li>6. معرفة الطالب بالاثار النفسية والاجتماعية لجرائم نظام البعث.</li> <li>7. يتمكن الطالب من فهم موقف النظام البعثي من الدين من خلال فهم عقيدة النظام السياسي سبباً لفهم موقف النظام من الدين.</li> <li>8. يتمكن الطالب من التعرف على صور انتهاكات القوانين العراقية وأنتهاكات حقوق الانسان وجرائم السلطة.</li> <li>9. تمكين الطالب من التعرف على بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث.</li> <li>10. يتعرف الطالب على أماكن السجون والاحتجاز لنظام البعث.</li> <li>11. معرفة الطالب بالجرائم البيئية وبأثار الجرائم البيئية لنظام البعث، ويتعرف جرائم المقابر الجماعية.</li> </ol> |

|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Indicative Contents</b><br>المحتويات الإرشادية | <p><b>الجزء الاول : جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا لعام 2005م، والجرائم النفسية والاجتماعية وآثارها وابرز انتهاكات النظام البعثي في العراق:</b></p> <p>التعريف بالجريمة لغة وأصطلاحاً، اركان واقسام الجريمة ( 2 ساعة ). جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام 2005م : أنواع الجرائم الدولية، القرارات الصادرة من المحكمة الجنائية العليا ( 2 ساعة ). وابرز القضايا التي نظرت فيها المحكمة ( 2 ساعة ). الجرائم النفسية والاجتماعية وآثارها وابرز انتهاكات النظام البعثي في العراق: الجرائم النفسية، اليات الجرائم النفسية ( 2 ساعة ). اثار الجرائم النفسية ، الجرائم الاجتماعية ( 2 ساعة ) . عسكرة المجتمع، موقف النظام البعثي من الدين ( 2 ساعة ) . أنتهاكات القوانين العراقية، صور أنتهاكات حقوق الانسان ( 2 ساعة ) . جرائم السلطة، بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث، أماكن السجون والاحتجاز لنظام البعث ( 2 ساعة ).</p> <p><b>الجزء الثاني : الجرائم البيئية لنظام البعث في العراق، جرائم المقابر الجماعية :</b></p> <p>الجرائم البيئية لنظام البعث في العراق: التلوث الحربي والاشعاعي – أستعمال الاسلحة المحرمة دولياً ومخاطر الالغام. ( 2 ساعة ). التلوث بالمواد المشعة، أثار أستخدام الاسلحة المحرمة دولياً ( 2 ساعة ). تدمير المدن والقرى ( سياسة الارض المحروقة ): قصف المدن، قصف العتبات المقدسة والمساجد والحسينيات، معركة نهر جاسم ، حرق آبار النفط ( 2 ساعة ). تجفيف الاهوارو أثارها البيئية والاجتماعية والاقتصادية ( 2 ساعة ). ، تجريف بساتين النخيل والاشجار والمزروعات ( 2 ساعة ). جرائم المقابر الجماعية وموقف الامم المتحدة منها ( 2 ساعة ). احداث المقابر الجماعية المرتكبة من النظام البعثي في العراق، التصنيف الزمني لمقابر ابادة الجماعية في العراق للمدة 1963- 2003 ( 2 ساعة ).</p> |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                      | <p>1- زيادة وعي الطالب بالجرائم التي ارتكبها نظام البعث في العراق وحقيقة ما جرى من مآسي وويلات بحق الشعب العراقي.</p> <p>2- اكتساب الطالب ثقافة عامة بماهية الجرائم واركانها واقسامها وموقف المشرع العراقي منها.</p> <p>3- زيادة وعي الطالب بموقف القانون الدولي والمحاكم الجنائية الدولية من الجرائم والانتهاكات التي ترتكبها الانظمة السلطوية.</p> |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطالب محسوب لـ 15 أسبوعاً      |           |                                                                            |            |
|--------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|------------|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | <b>33</b> | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعياً       | <b>2.2</b> |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | <b>17</b> | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعياً | <b>1.1</b> |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | <b>50</b> |                                                                            |            |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |                      |                  |            |                           |  |
|---------------------------------------------------|----------------------|------------------|------------|---------------------------|--|
|                                                   | Time/Number          | Weight (Marks)   | Week Due   | Relevant Learning Outcome |  |
| Formative assessment                              | Quizzes              | 2<br>10% (10)    | 5, 10      | LO #1, 2, 10 and 11       |  |
|                                                   | Assignments          | 2<br>10% (10)    | 2, 12      | LO # 3, 4, 6 and 7        |  |
|                                                   | Projects / tutorial. | 1<br>10% (10)    | Continuous |                           |  |
|                                                   | Report               | 1<br>10% (10)    | 13         | LO # 5, 8 and 10          |  |
| Summative assessment                              | Midterm Exam         | 1 hr<br>10% (10) | 7          | LO # 1-7                  |  |
|                                                   | Final Exam           | 2hr<br>50% (50)  | 16         | All                       |  |
| Total assessment                                  |                      | 100% (100 Marks) |            |                           |  |

| <b>Delivery Plan (Weekly Syllabus)</b><br>المناهج الاسبوعي النظري |                         |
|-------------------------------------------------------------------|-------------------------|
|                                                                   | <b>Material Covered</b> |

## Semester Four

|         |                                                                                                                                               |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Week 1  | محاضرة تعريفية عن المادة وأهميتها.                                                                                                            |
| Week 2  | التعريف بالجريمة لغة واصطلاحاً، أقسام الجريمة، جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام 2005م ، أنواع الجرائم الدولية. |
| Week 3  | القرارات الصادرة من المحكمة الجنائية العليا، وأبرز القضايا التي نظرت فيها المحكمة.                                                            |
| Week 4  | الجرائم النفسية، اليات الجرائم النفسية.                                                                                                       |
| Week 5  | اثار الجرائم النفسية، الجرائم الاجتماعية                                                                                                      |
| Week 6  | عسكرة المجتمع، موقف النظام البعثي من الدين.                                                                                                   |
| Week 7  | انتهاكات القوانين العراقية، صور انتهاكات حقوق الانسان، جرائم السلطة.                                                                          |
| Week 8  | بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث، أماكن السجون والاحتجاز لنظام البعث.                                                     |
| Week 9  | الجرائم البيئية لنظام البعث في العراق: التلوث الحربي والاشعاعي – استعمال الاسلحة المحرمة دولياً ومخاطر الألغام.                               |
| Week 10 | التلوث بالمواد المشعة، أثار استخدام الاسلحة المحرمة دولياً                                                                                    |
| Week 11 | تدمير المدن والقرى (سياسة الارض المحروقة).                                                                                                    |
| Week 12 | تجفيف الأهوار أثارها البيئية والاجتماعية والاقتصادية .                                                                                        |
| Week 13 | تجريف بساتين النخيل والاشجار والمزروعات.                                                                                                      |
| Week 14 | جرائم المقابر الجماعية، أحداث المقابر الجماعية المرتكبة من النظام البعثي في العراق.                                                           |
| Week 15 | التصنيف الزمني لمقابر الإبادة الجماعية في العراق للمدة 1963 - 2003.                                                                           |
| Week 16 | الامتحان النهائي                                                                                                                              |

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

|                   | Text                                                                                                                          | Available in the Library? |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| Required Texts    | المنهج المقرر الدراسي للجامعات الحكومية و الأهلية كافة كتاب وزارة التعليم والبحث العلمي ذي العدد (ت م 3 / 7588 في 2023/10/19) | نعم                       |
| Recommended Texts |                                                                                                                               | لا                        |
| Websites          |                                                                                                                               |                           |

### Grading Scheme

#### مخطط الدرجات

| Group                       | Grade            | التقدير             | Marks %  | Definition                            |
|-----------------------------|------------------|---------------------|----------|---------------------------------------|
| Success Group<br>(50 - 100) | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                             | B - Very Good    | جيد جداً            | 80 - 89  | Above average with some errors        |
|                             | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                             | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                             | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)      | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                             | F – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
|                             |                  |                     |          |                                       |

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

## MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information                 |                        |                               |                                                                                                                                                                                                                                                     |
|------------------------------------|------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                        |                               |                                                                                                                                                                                                                                                     |
| Module Title                       | <b>Biochemistry II</b> |                               | Module Delivery                                                                                                                                                                                                                                     |
| Module Type                        | <b>Core</b>            |                               | <input checked="" type="checkbox"/> Theory<br><input checked="" type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | <b>Bio-2414</b>        |                               |                                                                                                                                                                                                                                                     |
| ECTS Credits                       | <b>6</b>               |                               |                                                                                                                                                                                                                                                     |
| SWL (hr/sem)                       | <b>143</b>             |                               |                                                                                                                                                                                                                                                     |
| Module Level                       | 2                      | Semester of Delivery          |                                                                                                                                                                                                                                                     |
| Administering Department           | Dept. of Biology       | College                       | College of Science                                                                                                                                                                                                                                  |
| Module Leader                      | Waseem Yousif Mohammed | e-mail                        | waseemyousif@uodiyala.edu.iq                                                                                                                                                                                                                        |
| Module Leader's Acad. Title        | Assist Prof.           | Module Leader's Qualification | Ph.D.                                                                                                                                                                                                                                               |
| Module Tutor                       | Waseem Yousif Mohammed | e-mail                        | waseemyousif@uodiyala.edu.iq                                                                                                                                                                                                                        |
| Peer Reviewer Name                 |                        | e-mail                        |                                                                                                                                                                                                                                                     |
| Scientific Committee Approval Date |                        | Version Number                | 1.0                                                                                                                                                                                                                                                 |

| Relation with other Modules       |                |          |   |
|-----------------------------------|----------------|----------|---|
| العلاقة مع المواد الدراسية الأخرى |                |          |   |
| Prerequisite module               | Biochemistry I | Semester | 3 |
| Co-requisites module              |                | Semester |   |

| Module Aims, Learning Outcomes and Indicative Contents    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Module Objectives<br>أهداف المادة الدراسية                | The module is designed to provide students with details of the metabolism of major classes of biomolecules. This will encourage an appreciation of the diversity and interconnection of metabolic pathways, and stimulate an understanding of the applicability of metabolism in a broad range of biological contexts.                                                                                                                                                                                                                                                 |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. Explain the biosynthesis and catabolism of various metabolites in cells<br>2. Describe carbohydrate metabolism, particularly, gluconeogenesis and the pentose phosphate pathway<br>3. Describe lipid and nucleotide metabolism as well as biosynthesis and catabolism of amino acids<br>4. Discuss metabolic interrelationships in cells and tissues under various conditions<br>5. Dissect biosynthetic and catabolic pathways of diverse metabolites and their products in cells<br>6. Conduct laboratory practicals, collect data, interpret and discuss results |
| Indicative Contents<br>المحتويات الإرشادية                | Carbohydrate metabolism - Gluconeogenesis and the pentose phosphate pathway - The role of enzymes and hormones in the control of metabolisms - Metabolic roles and importance in energy supply and provision of precursors - Lipid metabolism - Function, transport and storage of lipids and other esters - Biosynthesis, degradation, and desaturation - Acetyl-CoA carboxylase and                                                                                                                                                                                  |

|  |                                                                                                                                                                                                                                |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | fatty acid synthesis - Purine and pyrimidine nucleotide metabolism - Nitrogen acquisition and amino acid metabolism - Biosynthesis and catabolism of amino acids and the regulation of pathways - Metabolic interrelationships |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b> | Lessons of all units will be offered in an interactive lecture where student participation is mandatory either by forming small group discussion in class, exchange ideas and question one another. Where applicable students will be assigned problems to solve and encouraged to assess one another. Learning material will be supplied to students in class or uploaded on Blackboard learning management system. Students will also be regularly referred to relevant section of the prescribed text book. Most of the tutorial work will be done as self-study or with the assistance of a tutor. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination. |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Student Workload (SWL)

#### الحمل الدراسي للطالب محسوب لـ 15 اسبوعا

|                                                                                |     |                                                                           |     |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|-----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 65  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 4.3 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 78  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5.2 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 143 |                                                                           |     |

### Module Evaluation

#### تقييم المادة الدراسية

|                             |                        | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
|-----------------------------|------------------------|-------------|------------------|------------|---------------------------|
| <b>Formative assessment</b> | <b>Quizzes</b>         | 2           | 10% (10)         | 5 and 10   | LO #1, #2 and #10, #11    |
|                             | <b>Assignments</b>     | 2           | 10% (10)         | 2 and 12   | LO #3, #4 and #6, #7      |
|                             | <b>Projects / Lab.</b> | 1           | 10% (10)         | Continuous | All                       |
|                             | <b>Report</b>          | 1           | 10% (10)         | 13         | LO #5, #8 and #10         |
| <b>Summative assessment</b> | <b>Midterm Exam</b>    | 2hr         | 10% (10)         | 7          | LO #1 - #7                |
|                             | <b>Final Exam</b>      | 3hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>     |                        |             | 100% (100 Marks) |            |                           |

### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

|               | Material Covered                                              |
|---------------|---------------------------------------------------------------|
| <b>Week 1</b> | Carbohydrate metabolism (digestion, absorption)               |
| <b>Week 2</b> | Anaerobic oxidation, calculation energy                       |
| <b>Week 3</b> | Lipid metabolism (digestion) and absorption acids bile salts, |
| <b>Week 4</b> | The Fatty Acid Oxidation, Energetics of $\beta$ -oxidation    |
| <b>Week 5</b> | oxidation and energy calculation                              |
| <b>Week 6</b> | Protein metabolism, osmotic balance                           |
| <b>Week 7</b> | Digestion and absorption Proteins: transformations            |

## Semester Four

|                   |                                                                     |
|-------------------|---------------------------------------------------------------------|
| <b>Week 8</b>     | EXAM                                                                |
| <b>Week 9</b>     | The chemistry of acids the amino in living tissues                  |
| <b>Week 10</b>    | Products Final, (urea) to disintegrate amino acids in living tissue |
| <b>Week 11-12</b> | Hormones                                                            |
| <b>Week 13</b>    | Sugar biosynthesis, Photosynthesis and synthesis disaccharides      |
| <b>Week 14</b>    | Sugar biosynthesis, Photosynthesis and synthesis disaccharide       |
| <b>Week 15</b>    | Preparatory week before the final Exam                              |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                                        |
|--------------------------------------------------------------------------------|----------------------------------------|
|                                                                                | Material Covered                       |
| <b>Week 1</b>                                                                  | Amino acids- Solubility test           |
| <b>Week 2</b>                                                                  | Ninhydrin Test                         |
| <b>Week 3</b>                                                                  | Xanthoproteic test                     |
| <b>Week 4</b>                                                                  | Mellon test                            |
| <b>Week 5</b>                                                                  | Sakaguchi test                         |
| <b>Week 6</b>                                                                  | Hopkins-Colé test                      |
| <b>Week 7</b>                                                                  | EXAM                                   |
| <b>Week 8</b>                                                                  | Proteins -Biuret test                  |
| <b>Week 9</b>                                                                  | Denaturation                           |
| <b>Week 10</b>                                                                 | Precipitation using concentrated acid  |
| <b>Week 11</b>                                                                 | Precipitation by salts of heavy metals |
| <b>Week 12</b>                                                                 | Precipitation by alkaline reagents     |
| <b>Week 13</b>                                                                 | Precipitation using organic solvents   |
| <b>Week 14</b>                                                                 | Precipitation using neutral salts      |
| <b>Week 15</b>                                                                 | EXAM                                   |

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس</b> |                                                                                                                                                                                                                                                                                                                                                    |                           |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                                                        | Text                                                                                                                                                                                                                                                                                                                                               | Available in the Library? |
| <b>Required Texts</b>                                                  | L Nelson, D., & Michael M, C. (2021). Lehninger Principles of Biochemistry 8th Edition.                                                                                                                                                                                                                                                            | Yes                       |
| <b>Recommended Texts</b>                                               | Rodwell, V. W., Bender, D., & Botham, K. M. (2018). Harper's illustrated biochemistry. McGraw-Hill.                                                                                                                                                                                                                                                | No                        |
| <b>Websites</b>                                                        | <a href="https://ocw.mit.edu/courses/5-111-principles-of-chemical-science-fall-2008/">https://ocw.mit.edu/courses/5-111-principles-of-chemical-science-fall-2008/</a><br><a href="https://ocw.mit.edu/courses/7-012-introduction-to-biology-fall-2004/download/">https://ocw.mit.edu/courses/7-012-introduction-to-biology-fall-2004/download/</a> |                           |

| Grading Scheme<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                       |                  |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير             | Marks %  | Definition                            |
| <b>Success Group<br/>(50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                  | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                       | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                                      |                  |                     |          |                                       |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |                     |          |                                       |

## MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية |                        |                               |                                                                                                                                                                                                                                                     |
|-----------------------------------------------|------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Module Title                                  | <b>Microbiology II</b> |                               | Module Delivery                                                                                                                                                                                                                                     |
| Module Type                                   | <b>Core</b>            |                               | <input checked="" type="checkbox"/> Theory<br><input checked="" type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                                   | <b>Bio-2415</b>        |                               |                                                                                                                                                                                                                                                     |
| ECTS Credits                                  | <b>7</b>               |                               |                                                                                                                                                                                                                                                     |
| SWL (hr/sem)                                  | <b>145</b>             |                               |                                                                                                                                                                                                                                                     |
| Module Level                                  | 2                      | Semester of Delivery          |                                                                                                                                                                                                                                                     |
| Administering Department                      | Dept. of Biology       | College                       | College of Science                                                                                                                                                                                                                                  |
| Module Leader                                 | Zainab Mohammed Nsaif  | e-mail                        | dr.zainab@uodiyala.edu.iq                                                                                                                                                                                                                           |
| Module Leader's Acad. Title                   | Professor              | Module Leader's Qualification | PhD                                                                                                                                                                                                                                                 |
| Module Tutor                                  | Zainab Mohammed Nsaif  | e-mail                        | dr.zainab@uodiyala.edu.iq                                                                                                                                                                                                                           |
| Peer Reviewer Name                            |                        | e-mail                        |                                                                                                                                                                                                                                                     |
| Scientific Committee Approval Date            | 01/09/2024             | Version Number                | 1.0                                                                                                                                                                                                                                                 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى |                |          |   |
|------------------------------------------------------------------|----------------|----------|---|
| Prerequisite module                                              | Microbiology I | Semester | 3 |
| Co-requisites module                                             |                | Semester |   |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Module Objectives<br>أهداف المادة الدراسية                                                                         | <p>Clinical microbiology deals with microorganisms such as pathogenic bacteria, viruses, fungi and parasites which are medically important and cause human diseases. Generally, microorganisms can cause a tremendous change on our planet and our life, there is a scientific speech says if “there is no microorganism on our earth there is no life on our planet” otherwise is also true because there are some dangerous and infectious microorganism which cause a dangerous airborne, foodborne and waterborne diseases that some of them are fatal and threaten human life. Evolution in the field of Clinical microbiology and exactly about identification of pathogenic microorganisms and the methods of chemotherapy and prophylaxes has saved the life of millions of peoples on our planet.</p> <p>Students will acquire a broad understanding of the basics of microbiology laboratories in terms of sterilization methods and the rules that must be adhered to when dealing with the tools and equipment used, in addition to using the laboratory techniques necessary to isolate these organisms and identify their shapes and characteristics. The student will also learn the techniques necessary to identify the types of these organisms and their groups, methods of counting, isolating and staining them.</p> |

|                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                  | <b>Course Objective:</b> <ol style="list-style-type: none"> <li>1. To understand the basic principles of Clinical Microbiology.</li> <li>2. To provide the student with the basic knowledge of microorganisms in general</li> <li>3. To study the main characteristics of microbes of medical importance and their identification.</li> <li>4. To teach aseptic techniques.</li> <li>5. To provide an understanding of antimicrobial agents and infectious diseases.</li> <li>6. To teach the basic immunological principles and methods for the study of immunological disorders.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية | <b>At the end of this module students should be able to:</b> <ul style="list-style-type: none"> <li>▪ Develop advanced academic knowledge about the concepts and principles of Medical Microbiology.</li> <li>▪ Cover the importance of Microbiology and the history background of this subject.</li> <li>▪ Detail knowledge about the Medical Microbiology and its applications.</li> <li>▪ Having knowledge about the up-to-date advancing and development in this field of subject</li> <li>▪ They could be familiar with the modest instruments in the medical labs like PCR and ELISA.</li> <li>▪ In addition to learning practically the technique of examining, using, how to collect the different type of specimens and how to prepare it for examinations and be familiar with the results and writing reports.</li> <li>▪ Recognition the methods of sterilization in the laboratory.</li> <li>▪ Tools and equipment used in the laboratory.</li> <li>▪ Staining methods and types of dyes used to identify the types of microorganisms.</li> <li>▪ Methods of counting bacteria.</li> <li>▪ Techniques for the process of culturing on plates.</li> </ul> |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                | The module will include:<br>Class attendance is regularly 85-90% of lectures each week 5 minutes before the lecture is a must. The students should also submit homework and assignments, accomplish extra classroom requirements such as preparing scientific reports, presentation and seminars and also be ready for performing quizzes, mid-term and final exams, participate in the laboratory works (practical labs) in order to pass successfully. Basics of working in the laboratory. Methods of dealing with tools and equipment in the laboratory.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                      | <p>Every student or small grouping students must prepare a report about a subject regarding clinical microbiology. Each report must include the following information: the logo of university or the Institute, the name of college or department, student's name, the title of the report, short description and brief introduction about the subject, aims of the report, short review literature, prospects and overviews and finally the references. Each student or small group is present his/her/there reports as a seminar (presentation) to confirm their capability to speak about a scientific subject in front of gathering in a teaching hall.</p> <p>All lessons held in the laboratory will be practical, with the participation of all students, who will be distributed into small groups to obtain the required results and encourage the spirit of competition among students and</p> |

## Semester Four

|  |                                                                               |
|--|-------------------------------------------------------------------------------|
|  | encouragement among groups to complete the experiment in the required manner. |
|--|-------------------------------------------------------------------------------|

| Student Workload (SWL)<br>الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا              |     |                                                                           |     |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|-----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | 65  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 4.3 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 80  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 5.3 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل              | 145 |                                                                           |     |

| Module Evaluation<br>تقييم المادة الدراسية |                        |             |                  |            |                           |
|--------------------------------------------|------------------------|-------------|------------------|------------|---------------------------|
|                                            |                        | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| <b>Formative assessment</b>                | <b>Quizzes</b>         | 2           | 10% (10)         | 5 and 10   | LO #1, #2 and #10,        |
|                                            | <b>Assignments</b>     | 2           | 10% (10)         | 2 and 12   | LO #3, #4 and #6, #7      |
|                                            | <b>Projects / Lab.</b> | 1           | 10% (10)         | Continuous | All                       |
|                                            | <b>Report</b>          | 1           | 10% (10)         | 13         | LO #5, #8 and #10         |
| <b>Summative assessment</b>                | <b>Midterm</b>         | 2hr         | 10% (10)         | 7          | LO #1 - #7                |
|                                            | <b>Final Exam</b>      | 3hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>                    |                        |             | 100% (100 Marks) |            |                           |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري |                                                           |
|------------------------------------------------------------|-----------------------------------------------------------|
|                                                            | Material Covered                                          |
| <b>Week 1</b>                                              | Introduction to Systemic Classification of Microorganisms |
| <b>Week 2</b>                                              | Systematic Classification of Bacteria                     |
| <b>Week 3</b>                                              | Systematic Classification of Fungi                        |
| <b>Week 4</b>                                              | Systematic Classification of Algae                        |
| <b>Week 5</b>                                              | First Exam                                                |
| <b>Week 6</b>                                              | Systematic Classification of Protozoa                     |
| <b>Week 7</b>                                              | Microbes and Biogeochemical Cycling of Elements           |
| <b>Week 8</b>                                              | Introduction into Environmental Microbiology              |
| <b>Week 9</b>                                              | Introduction to Industrial Microbiology                   |
| <b>Week 10</b>                                             | Introduction to medical microbiology and Immunity         |
| <b>Week 11</b>                                             | Introduction to immunology                                |
| <b>Week 12</b>                                             | Review                                                    |
| <b>Week 13</b>                                             | Second Exam                                               |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر |                  |
|------------------------------------------------------------------|------------------|
|                                                                  | Material Covered |

## Semester Four

|                |                                                                    |
|----------------|--------------------------------------------------------------------|
| <b>Week 1</b>  | Lab1 An introduction to microbiology, aseptic technique and safety |
| <b>Week 2</b>  | Lab2 Tools and Equipment used in Microbiology Lab.                 |
| <b>Week 3</b>  | Lab3 Culture Media                                                 |
| <b>Week 4</b>  | Lab4 Bacterial Staining                                            |
| <b>Week 5</b>  | Lab5 Type of the Stains/ Differential stain                        |
| <b>Week 6</b>  | Lab6 Selective stain                                               |
| <b>Week 7</b>  | Lab7 Antibiotics                                                   |
| <b>Week 8</b>  | Mid exam                                                           |
| <b>Week 9</b>  | Lab8 Bacterial Count                                               |
| <b>Week 10</b> | Lab9 Turbidimetry Determinations:                                  |
| <b>Week 11</b> | Lab10 Pour Plate Method                                            |
| <b>Week 12</b> | Lab11 Bacterial Culture Techniques                                 |
| <b>Week 13</b> | Lab12 Colony morphology                                            |
| <b>Week 14</b> | Lab13 Yeast and molds                                              |
| <b>Week 15</b> | Final exam                                                         |

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس</b> |                                                                                                                                                                                                                |                                  |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                                                                        | <b>Text</b>                                                                                                                                                                                                    | <b>Available in the Library?</b> |
| <b>Required Texts</b>                                                  | Dubey, R. C., & Maheshwari, D. K. (2023). A textbook of microbiology. S. Chand Publishing.                                                                                                                     | Yes                              |
| <b>Recommended Texts</b>                                               | Green, L. H., & Goldman, E. (Eds.). (2021). Practical handbook of microbiology. CRC press.<br>Parija, S. C. (2023). Textbook of microbiology and immunology. Berlin, Heidelberg, Germany: Springer.            | Yes                              |
| <b>Websites</b>                                                        | <a href="https://microbiologyinfo.com/">https://microbiologyinfo.com/</a><br><a href="https://microbe.net/resources/microbiology-web-resources/">https://microbe.net/resources/microbiology-web-resources/</a> |                                  |

| <b>Grading Scheme</b><br><b>مخطط الدرجات</b> |                  |                     |                |                                       |
|----------------------------------------------|------------------|---------------------|----------------|---------------------------------------|
| <b>Group</b>                                 | <b>Grade</b>     | <b>التقدير</b>      | <b>Marks %</b> | <b>Definition</b>                     |
| <b>Success Group (50 - 100)</b>              | A - Excellent    | امتياز              | 90 - 100       | Outstanding Performance               |
|                                              | B - Very Good    | جيد جدا             | 80 - 89        | Above average with some errors        |
|                                              | C - Good         | جيد                 | 70 - 79        | Sound work with notable errors        |
|                                              | D - Satisfactory | متوسط               | 60 - 69        | Fair but with major shortcomings      |
|                                              | E - Sufficient   | مقبول               | 50 - 59        | Work meets minimum criteria           |
| <b>Fail Group (0 – 49)</b>                   | FX – Fail        | راسب (قيد المعالجة) | (45-49)        | More work required but credit awarded |
|                                              | F – Fail         | راسب                | (0-44)         | Considerable amount of work required  |

## Semester Four

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**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.



## First Cycle – Bachelor's Degree (B.Sc.) – Biology

بكالوريوس – علوم حياة

تم اعداد الملف من قبل قسم علوم لحياة /كلية العلوم /جامعة ديالى

المستوى الثالث

# Level Three

August , 2025

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## 1. Mission & Vision Statement

### Vision Statement

Opportunities for high-level training are available for the students enrolled in the Department of Biology, to prepare them to enter the labor market after graduation to work in the medical laboratories, teaching in the secondary schools, and working in the agricultural enterprises, environmental affairs, water resources and other institutions that have relationships with biological sciences in one way or another. The combination of instructional methods leads students to a balanced understanding of the scientific methods used by biologists to make observations, develop insights and create theories about the living organisms that populate our planet. Small class sizes within the biology program foster a close working relationship between academic staff and students in an informal and nurturing atmosphere.

### Mission Statement

The biology academic staff pursues a multifaceted charge at Diyala University. The Program seeks to provide all biology students with fundamental knowledge of biology, as well as a deeper understanding of a selected focus area within the biological sciences. The curriculum and advising have been designed to prepare graduates for their professional future, whether they choose to work as field biologists specializing in botany or wildlife, or to pursue advanced degrees in the life sciences or health sciences. The biology program also provides the necessary fundamental knowledge of the life sciences to support the Nursing degree, the Environmental Studies degree, and the Associate of Science degree in Forest Technology. In addition, biology courses provide a key laboratory science experience for those students seeking to complete the general education requirements

## 2. Program Specification

|                        |                       |                              |           |
|------------------------|-----------------------|------------------------------|-----------|
| <b>Programme code:</b> | BSc-Bio               | <b>ECTS</b>                  | 240       |
| <b>Duration:</b>       | 4 levels, 8 Semesters | <b>Method of Attendance:</b> | Full Time |

Biology means the study of life. It is an exciting, wonderful and rapidly developing subject. Biology play an important role in overcoming the global challenges from disease to environment of the earth. The programme puts a strong emphasis on research and academic skills training across all years. The BSc in Biology is designed to provide students with a solid foundation in fundamentals aspects of plant, animal, ecology, genetics and microbiology. The programme provide skills in laboratory and practical skills that are appropriate to the study of living organisms. The programme is also designed to provide students with a wide-ranging exposure to the theory and practice of the courses, as well as an education in its diverse applications in medicine, industry, and environment.

Biology graduates are qualified for many different types of careers. The breadth of biology studied will determine the opportunities available, but regardless of the path chosen, students will have acquired a broad variety of subject-specific and general abilities that are applicable to jobs in both the biological and non-biological domains.

To graduate, a student shall have undergone 8 semesters of study including summer practical training. Course workload must meet the graduation requirements of the University based on minimum academic standards. The student must earn a minimum of 240 ECTS for the four-year programme.

Level one is focusing on fundamental topics such as Zoology, Botany, Chemistry, Biophysics and Mathematics. Level two will cover a range of concepts including biological systems and the importance of biology in real life. The students will explore topics such as Biochemistry, Entomology, Microbiology, Parasitology, Plant Taxonomy and Anatomy allowing them to develop their interests at a higher level. During level three and four, the students will study in-depth courses provide them an opportunities to learn specialist topics such as biotechnology, molecular biology, pathogenic bacteria, medical virology, pollution, histology and immunology. In the fourth year, more emphasis is placed on student centred learning exercises, workshops, and seminars. Year 4 has a compulsory undertaking a research project/dissertation.

## 3. Program Objectives

1. A comprehensive study of biological sciences, their applications and uses in society theoretically, scientifically and applicability.
2. Preparation of scientific cadres to work in the fields of medicine and health, agricultural and food industries.
3. Providing the students with the necessary scientific techniques and how to deal with devices and equipments that can be used in theoretical and applied studies.
4. Providing the state institutions, private and mixed sectors (medical, industrial and laboratory institutions) with specialized cadres.
5. Investigate and study the new developments in the biological sciences and keep updated with the scientific developments in this field and incorporate that within the prescribed curriculum.
6. To prepare students for a wide variety of post-baccalaureate paths, including graduate school, professional training programs, or entry level jobs in any area of biology.

## 4. Student Learning Outcomes

Biology is the study of the organization and operation of life at the molecular, cellular, organism, and population levels. Graduates obtain information on the historical, technical and social aspects of biology and utilize basic knowledge toward realizing broader concepts. The Department offers a Bachelor of Science in Biology with a concentration in General Biology; Pre-medicine / Pre-dentistry; Biotechnology/Molecular Biology and a minor in Secondary Education that leads to a Public Instruction License. Additionally, the Department offers courses to a large number of students from other departments and supports pre-professional programs. The Biology curriculum and experiences are designed to prepare students, in part, for entry into professional health programs, graduate studies, technical careers and education.

1. Graduates will be able to illustrate the structure and function cellular components and explain how they interact in a living cell.
2. Graduates will be able to formally communicate the results of biological investigations using both oral and written communication skills.
3. Graduates will be able to perform laboratory experiments and field studies, by using scientific equipment and computer technology while observing appropriate safety protocols.
4. Graduates will be able to demonstrate a balanced including the historical development of foundational concept of how scientific knowledge develops, theories and laws and the nature of science.
5. Graduates will be able to demonstrate scientific quantitative skills, such as the ability to conduct simple data analyses.
6. Graduates will be able to use critical-thinking and problem-solving skills to develop a research project and/or paper.

## 5. Academic Staff

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## 6. Credits, Grading and GPA

### Credits

AL-Turath University is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 25 hrs student workload, including structured and unstructured workload.

## Grading

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

| GRADING SCHEME                                                                                                                                                                                                                                                                                                                                                           |                  |                     |           |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|-----------|---------------------------------------|
| مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                             |                  |                     |           |                                       |
| Group                                                                                                                                                                                                                                                                                                                                                                    | Grade            | التقدير             | Marks (%) | Definition                            |
| Success Group<br>(50 - 100)                                                                                                                                                                                                                                                                                                                                              | A - Excellent    | امتياز              | 90 - 100  | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                          | B - Very Good    | جيد جدا             | 80 - 89   | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                          | C - Good         | جيد                 | 70 - 79   | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                          | D - Satisfactory | متوسط               | 60 - 69   | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                          | E - Sufficient   | مقبول               | 50 - 59   | Work meets minimum criteria           |
| Fail Group<br>(0 – 49)                                                                                                                                                                                                                                                                                                                                                   | FX – Fail        | راسب - قيد المعالجة | (45-49)   | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                          | F – Fail         | راسب                | (0-44)    | Considerable amount of work required  |
| Note:                                                                                                                                                                                                                                                                                                                                                                    |                  |                     |           |                                       |
| Number Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |                     |           |                                       |

## Calculation of the Cumulative Grade Point Average (CGPA):

The CGPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

CGPA of a 4-year B.Sc. degree:

$$\text{CGPA} = [(1^{\text{st}} \text{ module score} \times \text{ECTS}) + (2^{\text{nd}} \text{ module score} \times \text{ECTS}) + \dots] / 240$$

## 7. Curriculum/Modules

**Semester 5 | 30 ECTS | 1 ECTS = 25 hrs**

| Code     | Module           | SSWL | USSWL | ECTS | Type | Pre-request |
|----------|------------------|------|-------|------|------|-------------|
| Bio-3511 | Cell Biology     | 63   | 62    | 5    | C    |             |
| Bio-3512 | Ecology          | 63   | 37    | 4    | C    |             |
| Bio-3513 | Histology        | 63   | 37    | 4    | C    |             |
| Bio-3514 | Mycology         | 63   | 62    | 5    | C    |             |
| Bio-3515 | Plant Physiology | 63   | 37    | 4    | C    |             |
| Bio-3516 | Immunology       | 63   | 37    | 4    | C    |             |
| Bio-3517 | Parasitology     | 63   | 37    | 4    | E    |             |

**Semester 6 | 30 ECTS | 1 ECTS = 25 hrs**

| Code     | Module                         | SSWL | USSWL | ECTS | Type | Pre-request |
|----------|--------------------------------|------|-------|------|------|-------------|
| Bio-3611 | Genetics                       | 63   | 62    | 5    | C    |             |
| Bio-3612 | Environmental Pollution        | 63   | 62    | 5    | C    |             |
| Bio-3613 | Animal Physiology              | 63   | 37    | 4    | C    |             |
| Bio-3614 | Biotoxicology                  | 63   | 37    | 4    | E    |             |
| Bio3615  | Microbiology(Aquatic and Soil) | 63   | 37    | 4    | C    |             |
| Bio-3616 | Microbial Physiology           | 63   | 37    | 4    | C    |             |
| Bio-3617 | Biological Control             | 63   | 37    | 4    | C    |             |

## 8. Contact

### Program Manager:

**Dr. Esam Hamid Hameed | Ph.D. in Biotechnology | Assistant Professor**

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### Program Coordinator:

**Naseer Khalil Abed | Ph.D. in Biology | Lecturer**

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## First Cycle – Bachelor's Degree (B.Sc.) – Biology

بكالوريوس – علوم حياة

تم اعداد الملف من قبل قسم علوم لحياة /كلية العلوم /جامعة ديالى

المستوى الثالث

# Level Three

August , 2025

## Table of Contents

1. Overview
2. Undergraduate Modules 2024-2025
3. Contact

## 1. Overview

This catalogue is about the courses (modules) given by the program of Biology to gain the Bachelor of Science degree. The program delivers (14) Modules with total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

### نظرة عامة

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج علوم الحياة للحصول على درجة بكالوريوس في العلوم ويقدم البرنامج (14) مادة دراسية مع إجمالي ساعات حمل الطالب و 240 إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

## 2. Undergraduate Courses 2024-2025

### Module 1

| Code                                                                                                                                                                                                                                                                                                                                                    | Course/Module Title   | ECTS          | Semester    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|-------------|
| Bio-3511                                                                                                                                                                                                                                                                                                                                                | Cell Biology          | 5             | 5           |
| Class (hr/w)                                                                                                                                                                                                                                                                                                                                            | Lect/Lab./Prac./Tutor | SSWL (hr/sem) | USWL (hr/w) |
| 2                                                                                                                                                                                                                                                                                                                                                       | 2                     | 63            | 62          |
| Description                                                                                                                                                                                                                                                                                                                                             |                       |               |             |
| Cell biology, also known as cytology, is the study of cells as the fundamental units of life. It focuses on cell structure, function, growth, division, communication, and interactions with the environment. This field provides essential knowledge for understanding health, disease, and biological processes at the molecular and cellular levels. |                       |               |             |

### Module 2

| Code                                                                                                                                                                                                                                                                                                                                                                                                                   | Course/Module Title   | ECTS          | Semester    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|-------------|
| Bio-3512                                                                                                                                                                                                                                                                                                                                                                                                               | Ecology               | 4             | 5           |
| Class (hr/w)                                                                                                                                                                                                                                                                                                                                                                                                           | Lect/Lab./Prac./Tutor | SSWL (hr/sem) | USWL (hr/w) |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                      | 2                     | 63            | 37          |
| Description                                                                                                                                                                                                                                                                                                                                                                                                            |                       |               |             |
| Ecology is the branch of biology that studies the interactions between organisms and their environment, including both living (biotic) and non-living (abiotic) components. It examines how these interactions shape the distribution, abundance, and diversity of life on Earth. Ecology provides essential insights into ecosystem functioning, environmental balance, and the impact of human activities on nature. |                       |               |             |

## Module 3

| Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Course/Module Title   | ECTS          | Semester    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|-------------|
| Bio-3513                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Histology             | 4             | 5           |
| Class (hr/w)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Lect/Lab./Prac./Tutor | SSWL (hr/sem) | USWL (hr/w) |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2                     | 63            | 37          |
| Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |               |             |
| Histology is the science concerned with the study of the microscopic anatomy of cells and tissues in plants and animals. The course introduces students to tissue preparation techniques, staining methods, and the use of the light and electron microscope for structural examination. It covers the four basic tissue types epithelial, connective, muscular, and nervous tissues as well as the histological organization of major organs and systems. Emphasis is placed on the correlation between microscopic structure and physiological function, as well as recognition of pathological alterations. Histology provides a critical foundation for advanced studies in anatomy, physiology, pathology, and clinical medicine. |                       |               |             |

## Module 4

| Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Course/Module Title   | ECTS          | Semester    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|-------------|
| Bio-3514                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Mycology              | 5             | 5           |
| Class (hr/w)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Lect/Lab./Prac./Tutor | SSWL (hr/sem) | USWL (hr/w) |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2                     | 63            | 62          |
| Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |               |             |
| Mycology is the scientific study of fungi, focusing on their diversity, structure, reproduction, physiology, and ecological roles. The course introduces students to fungal classification, morphology, growth, and metabolism, as well as their role as decomposers, symbionts, and pathogens. It also explores the medical, agricultural, and industrial importance of fungi, including their use in antibiotics, fermentation, biotechnology, and food production. Special attention is given to pathogenic fungi that cause diseases in humans, animals, and plants, along with methods of diagnosis, prevention, and control. Understanding mycology provides a foundation for advances in microbiology, medicine, agriculture, and environmental science. |                       |               |             |

## Module 5

| Code                                                                                                                                                                                                                                                                                                               | Course/Module Title   | ECTS          | Semester    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|-------------|
| Bio-3515                                                                                                                                                                                                                                                                                                           | Plant Physiology      | 4             | 5           |
| Class (hr/w)                                                                                                                                                                                                                                                                                                       | Lect/Lab./Prac./Tutor | SSWL (hr/sem) | USWL (hr/w) |
| 2                                                                                                                                                                                                                                                                                                                  | 2                     | 63            | 37          |
| Description                                                                                                                                                                                                                                                                                                        |                       |               |             |
| Plant Physiology is the branch of biology that studies the vital functions and processes of plants, including photosynthesis, respiration, water relations, mineral nutrition, growth, and development. It explains how plants interact with their environment and adapt to various internal and external factors. |                       |               |             |

## Module 6

| Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Course/Module Title   | ECTS          | Semester    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|-------------|
| Bio-3516                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Immunology            | 4             | 5           |
| Class (hr/w)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Lect/Lab./Prac./Tutor | SSWL (hr/sem) | USWL (hr/w) |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2                     | 63            | 37          |
| Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |               |             |
| Immunology is the scientific study of the immune system and its role in protecting the body from infections, toxins, and abnormal cells. The course covers the cells, tissues, and organs of the immune system, the molecular and cellular mechanisms of innate and adaptive immunity, and the regulation of immune responses. It also examines immunological memory, vaccination, hypersensitivity reactions, autoimmunity, immunodeficiency diseases, and transplantation immunology. Special emphasis is placed on the clinical applications of immunology in diagnosis, treatment, and prevention of diseases. Immunology serves as a foundation for medical sciences, microbiology, biotechnology, and therapeutic development. |                       |               |             |

## Module 7

| Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Course/Module Title   | ECTS          | Semester    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|-------------|
| Bio-3517                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Parasitology          | 4             | 5           |
| Class (hr/w)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Lect/Lab./Prac./Tutor | SSWL (hr/sem) | USWL (hr/w) |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2                     | 63            | 37          |
| Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |               |             |
| Parasitology is the scientific study of parasites and their relationships with host organisms. The course explores the morphology, physiology, life cycles, and epidemiology of protozoan, helminthic, and arthropod parasites that affect humans, animals, and plants. Emphasis is placed on host–parasite interactions, mechanisms of pathogenicity, immune responses to parasitic infections, and transmission dynamics. The course also addresses diagnostic techniques, treatment strategies, and preventive measures for parasitic diseases of medical and veterinary significance. Understanding parasitology provides essential knowledge for public health, epidemiology, medicine, veterinary science, and agriculture. |                       |               |             |

## Module 8

| Code                                                                                                                                                                                                                                                                   | Course/Module Title   | ECTS          | Semester    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|-------------|
| Bio-3611                                                                                                                                                                                                                                                               | Genetics              | 5             | 6           |
| Class (hr/w)                                                                                                                                                                                                                                                           | Lect/Lab./Prac./Tutor | SSWL (hr/sem) | USWL (hr/w) |
| 2                                                                                                                                                                                                                                                                      | 2                     | 63            | 62          |
| Description                                                                                                                                                                                                                                                            |                       |               |             |
| Genetics is the branch of biology that studies genes, heredity, and variation in living organisms. It focuses on how traits are inherited, the structure and function of DNA and RNA, and the molecular mechanisms that control gene expression and genetic diversity. |                       |               |             |

## Module 9

| Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Course/Module Title     | ECTS          | Semester    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------|-------------|
| Bio-3612                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Environmental Pollution | 5             | 6           |
| Class (hr/w)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Lect/Lab./Prac./Tutor   | SSWL (hr/sem) | USWL (hr/w) |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2                       | 63            | 62          |
| Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                         |               |             |
| Environmental Pollution is the scientific study of contaminants in air, water, soil, and ecosystems, and their effects on living organisms and the environment. The course examines the sources, types, chemical and physical properties, transport, and fate of pollutants. It also addresses environmental monitoring techniques, risk assessment, and strategies for pollution control and management. Special attention is given to human-induced pollution, industrial discharges, agricultural runoff, solid waste, and emerging contaminants. Understanding environmental pollution is essential for sustainable development, public health, conservation, and policy-making aimed at minimizing ecological damage. |                         |               |             |

## Module 10

| Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Course/Module Title   | ECTS          | Semester    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|-------------|
| Bio-3613                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Animal Physiology     | 4             | 6           |
| Class (hr/w)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Lect/Lab./Prac./Tutor | SSWL (hr/sem) | USWL (hr/w) |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       | 63            | 37          |
| Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                       |               |             |
| Animal Physiology is the branch of biology that examines the functional processes of animals at the molecular, cellular, tissue, organ, and system levels. The course covers major physiological systems such as nervous, muscular, circulatory, respiratory, excretory, endocrine, and reproductive systems. It explores mechanisms of homeostasis, metabolism, thermoregulation, neurophysiology, hormonal regulation, and physiological adaptations to environmental challenges. Emphasis is placed on experimental approaches to studying physiological processes and understanding the integration of systems for overall animal health and function. Animal physiology provides foundational knowledge for medicine, veterinary science, zoology, and related biological sciences. |                       |               |             |

## Module 11

| Code                                                                                                                                                                                                                                                                                                              | Course/Module Title   | ECTS          | Semester    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|-------------|
| Bio-3614                                                                                                                                                                                                                                                                                                          | Biotoxicology         | 4             | 6           |
| Class (hr/w)                                                                                                                                                                                                                                                                                                      | Lect/Lab./Prac./Tutor | SSWL (hr/sem) | USWL (hr/w) |
| 2                                                                                                                                                                                                                                                                                                                 | 2                     | 63            | 37          |
| Description                                                                                                                                                                                                                                                                                                       |                       |               |             |
| Biotoxicology is the branch of science that studies the effects of biological toxins on living organisms. It focuses on the nature, mechanisms, and impacts of toxic substances produced by plants, animals, microbes, and other biological sources, as well as methods for detection, treatment, and prevention. |                       |               |             |

## Module 12

| Code                                                                                                                                                                                                                                                                                                     | Course/Module Title            | ECTS          | Semester    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------|-------------|
| Bio-3615                                                                                                                                                                                                                                                                                                 | Microbiology(Aquatic and Soil) | 4             | 6           |
| Class (hr/w)                                                                                                                                                                                                                                                                                             | Lect/Lab./Prac./Tutor          | SSWL (hr/sem) | USWL (hr/w) |
| 2                                                                                                                                                                                                                                                                                                        | 2                              | 63            | 37          |
| Description                                                                                                                                                                                                                                                                                              |                                |               |             |
| Microbiology (Aquatic and Soil) is the study of microorganisms in water and soil environments, including their diversity, structure, function, and ecological roles. It focuses on microbial interactions with the environment, nutrient cycling, and their impact on ecosystem health and productivity. |                                |               |             |

## Module 13

| Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Course/Module Title   | ECTS          | Semester    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|-------------|
| Bio-3616                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Microbial Physiology  | 4             | 6           |
| Class (hr/w)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Lect/Lab./Prac./Tutor | SSWL (hr/sem) | USWL (hr/w) |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2                     | 63            | 37          |
| Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |               |             |
| Microbial Physiology is the branch of microbiology that investigates the biochemical and physical processes of microorganisms. The course covers microbial growth, reproduction, metabolism, enzyme activity, and energy transformations, including aerobic and anaerobic respiration, fermentation, and photosynthesis in microorganisms. It also examines microbial responses and adaptations to environmental stresses, regulation of metabolic pathways, and interactions with other organisms. Understanding microbial physiology provides a foundation for applied fields such as industrial microbiology, biotechnology, medicine, and environmental microbiology. |                       |               |             |

## Module 14

| Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Course/Module Title   | ECTS          | Semester    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|-------------|
| Bio-3617                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Biological Control    | 4             | 6           |
| Class (hr/w)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Lect/Lab./Prac./Tutor | SSWL (hr/sem) | USWL (hr/w) |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2                     | 63            | 37          |
| Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |               |             |
| Biological Control is the science and practice of managing pest populations through the use of natural enemies, including predators, parasitoids, pathogens, and competitors. The course explores the principles of ecological interactions, host parasite relationships, population dynamics, and strategies for the introduction, augmentation, or conservation of biological control agents. Emphasis is placed on integrated pest management (IPM), assessment of environmental risks, and the application of biological control in agriculture, forestry, and public health. Understanding biological control is essential for sustainable pest management, reducing chemical inputs, and maintaining ecosystem health. |                       |               |             |

وصف المقرر



جامعة التراث  
AL-TURATH  
UNIVERSITY

## First Cycle – Bachelor's Degree (B.Sc.) – Biology

بكالوريوس – علوم حياة

تم اعداد الملف من قبل قسم علوم لحياة /كلية العلوم /جامعة ديالى

المستوى الثالث

# Level Three

August , 2025

## MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| Module Information                 |                           |                               |                                                                                                                                                                                                                                          |
|------------------------------------|---------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                           |                               |                                                                                                                                                                                                                                          |
| Module Title                       | <u>Cell Biology</u>       |                               | Module Delivery                                                                                                                                                                                                                          |
| Module Type                        | <u>Core</u>               |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | <u>Bio-3511</u>           |                               |                                                                                                                                                                                                                                          |
| ECTS Credits                       | 5                         |                               |                                                                                                                                                                                                                                          |
| SWL (hr/sem)                       | <u>125</u>                |                               |                                                                                                                                                                                                                                          |
| Module Level                       | 3                         | Semester of Delivery          |                                                                                                                                                                                                                                          |
| Administering Department           | Dept. of Biology          | College                       | College of Science                                                                                                                                                                                                                       |
| Module Leader                      | Dr. Ibrahim Hadi Mohammed | e-mail                        | <a href="mailto:dr.ibrahimhadi@uodiyala.edu.iq">dr.ibrahimhadi@uodiyala.edu.iq</a>                                                                                                                                                       |
| Module Leader's Acad. Title        | Professor                 | Module Leader's Qualification | Ph.D.                                                                                                                                                                                                                                    |
| Module Tutor                       | Dr. Ibrahim Hadi Mohammed | e-mail                        | <a href="mailto:dr.ibrahimhadi@uodiyala.edu.iq">dr.ibrahimhadi@uodiyala.edu.iq</a>                                                                                                                                                       |
| Peer Reviewer Name                 |                           | e-mail                        |                                                                                                                                                                                                                                          |
| Scientific Committee Approval Date |                           | Version Number                | 1.0                                                                                                                                                                                                                                      |

| Relation with other Modules       |  |          |  |
|-----------------------------------|--|----------|--|
| العلاقة مع المواد الدراسية الأخرى |  |          |  |
| Prerequisite module               |  | Semester |  |
| Co-requisites module              |  | Semester |  |

| Module Aims, Learning Outcomes and Indicative Contents   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Module Objectives<br>أهداف المادة الدراسية               | <ol style="list-style-type: none"> <li>Understand the fundamental structure and function of cells, the basic units of life in all organisms.</li> <li>Differentiate between prokaryotic and eukaryotic cells, as well as between plant and animal cells.</li> <li>Explore the structure and function of major cellular organelles, including the nucleus, mitochondria, endoplasmic reticulum, Golgi apparatus, and cytoskeleton.</li> <li>Gain knowledge of the chemical composition of cells, including biomolecules like proteins, lipids, carbohydrates.</li> </ol> |
| Module Learning Outcomes                                 | By the end of this course, students will be able to: <ol style="list-style-type: none"> <li>Describe the structure and function of cellular components,</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                      |

|                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| مخرجات التعلم للمادة الدراسية                                          | including membranes, organelles, and the cytoskeleton.<br>2. Differentiate between types of cells, such as prokaryotic vs. eukaryotic, and plant vs. animal cells.<br>3. Explain the mechanisms of membrane transport, including diffusion, osmosis, and active transport.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                      | Introduction Cell biology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Strategies</b>                                                      | 1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another.<br>2. Where applicable students will be assigned problems to solve and encouraged to assess one another.<br>3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system.<br>4. Students will also be regularly referred to relevant section of the prescribed text book.<br>5. Most of the tutorial work will be done as self-study or with the assistance of a tutor.<br>6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination. |

| <b>Student Workload (SWL)</b><br>الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا       |     |                                                                           |     |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|-----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | 63  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 4.2 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 62  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 4.1 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل              | 125 |                                                                           |     |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |                    |             |                |            |                           |
|---------------------------------------------------|--------------------|-------------|----------------|------------|---------------------------|
|                                                   |                    | Time/Number | Weight (Marks) | Week Due   | Relevant Learning Outcome |
| <b>Formative assessment</b>                       | <b>Quizzes</b>     | 2           | 10% (10)       | 5 and 10   | LO #1, #2 and #10, #11    |
|                                                   | <b>Assignments</b> | 2           | 10% (10)       | 2 and 12   | LO #3, #4 and #6, #7      |
|                                                   | <b>Projects /</b>  | 1           | 10% (10)       | Continuous | All                       |

|                             |                   |     |                  |    |                   |
|-----------------------------|-------------------|-----|------------------|----|-------------------|
|                             | <b>Report</b>     | 1   | 10% (10)         | 13 | LO #5, #8 and #10 |
| <b>Summative assessment</b> | <b>Midterm</b>    | 2hr | 10% (10)         | 7  | LO #1 - #7        |
|                             | <b>Final Exam</b> | 3hr | 50% (50)         | 16 | All               |
| <b>Total assessment</b>     |                   |     | 100% (100 Marks) |    |                   |

| <b>Delivery Plan (Weekly Syllabus)</b><br><b>المنهاج الاسبوعي النظري</b> |                                                                      |
|--------------------------------------------------------------------------|----------------------------------------------------------------------|
|                                                                          | <b>Material Covered</b>                                              |
| <b>Week 1</b>                                                            | Introduction to cell biology                                         |
| <b>Week 2</b>                                                            | Techniques in cell biology                                           |
| <b>Week 3</b>                                                            | Cell Membranes                                                       |
| <b>Week 4</b>                                                            | Cell Organelles and Structures                                       |
| <b>Week 5</b>                                                            | Golgi apparatus , Endoplasmic reticulum , Mitochondria, chloroplasts |
| <b>Week 6</b>                                                            | Lysosome , peroxisome, Cytoskeleton                                  |
| <b>Week 7</b>                                                            | Nucleus , Chromosome                                                 |
| <b>Week 8</b>                                                            | <b>Exam</b>                                                          |
| <b>Week 9</b>                                                            | Cell Signaling                                                       |
| <b>Week</b>                                                              | Cell Division                                                        |
| <b>Week</b>                                                              | Cell Cycle                                                           |
| <b>Week</b>                                                              | Apoptosis , programmed Cell death                                    |
| <b>Week</b>                                                              | Cell communication                                                   |
| <b>Week</b>                                                              | Genetic diseases                                                     |
| <b>Week</b>                                                              | <b>Exam</b>                                                          |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                                              |
|--------------------------------------------------------------------------------|----------------------------------------------|
|                                                                                | <b>Material Covered</b>                      |
| <b>Week 1</b>                                                                  | Lab 1: Introduction to laboratory techniques |
| <b>Week 2</b>                                                                  | Lab 2: Light microscopy and electron         |
| <b>Week 3</b>                                                                  | Lab 3: Cell fractionation                    |
| <b>Week 4</b>                                                                  | Lab 4: Cell centrifugation                   |
| <b>Week 5</b>                                                                  | Lab 5: Cell culture techniques               |
| <b>Week 6</b>                                                                  | Lab 6: Cell staining                         |
| <b>Week 7</b>                                                                  | Lab 7: Observation of Cell Types             |
| <b>Week 8</b>                                                                  | Lab 8: <b>Exam</b>                           |
| <b>Week 9</b>                                                                  | Lab 9: Cell Membrane Permeability            |
| <b>Week</b>                                                                    | Lab 10: Mitosis                              |
| <b>Week</b>                                                                    | Lab 11: Cell Counting                        |
| <b>Week</b>                                                                    | Lab 12: Cell Culture                         |
| <b>Week</b>                                                                    | Lab 13: Osmosis and Diffusion                |
| <b>Week</b>                                                                    | Lab 14: Apoptosis Assays                     |

|             |              |
|-------------|--------------|
| <b>Week</b> | Lab 15: Exam |
|-------------|--------------|

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس</b> |                                                                                                                                                                                                                |                                  |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                                                                        | <b>Text</b>                                                                                                                                                                                                    | <b>Available in the Library?</b> |
| <b>Required Texts</b>                                                  | Alberts, B., Heald, R., Johnson, A., Morgan, D., Raff, M., Roberts, K., & Walter, P. (2022). Molecular biology of the cell: seventh international student edition with registration card. WW Norton & Company. | No                               |
| <b>Recommended Texts</b>                                               | Lodish, H. F., Berk, A., Kaiser, C., Krieger, M., Bretscher, A., Ploegh, H. L., ... & Amon, A. (2021). Molecular cell biology (Vol. 1). New York: WH Freeman.                                                  | Yes                              |
| <b>Websites</b>                                                        | <a href="https://www.nature.com/scitable/topic/cell-biology-13906536/">https://www.nature.com/scitable/topic/cell-biology-13906536/</a><br><a href="https://rupress.org/jcb">https://rupress.org/jcb</a>       |                                  |

| <b>Grading Scheme</b><br><b>مخطط الدرجات</b>                                                                                                                                                                                                                                                                                                                                         |                         |                     |                |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|----------------|---------------------------------------|
| <b>Group</b>                                                                                                                                                                                                                                                                                                                                                                         | <b>Grade</b>            | <b>التقدير</b>      | <b>Marks %</b> | <b>Definition</b>                     |
| <b>Success Group (50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                      | <b>A - Excellent</b>    | امتياز              | 90 - 100       | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>B - Very Good</b>    | جيد جدا             | 80 - 89        | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>C - Good</b>         | جيد                 | 70 - 79        | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>D - Satisfactory</b> | متوسط               | 60 - 69        | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>E - Sufficient</b>   | مقبول               | 50 - 59        | Work meets minimum criteria           |
| <b>Fail Group (0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                           | <b>FX – Fail</b>        | راسب (قيد المعالجة) | (45-49)        | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>F – Fail</b>         | راسب                | (0-44)         | Considerable amount of work required  |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                         |                     |                |                                       |

## MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| Module Information                 |                       |                                                                                                                                                                                                                                          |                                                                                  |
|------------------------------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                       |                                                                                                                                                                                                                                          |                                                                                  |
| Module Title                       | <u>Ecology</u>        | Module Delivery                                                                                                                                                                                                                          |                                                                                  |
| Module Type                        | <u>Core</u>           | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |                                                                                  |
| Module Code                        | <u>Bio-3512</u>       |                                                                                                                                                                                                                                          |                                                                                  |
| ECTS Credits                       | <b>4</b>              |                                                                                                                                                                                                                                          |                                                                                  |
| SWL (hr/sem)                       | <u>100</u>            |                                                                                                                                                                                                                                          |                                                                                  |
| Module Level                       | 3                     |                                                                                                                                                                                                                                          |                                                                                  |
| Administering Department           | Dept. of Biology      | College                                                                                                                                                                                                                                  | College of Science                                                               |
| Module Leader                      | Dr.Munther Hamza Rath | e-mail                                                                                                                                                                                                                                   | <a href="mailto:Prof.dr.rathi@uodiyala.edu.iq">Prof.dr.rathi@uodiyala.edu.iq</a> |
| Module Leader's Acad. Title        | Professor             | Module Leader's Qualification                                                                                                                                                                                                            | Ph.D.                                                                            |
| Module Tutor                       | Dr.Munther Hamza Rath | e-mail                                                                                                                                                                                                                                   | <a href="mailto:Prof.dr.rathi@uodiyala.edu.iq">Prof.dr.rathi@uodiyala.edu.iq</a> |
| Peer Reviewer Name                 |                       | e-mail                                                                                                                                                                                                                                   |                                                                                  |
| Scientific Committee Approval Date |                       | Version Number                                                                                                                                                                                                                           | 1.0                                                                              |

| Relation with other Modules       |  |          |  |
|-----------------------------------|--|----------|--|
| العلاقة مع المواد الدراسية الأخرى |  |          |  |
| Prerequisite module               |  | Semester |  |
| Co-requisites module              |  | Semester |  |

| Module Aims, Learning Outcomes and Indicative Contents   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Module Objectives</b><br>أهداف المادة الدراسية        | By the end of this course, students will be able to:<br>1. Understand core ecological principles <ul style="list-style-type: none"> <li>Explain the structure and function of ecosystems, biomes, and major biogeochemical cycles.</li> <li>Describe the interactions between living organisms and their physical environment.</li> </ul> 2. Analyze environmental issues <ul style="list-style-type: none"> <li>Identify and evaluate local, regional, and global environmental problems.</li> <li>Assess human impacts on air, water, soil, and biodiversity.</li> </ul> 3. Apply scientific methods to environmental studies <ul style="list-style-type: none"> <li>Design and conduct laboratory and field experiments related to environmental factors.</li> </ul> |

|                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                  | <ul style="list-style-type: none"> <li>Collect, analyze, and interpret environmental data using appropriate tools and statistical methods.</li> </ul> <p>4. Evaluate sustainability concepts</p> <ul style="list-style-type: none"> <li>Explain the principles of sustainable resource use and conservation.</li> <li>Discuss strategies for balancing environmental, economic, and social needs.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية | By the end of this course, students will be able to:<br>1. Describe the fundamental concepts of ecology, including ecosystem structure, energy flow, and biogeochemical cycles.<br>2. Identify major environmental problems such as pollution, deforestation, climate change, and biodiversity loss.<br>3. Explain the impact of human activities on natural resources including air, water, and soil.<br>4. Design and conduct simple experiments to investigate environmental factors and analyze data using basic statistical tools.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                | 1. Introduction to Environmental Science <ul style="list-style-type: none"> <li>Definition, scope, and importance</li> <li>Components of the environment (biotic and abiotic factors)</li> <li>Levels of organization: individual, population, community, ecosystem, biosphere</li> </ul> 2. Ecosystems and Ecological Principles <ul style="list-style-type: none"> <li>Structure and function of ecosystems</li> <li>Energy flow and food chains/webs</li> <li>Biogeochemical cycles (carbon, nitrogen, phosphorus, water cycles)</li> <li>Ecological succession</li> </ul> 3. Biodiversity and Conservation <ul style="list-style-type: none"> <li>Importance of biodiversity</li> <li>Threats to biodiversity: habitat loss, pollution, invasive species</li> <li>Conservation strategies and protected areas</li> </ul> 4. Population Ecology and Dynamics <ul style="list-style-type: none"> <li>Population growth models (exponential, logistic)</li> <li>Carrying capacity and limiting factors</li> <li>Human population growth and impact</li> </ul> 5. Environmental Pollution <ul style="list-style-type: none"> <li>Types of pollution: air, water, soil, noise, and thermal pollution</li> <li>Sources and effects of pollutants</li> <li>Pollution control methods and technologies.</li> </ul> |

### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b> | 1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another.<br>2. Where applicable students will be assigned problems to solve and encouraged to assess one another.<br>3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system.<br>4. Students will also be regularly referred to relevant section of the prescribed text book.<br>5. Most of the tutorial work will be done as self-study or with the assistance of a tutor. |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination. |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Student Workload (SWL)<br>الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا              |     |                                                                           |     |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|-----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | 63  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 4.2 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 37  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 2.4 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل              | 100 |                                                                           |     |

| Module Evaluation<br>تقييم المادة الدراسية |                    |             |                  |            |                           |
|--------------------------------------------|--------------------|-------------|------------------|------------|---------------------------|
|                                            |                    | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| <b>Formative assessment</b>                | <b>Quizzes</b>     | 2           | 10% (10)         | 5 and 10   | LO #1, #2 and #10, #11    |
|                                            | <b>Assignments</b> | 2           | 10% (10)         | 2 and 12   | LO #3, #4 and #6, #7      |
|                                            | <b>Projects /</b>  | 1           | 10% (10)         | Continuous | All                       |
|                                            | <b>Report</b>      | 1           | 10% (10)         | 13         | LO #5, #8 and #10         |
| <b>Summative assessment</b>                | <b>Midterm</b>     | 2hr         | 10% (10)         | 7          | LO #1 - #7                |
|                                            | <b>Final Exam</b>  | 3hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>                    |                    |             | 100% (100 Marks) |            |                           |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري |                                                                                                 |
|------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
|                                                            | Material Covered                                                                                |
| <b>Week 1</b>                                              | Ecology- Introduction and terms , Branches of Ecology , Levels organization of Ecology Habitat. |
| <b>Week 2</b>                                              | Basic principles of Ecosystem                                                                   |
| <b>Week 3</b>                                              | Energy flow in the ecosystem, Food chain and food web, Ecological pyramids                      |
| <b>Week 4</b>                                              | Some Major Ecosystem                                                                            |
| <b>Week 5</b>                                              | Biogeochemical cycles : Gaseous cycles                                                          |
| <b>Week 6</b>                                              | Biogeochemical cycles : Sedimentary cycles                                                      |
| <b>Week 7</b>                                              | Exam                                                                                            |
| <b>Week 8</b>                                              | Primary and secondary productivity                                                              |
| <b>Week 9</b>                                              | Biological interrelationships                                                                   |

|             |                                                                         |
|-------------|-------------------------------------------------------------------------|
| <b>Week</b> | Limiting factors and tolerance levels : Liebiges law of minimum 1840    |
| <b>Week</b> | Limiting factors and tolerance levels : Shelfords law of tolerance 1911 |
| <b>Week</b> | Population                                                              |
| <b>Week</b> | Biodiversity and its Conservation                                       |
| <b>Week</b> | Environmental organizations                                             |
| <b>Week</b> | <b>Exam</b>                                                             |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                                                                                                           |
|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
|                                                                                | <b>Material Covered</b>                                                                                   |
| <b>Week 1</b>                                                                  | Lab 1: Temperature measurements                                                                           |
| <b>Week 2</b>                                                                  | Lab 2: Relative humidity                                                                                  |
| <b>Week 3</b>                                                                  | Lab 3: Atmospheric pressure                                                                               |
| <b>Week 4</b>                                                                  | Lab 4: Other instruments and devices are used in ecology for different purpose eg. Van Dorn water sampler |
| <b>Week 5</b>                                                                  | Lab 5: Turbidity and nephelometer                                                                         |
| <b>Week 6</b>                                                                  | Lab 6: Sampling in Ecology                                                                                |
| <b>Week 7</b>                                                                  | Lab 7: <b>Exam</b>                                                                                        |
| <b>Week 8</b>                                                                  | Lab 8: Animal Populations Sampling                                                                        |
| <b>Week 9</b>                                                                  | Lab 9: Soil sampling and textures                                                                         |
| <b>Week</b>                                                                    | Lab 10: Measurement of productivity                                                                       |
| <b>Week</b>                                                                    | Lab 11: Solar soil sterilization (an environmentally-friendly alternative)                                |
| <b>Week</b>                                                                    | Lab 12: Demonstrating Liebig's Law of the Minimum                                                         |
| <b>Week</b>                                                                    | Lab 13: Salt stress on plant germination (NaCl gradient )                                                 |
| <b>Week</b>                                                                    | Lab 14: pH effect on seed germination / alge growth .                                                     |
| <b>Week</b>                                                                    | Lab 15: <b>Exam</b>                                                                                       |

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس</b> |                                                                                                                                                                                                                                              |                                  |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                                                                        | <b>Text</b>                                                                                                                                                                                                                                  | <b>Available in the Library?</b> |
| <b>Required Texts</b>                                                  | Singh, V. (2024). Textbook of environment and ecology (pp. 217-224). Singapore: Springer.                                                                                                                                                    | Yes                              |
| <b>Recommended Texts</b>                                               | van Wilgen, B. W. (2024). New ecological textbook for Angola. South African Journal of Science, 120(1/2).                                                                                                                                    | Yes                              |
| <b>Websites</b>                                                        | <a href="https://esa.org/about/what-does-ecology-have-to-do-with-me/">https://esa.org/about/what-does-ecology-have-to-do-with-me/</a><br><a href="https://www.britannica.com/science/ecology">https://www.britannica.com/science/ecology</a> |                                  |

| <b>Grading Scheme</b><br><b>مخطط الدرجات</b> |              |                |                |                   |
|----------------------------------------------|--------------|----------------|----------------|-------------------|
| <b>Group</b>                                 | <b>Grade</b> | <b>التقدير</b> | <b>Marks %</b> | <b>Definition</b> |

|                                                                                                                                                                                                                                                                                                                                                                                             |                         |                     |          |                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|----------|---------------------------------------|
| <b>Success Group<br/>(50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                         | <b>A -</b><br>Excellent | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                             | <b>B -</b> Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                             | <b>C -</b> Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                             | <b>D -</b> Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                             | <b>E -</b> Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                              | <b>FX –</b> Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                             | <b>F –</b> Fail         | راسب                | (0-44)   | Considerable amount of work required  |
| <p><b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.</p> |                         |                     |          |                                       |

## MODULE DESCRIPTION FORM

### نموذج وصف المادة الدراسية

| Module Information                 |                              |                               |                                                                                                                                                                                                                                          |  |
|------------------------------------|------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| معلومات المادة الدراسية            |                              |                               |                                                                                                                                                                                                                                          |  |
| Module Title                       | <u>Histology</u>             |                               | Module Delivery                                                                                                                                                                                                                          |  |
| Module Type                        | <u>Core</u>                  |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |  |
| Module Code                        | <u>Bio-3513</u>              |                               |                                                                                                                                                                                                                                          |  |
| ECTS Credits                       | 4                            |                               |                                                                                                                                                                                                                                          |  |
| SWL (hr/sem)                       | <u>100</u>                   |                               |                                                                                                                                                                                                                                          |  |
| Module Level                       | 3                            | Semester of Delivery          | 5                                                                                                                                                                                                                                        |  |
| Administering Department           | Dept. of Biology             | College                       | College of Science                                                                                                                                                                                                                       |  |
| Module Leader                      | Dr.Anwar Abdulameer Mohammad | e-mail                        | <a href="mailto:anwarabdulameer@uodiyala.edu.iq">anwarabdulameer@uodiyala.edu.iq</a>                                                                                                                                                     |  |
| Module Leader's Acad. Title        | Assistant professor          | Module Leader's Qualification | Ph.D.                                                                                                                                                                                                                                    |  |
| Module Tutor                       | Dr.Anwar Abdulameer Mohammad | e-mail                        | <a href="mailto:anwarabdulameer@uodiyala.edu.iq">anwarabdulameer@uodiyala.edu.iq</a>                                                                                                                                                     |  |
| Peer Reviewer Name                 |                              | e-mail                        |                                                                                                                                                                                                                                          |  |
| Scientific Committee Approval Date |                              | Version Number                |                                                                                                                                                                                                                                          |  |

### Relation with other Modules

#### العلاقة مع المواد الدراسية الأخرى

|                             |  |                 |  |
|-----------------------------|--|-----------------|--|
| <b>Prerequisite module</b>  |  | <b>Semester</b> |  |
| <b>Co-requisites module</b> |  | <b>Semester</b> |  |

| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br><b>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Objectives</b><br><b>أهداف المادة الدراسية</b>                                                                         | Introduction to histology , primary tissues their description and features                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Module Learning Outcomes</b><br><b>مخرجات التعلم للمادة الدراسية</b>                                                          | Students have to know characteristics of each tissue in different organs , to understand functions of each system or organ in the human body .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Indicative Contents</b><br><b>المحتويات الإرشادية</b>                                                                         | <ol style="list-style-type: none"> <li>1. Introduction to Histology <ul style="list-style-type: none"> <li>• Definition, scope, and importance of histology</li> <li>• Basic microscopy techniques and preparation of tissue samples</li> </ul> </li> <li>2. Epithelial Tissue <ul style="list-style-type: none"> <li>• Classification of epithelial tissues</li> <li>• Structure, function, and locations</li> <li>• Specializations (cilia, microvilli, glands)</li> </ul> </li> <li>3. Connective Tissue <ul style="list-style-type: none"> <li>• Types of connective tissue: loose, dense, cartilage, bone, blood</li> <li>• Components of connective tissue: cells, fibers, matrix</li> <li>• Functions and examples</li> </ul> </li> <li>4. Muscle Tissue <ul style="list-style-type: none"> <li>• Types: skeletal, cardiac, and smooth muscle</li> <li>• Structure and function of each muscle type</li> <li>• Muscle contraction basics</li> </ul> </li> <li>5. Nervous Tissue <ul style="list-style-type: none"> <li>• Neurons: structure and function</li> <li>• Neuroglia cells</li> <li>• Synapses and nerve impulses</li> </ul> </li> <li>6. Specialized Tissues and Organs <ul style="list-style-type: none"> <li>• Histology of skin and its derivatives</li> <li>• Histology of blood and lymphatic tissue</li> <li>• Histology of endocrine and exocrine glands.</li> </ul> </li> </ol> |

| <b>Learning and Teaching Strategies</b><br><b>استراتيجيات التعلم والتعليم</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                             | <ol style="list-style-type: none"> <li>1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another.</li> <li>2. Where applicable students will be assigned problems to solve and encouraged to assess one another.</li> <li>3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system.</li> <li>4. Students will also be regularly referred to relevant section of the prescribed text book.</li> <li>5. Most of the tutorial work will be done as self-study or with the assistance of a tutor.</li> </ol> |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination. |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ 15 اسبوعا       |     |                                                                    |     |
|-------------------------------------------------------------------------|-----|--------------------------------------------------------------------|-----|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 63  | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 4.2 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 37  | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 2.4 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل              | 100 |                                                                    |     |

| Module Evaluation<br>تقييم المادة الدراسية |                   |             |                  |            |                           |
|--------------------------------------------|-------------------|-------------|------------------|------------|---------------------------|
|                                            |                   | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| Formative assessment                       | Quizzes           | 2           | 10% (10)         | 5 and 10   | LO #1, #2 and #10, #11    |
|                                            | Assignments       | 2           | 10% (10)         | 2 and 12   | LO #3, #4 and #6, #7      |
|                                            | Projects / Report | 1           | 10% (10)         | Continuous | All                       |
|                                            | Report            | 1           | 10% (10)         | 13         | LO #5, #8 and #10         |
| Summative assessment                       | Midterm           | 2hr         | 10% (10)         | 7          | LO #1 - #7                |
|                                            | Final Exam        | 3hr         | 50% (50)         | 16         | All                       |
| Total assessment                           |                   |             | 100% (100 Marks) |            |                           |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري |                                                                                            |
|------------------------------------------------------------|--------------------------------------------------------------------------------------------|
|                                                            | Material Covered                                                                           |
| Week 1                                                     | Introduction to histology and epithelial tissue ,                                          |
| Week 2                                                     | Glandular epithelial tissue , classification of glands and their description and locations |
| Week 3                                                     | Connective tissue , and essential elements of connective tissue                            |
| Week 4                                                     | Classification of connective tissue , proper connective tissue , their features and        |
| Week 5                                                     | skeletal connective tissue , cartilage , types of cartilages , locations in addition to    |
| Week 6                                                     | Skeletal connective tissue , Bone , features of bones , matrix                             |
| Week 7                                                     | Hemopoetic tissue , maturation of erythrocytes and leukocytes                              |
| Week 8                                                     | Exam                                                                                       |
| Week 9                                                     | Muscular tissue , types of muscle , features of each type of muscle                        |

|             |                                                                                          |
|-------------|------------------------------------------------------------------------------------------|
| <b>Week</b> | Nerve tissue , features of nerves , ,classification of neurons and fibers in addition to |
| <b>Week</b> | Circulatory system , divisions of the system , features of arteries and veins ...        |
| <b>Week</b> | Lymphatic system , features of lymphatic vessel , thymus gland and spleen in addition    |
| <b>Week</b> | Integumentary system , epidermis and dermis                                              |
| <b>Week</b> | Hair layers and nail                                                                     |
| <b>Week</b> | <b>Exam</b>                                                                              |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                                                                                  |
|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
|                                                                                | <b>Material Covered</b>                                                          |
| <b>Week 1</b>                                                                  | Lab 1: Epithelial tissue , types of epithelial ( simple and stratified)          |
| <b>Week 2</b>                                                                  | Lab 2: Glandular epithelial , classification of glands their features            |
| <b>Week 3</b>                                                                  | Lab 3: Connective tissue , proper ( loose connective )                           |
| <b>Week 4</b>                                                                  | Lab 4: cartilage types , hyaline , elastic and white fiber cartilage             |
| <b>Week 5</b>                                                                  | Lab 5: Bone , organization of bone lamellae                                      |
| <b>Week 6</b>                                                                  | Lab 6: <b>Exam</b>                                                               |
| <b>Week 7</b>                                                                  | Lab 7: Histology of bone marrow , red bone marrow and yellow                     |
| <b>Week 8</b>                                                                  | Lab 8: histology of skeletal muscle , smooth and cardiac muscle                  |
| <b>Week 9</b>                                                                  | Lab 9: features of nerve tissue , types of glail and nerve fibers                |
| <b>Week</b>                                                                    | Lab 10: layers of arteries , veins and pericardium                               |
| <b>Week</b>                                                                    | Lab 11: skin histology , epidermis and dermis , deat glands and sebaceous glands |
| <b>Week</b>                                                                    | Lab 12: layers of hair                                                           |
| <b>Week</b>                                                                    | Lab 13: lymphatic organs lymph nodes ,spleen and tonsils                         |
| <b>Week</b>                                                                    | Lab 14: digestive system histology oral cavity and salivary gland                |
| <b>Week</b>                                                                    | Lab 15: <b>Exam</b>                                                              |

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس</b> |                                                                                                                                                                                                                                                                                      |                                  |
|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                                                                        | <b>Text</b>                                                                                                                                                                                                                                                                          | <b>Available in the Library?</b> |
| <b>Required Texts</b>                                                  | O'Dowd, G., Bell, S., & Wright, S. (2023). Wheater's Functional Histology, E-Book: A Text and Colour Atlas. Elsevier Health Sciences.                                                                                                                                                | Yes                              |
| <b>Recommendend Texts</b>                                              | Neumann, P. E., & Neumann, E. E. (2021). General histological woes: Definition and classification of tissues. Clinical Anatomy, 34(5), 794-801.                                                                                                                                      | Yes                              |
| <b>Websites</b>                                                        | <a href="https://www.ncbi.nlm.nih.gov/books/NBK557663/">https://www.ncbi.nlm.nih.gov/books/NBK557663/</a><br><a href="https://www.open.edu/openlearn/mod/oucontent/view.php?id=65372&amp;section=1">https://www.open.edu/openlearn/mod/oucontent/view.php?id=65372&amp;section=1</a> |                                  |

| Grading Scheme<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                       |                  |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير             | Marks %  | Definition                            |
| <b>Success Group<br/>(50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                  | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                       | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |                     |          |                                       |

## MODULE DESCRIPTION FORM

### نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية |                        |                               |                                                                                                                                                                                                                                          |                                                                          |  |  |
|-----------------------------------------------|------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--|--|
| Module Title                                  | <u><b>Mycology</b></u> |                               | Module Delivery                                                                                                                                                                                                                          |                                                                          |  |  |
| Module Type                                   | <u><b>Core</b></u>     |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |                                                                          |  |  |
| Module Code                                   | <u><b>Bio-3514</b></u> |                               |                                                                                                                                                                                                                                          |                                                                          |  |  |
| ECTS Credits                                  | <b>5</b>               |                               |                                                                                                                                                                                                                                          |                                                                          |  |  |
| SWL (hr/sem)                                  | <u><b>125</b></u>      |                               |                                                                                                                                                                                                                                          |                                                                          |  |  |
| Module Level                                  | 3                      | Semester of Delivery          | 5                                                                                                                                                                                                                                        |                                                                          |  |  |
| Administering Department                      | Dept. of Biology       | College                       | College of Science                                                                                                                                                                                                                       |                                                                          |  |  |
| Module Leader                                 | Dr.Anaam Fuad Hussain  |                               | e-mail                                                                                                                                                                                                                                   | <a href="mailto:anaamfuad@uodiyala.edu.iq">anaamfuad@uodiyala.edu.iq</a> |  |  |
| Module Leader's Acad. Title                   | Professor              | Module Leader's Qualification | Ph.D.                                                                                                                                                                                                                                    |                                                                          |  |  |
| Module Tutor                                  | Dr.Anaam Fuad Hussain  |                               | e-mail                                                                                                                                                                                                                                   | <a href="mailto:anaamfuad@uodiyala.edu.iq">anaamfuad@uodiyala.edu.iq</a> |  |  |
| Peer Reviewer Name                            |                        |                               | e-mail                                                                                                                                                                                                                                   |                                                                          |  |  |
| Scientific Committee Approval Date            |                        |                               | Version Number                                                                                                                                                                                                                           | 1.0                                                                      |  |  |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى |  |          |  |
|------------------------------------------------------------------|--|----------|--|
| Prerequisite module                                              |  | Semester |  |
| Co-requisites module                                             |  | Semester |  |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Objectives</b><br>أهداف المادة الدراسية                                                                  | <ol style="list-style-type: none"> <li>1. Introducing the student to fungi in terms of the history of interest in them, their characteristics, methods of diagnosis and preservation, their importance to humans, and the transformations they carry out in mineral and organic materials, as they are organisms with enzymatic activity, and the role of these organisms in maintaining the vital environmental balance.</li> <li>2. Introducing the student to the classical classification of fungi and the technical developments taking place in this science, such as chemical and molecular methods.</li> <li>3. Introducing the student to medical fungi, how to treat and prevent them, as well as mycotoxigenic fungi, those used in industry, and biological resistance.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية                                                   | <p>By the end of this course, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Understand the basic biology and classification of fungi, including their morphology, physiology, and life cycles.</li> <li>2. Identify and describe the major groups of fungi, including yeasts, molds, and mushrooms, using microscopic and macroscopic characteristics.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                                                                  | <ol style="list-style-type: none"> <li>1. Introduction to Mycology <ul style="list-style-type: none"> <li>• Definition and scope of mycology</li> <li>• History and significance of fungi</li> </ul> </li> <li>2. Fungal Morphology and Structure <ul style="list-style-type: none"> <li>• General characteristics of fungi</li> <li>• Hyphae, mycelium, spores, and reproductive structures</li> </ul> </li> <li>3. Fungal Classification and Taxonomy <ul style="list-style-type: none"> <li>• Major fungal groups (Zygomycetes, Ascomycetes, Basidiomycetes, Deuteromycetes)</li> <li>• Criteria for classification</li> </ul> </li> <li>4. Fungal Physiology and Nutrition <ul style="list-style-type: none"> <li>• Growth requirements</li> <li>• Metabolic pathways</li> <li>• Environmental factors affecting fungi</li> </ul> </li> <li>5. Fungal Life Cycles and Reproduction <ul style="list-style-type: none"> <li>• Sexual and asexual reproduction</li> <li>• Spore formation and dispersal mechanisms</li> </ul> </li> <li>6. Ecology and Economic Importance of Fungi <ul style="list-style-type: none"> <li>• Role in decomposition and nutrient cycling</li> <li>• Symbiotic relationships (mycorrhizae, lichens)</li> <li>• Industrial and pharmaceutical applications</li> </ul> </li> <li>7. Pathogenic Fungi <ul style="list-style-type: none"> <li>• Fungal diseases in humans, animals, and plants</li> <li>• Mechanisms of pathogenicity and host response</li> </ul> </li> <li>8. Laboratory Techniques in Mycology</li> </ol> |

|  |                                                                                                                                                                  |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <ul style="list-style-type: none"> <li>Isolation and cultivation methods</li> <li>Identification techniques (microscopy, staining, biochemical tests)</li> </ul> |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b> | <ol style="list-style-type: none"> <li>Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another.</li> <li>Where applicable students will be assigned problems to solve and encouraged to assess one another.</li> <li>Learning material will be supplied to students in class or uploaded on Blackboard learning management system.</li> <li>Students will also be regularly referred to relevant section of the prescribed text book.</li> <li>Most of the tutorial work will be done as self-study or with the assistance of a tutor.</li> <li>The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.</li> </ol> |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Student Workload (SWL)

#### الحمل الدراسي للطالب محسوب لـ 15 اسبوعا

|                                                                                |            |                                                                           |            |
|--------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------|------------|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | <b>63</b>  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | <b>4.2</b> |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | <b>62</b>  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | <b>4.1</b> |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | <b>125</b> |                                                                           |            |

### Module Evaluation

#### تقييم المادة الدراسية

|                             |                    | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
|-----------------------------|--------------------|-------------|----------------|----------|---------------------------|
| <b>Formative assessment</b> | <b>Quizzes</b>     | 2           | 10% (10)       | 5 and 10 | LO #1, #2 and #3, #4      |
|                             | <b>Assignments</b> | 2           | 10% (10)       | 2 and 12 | LO #3, #4 and #6, #7      |

|                             |                   |     |                  |            |                   |
|-----------------------------|-------------------|-----|------------------|------------|-------------------|
| <b>Summative assessment</b> | <b>Projects /</b> | 1   | 10% (10)         | Continuous | All               |
|                             | <b>Report</b>     | 1   | 10% (10)         | 13         | LO #5, #8 and #10 |
|                             | <b>Midterm</b>    | 2hr | 10% (10)         | 7          | LO #1 - #7        |
|                             | <b>Final Exam</b> | 3hr | 50% (50)         | 16         | All               |
| <b>Total assessment</b>     |                   |     | 100% (100 Marks) |            |                   |

| <b>Delivery Plan (Weekly Syllabus)</b><br>المنهاج الاسبوعي النظري |                                                                                                                         |
|-------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
|                                                                   | <b>Material Covered</b>                                                                                                 |
| <b>Week 1</b>                                                     | Mycology definition History of fungi, general characteristics of fungi and relationship among fungi and other organisms |
| <b>Week 2</b>                                                     | Principles of living fungi: Living mode of fungi, Nutrition                                                             |
| <b>Week 3</b>                                                     | Morphology of fungi: molds and Yeasts                                                                                   |
| <b>Week 4</b>                                                     | Fungal cell Structure and Function                                                                                      |
| <b>Week 5</b>                                                     | Reproduction of fungi                                                                                                   |
| <b>Week 6</b>                                                     | <b>Exam</b>                                                                                                             |
| <b>Week 7</b>                                                     | Taxonomy of fungi, Kingdom1: protozoa                                                                                   |
| <b>Week 8</b>                                                     | Kingdom II: Straminipila                                                                                                |
| <b>Week 9</b>                                                     | Kingdom III: Fungi , Phylum1: Chytridiomycota, Phylum2: Zygomycota                                                      |
| <b>Week</b>                                                       | Phylum3: Ascomycota , Class1: Archiascomycetes                                                                          |
| <b>Week</b>                                                       | Phylum3: Ascomycota , Class2: Hemiascomycetes                                                                           |
| <b>Week 12</b>                                                    | Phylum3: Ascomycota Class3: Plectoascomycetes, Class4: Hymenoascomycetes, Class5: Loculoascomycetes                     |
| <b>Week</b>                                                       | Phylum4: Basidiomycota                                                                                                  |
| <b>Week</b>                                                       | Phylum5: Anamorphic Fungi                                                                                               |
| <b>Week</b>                                                       | <b>Exam</b>                                                                                                             |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br>المنهاج الاسبوعي للمختبر |                                                                                   |
|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
|                                                                         | <b>Material Covered</b>                                                           |
| <b>Week 1</b>                                                           | Lab 1: Laboratory Safety Manual                                                   |
| <b>Week 2</b>                                                           | Lab 2:Isolation of Fungi from different sources                                   |
| <b>Week 3</b>                                                           | Lab 3:Study of fungal Morphology Macroscopic and microscopic study                |
| <b>Week 4</b>                                                           | Lab4: Study the effects of some physiological parameters on fungal (molds) growth |
| <b>Week 5</b>                                                           | Lab5: Preservation in Fungi                                                       |
| <b>Week 6</b>                                                           | Lab 6: Classification of fungi, Kingdom I: Protozoa, Class1: Myxomycetes          |
| <b>Week 7</b>                                                           | Lab 7: Kingdom II: Straminipila, Phylum: Oomycota                                 |
| <b>Week 8</b>                                                           | Lab 8: Kingdom III: Fungi , Phylum1: Chytridiomycota                              |
| <b>Week 9</b>                                                           | <b>Exam</b>                                                                       |
| <b>Week</b>                                                             | Lab 9:Phylum2: Zygomycota                                                         |
| <b>Week</b>                                                             | Lab10: Phylum3: Ascomycota, Class 1: Archiascomycetes, Class 2:                   |

|                |                                                                                                   |
|----------------|---------------------------------------------------------------------------------------------------|
| <b>Week 12</b> | Lab 11 Phylum3: Ascomycota, Class 4: Hymenozomycetes (Pyrenozomycetes), Class5: Loculoascomycetes |
| <b>Week 12</b> | Lab 12: Phylum4: Basidiomycota                                                                    |
| <b>Week 12</b> | Lab 13: Phylum5:Anamorphic fungi                                                                  |
| <b>Week</b>    | Exam                                                                                              |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس |                                                                                                                                                                                                                                                                |                           |
|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                                          | Text                                                                                                                                                                                                                                                           | Available in the Library? |
| <b>Required Texts</b>                                    | Introductory mycology 3 <sup>rd</sup> ed. (1996)Editor :Alexopoulos and Mims.<br>Introduction to fungi 3 <sup>rd</sup> ed.(2007) Editor: Webster and Weber.<br>Parija, S. C., & Rudramurthy, S. M. (Eds.). (2024). Textbook of Fungal Zoonoses and Sapronoses. | Yes                       |
| <b>Recommended Texts</b>                                 | Shanahan, K. (2024). OVERVIEW OF FUNGAL DISEASE AND MEDICAL MYCOLOGY.                                                                                                                                                                                          | Yes                       |
| <b>Websites</b>                                          | <a href="https://imafungus.pensoft.net/">https://imafungus.pensoft.net/</a><br><a href="https://www.merriam-webster.com/dictionary/mycology">https://www.merriam-webster.com/dictionary/mycology</a>                                                           |                           |

| Grading Scheme<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                       |                         |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade                   | التقدير             | Marks %  | Definition                            |
| <b>Success Group (50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                      | <b>A - Excellent</b>    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>B - Very Good</b>    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>C - Good</b>         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>D - Satisfactory</b> | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>E - Sufficient</b>   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group (0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                           | <b>FX – Fail</b>        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>F – Fail</b>         | راسب                | (0-44)   | Considerable amount of work required  |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                         |                     |          |                                       |

## MODULE DESCRIPTION FORM

### نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية |
|-----------------------------------------------|
|-----------------------------------------------|

|                                    |                         |                  |                               |                                                                                                                                                                                                                                          |       |
|------------------------------------|-------------------------|------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| Module Title                       | <u>Plant physiology</u> |                  |                               | Module Delivery                                                                                                                                                                                                                          |       |
| Module Type                        | <u>Core</u>             |                  |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |       |
| Module Code                        | <u>Bio-3515</u>         |                  |                               |                                                                                                                                                                                                                                          |       |
| ECTS Credits                       | 4                       |                  |                               |                                                                                                                                                                                                                                          |       |
| SWL (hr/sem)                       | <u>100</u>              |                  |                               |                                                                                                                                                                                                                                          |       |
| Module Level                       |                         | 3                | Semester of Delivery          |                                                                                                                                                                                                                                          | 5     |
| Administering Department           |                         | Dept. of Biology | College                       | College of Science                                                                                                                                                                                                                       |       |
| Module Leader                      | Dr.Dina Abdulsalam Saad |                  | e-mail                        | <a href="mailto:dinaabdulsalam@uodiyala.edu.iq">dinaabdulsalam@uodiyala.edu.iq</a>                                                                                                                                                       |       |
| Module Leader's Acad. Title        |                         | Lecturer         | Module Leader's Qualification |                                                                                                                                                                                                                                          | Ph.D. |
| Module Tutor                       | Dr.Dina Abdulsalam Saad |                  | e-mail                        | <a href="mailto:dinaabdulsalam@uodiyala.edu.iq">dinaabdulsalam@uodiyala.edu.iq</a>                                                                                                                                                       |       |
| Peer Reviewer Name                 |                         |                  | e-mail                        |                                                                                                                                                                                                                                          |       |
| Scientific Committee Approval Date |                         |                  | Version Number                | 1.0                                                                                                                                                                                                                                      |       |

| <b>Relation with other Modules</b><br>العلاقة مع المواد الدراسية الأخرى |  |                 |  |
|-------------------------------------------------------------------------|--|-----------------|--|
| <b>Prerequisite module</b>                                              |  | <b>Semester</b> |  |
| <b>Co-requisites module</b>                                             |  | <b>Semester</b> |  |

| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Objectives</b><br>أهداف المادة الدراسية                                                                         | 1. Study the functions of plant organs and identify their general characteristics.<br>2. Study the mechanisms of plant physiological functions, such as photosynthesis and respiration.<br>3. Learn the chemical and physical properties of water and the mechanisms of water and salt absorption in plants.<br>4. Learn about the types of plant growth regulators.                                   |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية                                                          | 1. Address the most important mechanisms of water and salt absorption in plants.<br>2. Identify the most important theories of plant sap ascent.<br>3. Learn the most important physiological processes in plants, namely photosynthesis and respiration.<br>4. The student will learn about the interactions of light and darkness in different plants.<br>5. Address the most important plant growth |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                                                                         | 1. Introduction to Plant Physiology <ul style="list-style-type: none"> <li>Definition, scope, and importance</li> <li>Overview of plant cell structure and function</li> </ul> 2. Water Relations in Plants                                                                                                                                                                                            |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <ul style="list-style-type: none"> <li>• Water uptake, transport, and transpiration</li> <li>• Osmosis, diffusion, and water potential</li> <li>• Mechanisms of water movement in plants</li> </ul> <p>3. Mineral Nutrition</p> <ul style="list-style-type: none"> <li>• Essential nutrients and their roles</li> <li>• Mechanisms of nutrient uptake and transport</li> <li>• Nutrient deficiencies and toxicity symptoms</li> </ul> <p>4. Photosynthesis</p> <ul style="list-style-type: none"> <li>• Structure and function of chloroplasts</li> <li>• Light and dark reactions (Calvin cycle)</li> <li>• Factors affecting photosynthesis efficiency</li> </ul> <p>5. Respiration in Plants</p> <ul style="list-style-type: none"> <li>• Aerobic and anaerobic respiration</li> <li>• Glycolysis, Krebs cycle, and electron transport chain</li> </ul> <p>6. Plant Growth and Development</p> <ul style="list-style-type: none"> <li>• Hormones and growth regulators (auxins, gibberellins, cytokinins, ethylene, abscisic acid)</li> <li>• Seed germination and dormancy</li> <li>• Photoperiodism and flowering.</li> </ul> |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| <b>Learning and Teaching Strategies</b><br><b>استراتيجيات التعلم والتعليم</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                             | <ol style="list-style-type: none"> <li>1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another.</li> <li>2. Where applicable students will be assigned problems to solve and encouraged to assess one another.</li> <li>3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system.</li> <li>4. Students will also be regularly referred to relevant section of the prescribed text book.</li> <li>5. Most of the tutorial work will be done as self-study or with the assistance of a tutor.</li> <li>6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.</li> </ol> |

| <b>Student Workload (SWL)</b><br><b>الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا</b> |            |                                                                           |            |
|---------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------|------------|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل        | <b>63</b>  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | <b>4.2</b> |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل  | <b>37</b>  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | <b>2.4</b> |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل               | <b>100</b> |                                                                           |            |

| Module Evaluation<br>تقييم المادة الدراسية |             |             |                  |            |                           |
|--------------------------------------------|-------------|-------------|------------------|------------|---------------------------|
|                                            |             | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| Formative assessment                       | Quizzes     | 2           | 10% (10)         | 5 and 10   | LO #1, #2 and #10, #11    |
|                                            | Assignments | 2           | 10% (10)         | 2 and 12   | LO #3, #4 and #6, #7      |
|                                            | Projects /  | 1           | 10% (10)         | Continuous | All                       |
|                                            | Report      | 1           | 10% (10)         | 13         | LO #5, #8 and #10         |
| Summative assessment                       | Midterm     | 2hr         | 10% (10)         | 7          | LO #1 - #7                |
|                                            | Final Exam  | 3hr         | 50% (50)         | 16         | All                       |
| Total assessment                           |             |             | 100% (100 Marks) |            |                           |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري |                              |
|------------------------------------------------------------|------------------------------|
|                                                            | Material Covered             |
| Week 1                                                     | Water relationships          |
| Week 2                                                     | diffusion and osmosis        |
| Week 3                                                     | Plasmolysis                  |
| Week 4                                                     | Absorption of water          |
| Week 5                                                     | Ascent of sap                |
| Week 6                                                     | Absorption of mineral salts  |
| Week 7                                                     | Active and passive transport |
| Week 8                                                     | Exam                         |
| Week 9                                                     | Photosynthesis               |
| Week                                                       | Dark reaction                |
| Week                                                       | Respiration                  |
| Week                                                       | Krips cycle                  |
| Week                                                       | Plant growth regulators      |
| Week                                                       | Cytokinins                   |
| Week                                                       | Exam                         |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر |                                      |
|------------------------------------------------------------------|--------------------------------------|
|                                                                  | Material Covered                     |
| Week 1                                                           | Lab 1: Solution and their types      |
| Week 2                                                           | Lab 2: Solution concentration        |
| Week 3                                                           | Lab 3: Diffusion                     |
| Week 4                                                           | Lab 4: Osmosis                       |
| Week 5                                                           | Lab 5: Plasmolysis and Deplasmolysis |

|               |                                         |
|---------------|-----------------------------------------|
| <b>Week 6</b> | Lab 6: Transport elements in plants     |
| <b>Week 7</b> | Lab 7: <b>Exam</b>                      |
| <b>Week 8</b> | Lab 8: Photosynthesis                   |
| <b>Week 9</b> | Lab 9: Transpiration                    |
| <b>Week</b>   | Lab 10: Separation of plant pigments    |
| <b>Week</b>   | Lab 11: Seeds dormancy                  |
| <b>Week</b>   | Lab 12: Thin layer chromatography (TLC) |
| <b>Week</b>   | Lab 13: Respiration                     |
| <b>Week</b>   | Lab 14: The plant hormones              |
| <b>Week</b>   | Lab 15: <b>Exam</b>                     |

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس</b> |                                                                                                                                                                                                                                                                                                                                                                                                        |                                  |
|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                                                                        | <b>Text</b>                                                                                                                                                                                                                                                                                                                                                                                            | <b>Available in the Library?</b> |
| <b>Required Texts</b>                                                  | Bhatla, S. C., & Lal, M. A. (2023). Plant physiology, development and metabolism. Springer Nature.                                                                                                                                                                                                                                                                                                     | Yes                              |
| <b>Recommended Texts</b>                                               | Pratap, M. (2025). A Textbook of Plant Physiology. Academic Guru Publishing House.                                                                                                                                                                                                                                                                                                                     | Yes                              |
| <b>Websites</b>                                                        | <a href="https://www.sciencedirect.com/journal/journal-of-plant-physiology">https://www.sciencedirect.com/journal/journal-of-plant-physiology</a><br><a href="https://bio.libretexts.org/Bookshelves/Botany/Botany_(Ha_Morrow_and_Algers)/04%3A_Plant_Physiology_and_Regulation">https://bio.libretexts.org/Bookshelves/Botany/Botany_(Ha_Morrow_and_Algers)/04%3A_Plant_Physiology_and_Regulation</a> |                                  |

| <b>Grading Scheme</b><br><b>مخطط الدرجات</b>                                                                                                                                                                                                                                                                                                                                         |                         |                     |                |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|----------------|---------------------------------------|
| <b>Group</b>                                                                                                                                                                                                                                                                                                                                                                         | <b>Grade</b>            | <b>التقدير</b>      | <b>Marks %</b> | <b>Definition</b>                     |
| <b>Success Group (50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                      | <b>A - Excellent</b>    | امتياز              | 90 - 100       | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>B - Very Good</b>    | جيد جدا             | 80 - 89        | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>C - Good</b>         | جيد                 | 70 - 79        | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>D - Satisfactory</b> | متوسط               | 60 - 69        | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>E - Sufficient</b>   | مقبول               | 50 - 59        | Work meets minimum criteria           |
| <b>Fail Group (0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                           | <b>FX – Fail</b>        | راسب (قيد المعالجة) | (45-49)        | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>F – Fail</b>         | راسب                | (0-44)         | Considerable amount of work required  |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                         |                     |                |                                       |

## MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| Module Information                 |                          |                                                                                                                                                                                                                                          |                                                                                  |
|------------------------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                          |                                                                                                                                                                                                                                          |                                                                                  |
| Module Title                       | <u>Immunology</u>        | Module Delivery                                                                                                                                                                                                                          |                                                                                  |
| Module Type                        | <u>Core</u>              | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |                                                                                  |
| Module Code                        | <u>Bio-3516</u>          |                                                                                                                                                                                                                                          |                                                                                  |
| ECTS Credits                       | <b>4</b>                 |                                                                                                                                                                                                                                          |                                                                                  |
| SWL (hr/sem)                       | <u>100</u>               |                                                                                                                                                                                                                                          |                                                                                  |
| Module Level                       | 3                        |                                                                                                                                                                                                                                          |                                                                                  |
| Administering Department           | Dept. of Biology         | College                                                                                                                                                                                                                                  | College of Science                                                               |
| Module Leader                      | Dr.Ibtihal Hameed Mohsin | e-mail                                                                                                                                                                                                                                   | <a href="mailto:ibtihalhameed@uodiyala.edu.iq">ibtihalhameed@uodiyala.edu.iq</a> |
| Module Leader's Acad. Title        | Assistant professor      | Module Leader's Qualification                                                                                                                                                                                                            | Ph.D.                                                                            |
| Module Tutor                       | Dr.Ibtihal Hameed Mohsin | e-mail                                                                                                                                                                                                                                   | <a href="mailto:ibtihalhameed@uodiyala.edu.iq">ibtihalhameed@uodiyala.edu.iq</a> |
| Peer Reviewer Name                 |                          | e-mail                                                                                                                                                                                                                                   |                                                                                  |
| Scientific Committee Approval Date |                          | Version Number                                                                                                                                                                                                                           | 1.0                                                                              |

| Relation with other Modules       |  |          |  |
|-----------------------------------|--|----------|--|
| العلاقة مع المواد الدراسية الأخرى |  |          |  |
| Prerequisite module               |  | Semester |  |
| Co-requisites module              |  | Semester |  |

| Module Aims, Learning Outcomes and Indicative Contents   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Module Objectives</b><br>أهداف المادة الدراسية        | 1. Understanding the history of immunology: Studying the origins of this science, its historical milestones, and the key scientists and discoveries that contributed to its development.<br>2. Exploring the fields and development of immunology: Reviewing the medical and research applications of immunology and its recent advancements.<br>3. Types of immunity and determining factors: Understanding innate and acquired immunity, as well as the genetic and environmental factors influencing immune responses.<br>4. Immune cells and their mechanisms of action: Studying the different types of immune cells (e.g., T cells, B cells, macrophages) and how they work together to combat pathogens. |

|                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                          | <p>5. Lymphoid organs: Identifying the primary and secondary lymphoid organs and their roles in the production and activation of immune cells.</p> <p>6. Types of immune responses: Differentiating between humoral and cell-mediated responses and understanding their mechanisms.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <p><b>Module Learning Outcomes</b><br/>مخرجات التعلم للمادة الدراسية</p> | <p>A: Cognitive Objectives:</p> <ol style="list-style-type: none"> <li>1. Knowledge (Level 1): Develop students' knowledge and their ability to recall learned information.</li> <li>2. Comprehension (Level 2): Improve the level of understanding and the ability to interpret concepts.</li> <li>3. Application (Level 3): Develop practical skills and the ability to apply learned knowledge.</li> <li>4. Analysis (Level 4): Enhance the ability to break down information into components and examine relationships.</li> <li>5. Synthesis (Level 5): Develop the ability to integrate and combine ideas to form new concepts.</li> <li>6. Evaluation (Level 6): Enable students to make judgments about the value and quality of material.</li> </ol> <p>B :Skills Objectives (Specific to the Course):</p> <ol style="list-style-type: none"> <li>1. Improve students' observation skills.</li> <li>2. Teach students imitation and modeling skills.</li> <li>3. Train students in experimental techniques and methods.</li> </ol>                                                                                                                             |
| <p><b>Indicative Contents</b><br/>المحتويات الإرشادية</p>                | <ol style="list-style-type: none"> <li>1. Introduction to Immunology <ul style="list-style-type: none"> <li>• Definition, scope, and historical perspective</li> <li>• Overview of the immune system components</li> </ul> </li> <li>2. Innate Immunity <ul style="list-style-type: none"> <li>• Physical and chemical barriers</li> <li>• Cells involved in innate immunity (macrophages, neutrophils, NK cells)</li> <li>• Inflammatory response and complement system</li> </ul> </li> <li>3. Adaptive Immunity <ul style="list-style-type: none"> <li>• Humoral and cell-mediated immunity</li> <li>• B lymphocytes: development, activation, and antibody production</li> <li>• T lymphocytes: types, activation, and functions</li> </ul> </li> <li>4. Antigens and Antibodies <ul style="list-style-type: none"> <li>• Structure and classification of antigens</li> <li>• Immunoglobulin classes and structure</li> <li>• Antigen-antibody interactions</li> </ul> </li> <li>5. Immune Response Regulation <ul style="list-style-type: none"> <li>• Cytokines and their roles</li> <li>• Mechanisms of immune tolerance and autoimmunity</li> </ul> </li> </ol> |

| <p><b>Learning and Teaching Strategies</b><br/>استراتيجيات التعلم والتعليم</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Strategies</b></p>                                                       | <ol style="list-style-type: none"> <li>1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another.</li> <li>2. Where applicable students will be assigned problems to solve and encouraged to assess one another.</li> <li>3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system.</li> <li>4. Students will also be regularly referred to relevant section of the prescribed text book.</li> <li>5. Most of the tutorial work will be done as self-study or with the assistance of a tutor.</li> </ol> |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination. |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Student Workload (SWL)<br>الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا              |     |                                                                           |     |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|-----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | 63  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 4.2 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 37  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 2.4 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل              | 100 |                                                                           |     |

| Module Evaluation<br>تقييم المادة الدراسية |                    |             |                     |            |                           |
|--------------------------------------------|--------------------|-------------|---------------------|------------|---------------------------|
|                                            |                    | Time/Number | Weight (Marks)      | Week Due   | Relevant Learning Outcome |
| <b>Formative assessment</b>                | <b>Quizzes</b>     | 2           | 10%                 | 5 and 10   | LO #1, #2                 |
|                                            | <b>Assignments</b> | 2           | 10%                 | 2 and 12   | LO #3, #4                 |
|                                            | <b>Projects /</b>  | 1           | 10%                 | Continuous | All                       |
|                                            | <b>Report</b>      | 1           | 10%                 | 13         | LO #5, #8                 |
| <b>Summative assessment</b>                | <b>Midterm</b>     | 2hr         | 10%                 | 7          | LO #1 - #7                |
|                                            | <b>Final Exam</b>  | 3hr         | 50%                 | 16         | All                       |
| <b>Total assessment</b>                    |                    |             | 100%<br>(100 Marks) |            |                           |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري |                                             |
|------------------------------------------------------------|---------------------------------------------|
|                                                            | Material Covered                            |
| <b>Week 1</b>                                              | Introduction of immunity                    |
| <b>Week 2</b>                                              | Inflammation                                |
| <b>Week 3</b>                                              | The Complement System                       |
| <b>Week 4</b>                                              | Antibodies & Antigen                        |
| <b>Week 5</b>                                              | Adaptive immunity (specific immune defense) |
| <b>Week 6</b>                                              | Cellular Immunity Response Process          |
| <b>Week 7</b>                                              | Disorders Associated with the Immune System |
| <b>Week 8</b>                                              | Hypersensitivity                            |

|               |                                              |
|---------------|----------------------------------------------|
| <b>Week 9</b> | Immunological tolerance                      |
| <b>Week</b>   | Autoimmune diseases                          |
| <b>Week</b>   | Reactions to Transplantation                 |
| <b>Week</b>   | Cytokines                                    |
| <b>Week</b>   | The role of lymphocytes in adaptive immunity |
| <b>Week</b>   | phagocytosis                                 |
| <b>Week</b>   | <b>Exam</b>                                  |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                                                                |
|--------------------------------------------------------------------------------|----------------------------------------------------------------|
|                                                                                | <b>Material Covered</b>                                        |
| <b>Week 1</b>                                                                  | Lab 1: Clinical Samples (Plasma and Serum)                     |
| <b>Week 2</b>                                                                  | Lab 2: Bactericidal Effect of Normal Serum                     |
| <b>Week 3</b>                                                                  | Lab 3: Immunogens, Antigens, Antibodies and Vaccines           |
| <b>Week 4</b>                                                                  | Lab 4: Antigen-Antibody Reaction (Serological Tests)           |
| <b>Week 5</b>                                                                  | Lab 5: Blood Grouping (ABO group)                              |
| <b>Week 6</b>                                                                  | Lab 6: Rose Bengal Test (RBT) Introduction                     |
| <b>Week 7</b>                                                                  | Lab 7: Widal Test                                              |
| <b>Week 8</b>                                                                  | Lab 8: C-reactive-protein(CRP)                                 |
| <b>Week 9</b>                                                                  | Lab 9: pregnancy test                                          |
| <b>Week</b>                                                                    | Lab 10: Rheumatoid Factor (RF) Test                            |
| <b>Week</b>                                                                    | Lab 11: AOS test                                               |
| <b>Week</b>                                                                    | Lab 12: ELASA techniques                                       |
| <b>Week</b>                                                                    | Lab 13: Complete Blood Count with Differential (CBC with Diff) |
| <b>Week</b>                                                                    | Lab 14: Allergy Testing: Specific IgE for allergens            |
| <b>Week</b>                                                                    | Lab 15: <b>Exam</b>                                            |

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس</b> |                                                                                                                                                                                                                                                   |                                  |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                                                                        | <b>Text</b>                                                                                                                                                                                                                                       | <b>Available in the Library?</b> |
| <b>Required Texts</b>                                                  | Chin-Hong, P., Joyce, E. A., Karandikar, M., Matloubian, M., Rubio, L. A., Schwartz, B. S., & Levinson, W. E. (2024). Levinson's Review of Medical Microbiology and Immunology: A Guide to Clinical Infectious Disease. McGraw Hill Professional. | Yes                              |
| <b>Recommended Texts</b>                                               | Parija, S. C. (2023). Textbook of microbiology and immunology (Vol. 1579). Berlin, Heidelberg, Germany: Springer.                                                                                                                                 | Yes                              |
| <b>Websites</b>                                                        | <a href="https://onlinelibrary.wiley.com/journal/15214141">https://onlinelibrary.wiley.com/journal/15214141</a><br><a href="https://ejimmunology.org/">https://ejimmunology.org/</a>                                                              |                                  |

| <b>Grading Scheme</b><br><b>مخطط الدرجات</b> |
|----------------------------------------------|
|----------------------------------------------|

| Group                                                                                                                                                                                                                                                                                                                                                                                       | Grade                   | التقدير             | Marks %  | Definition                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|----------|---------------------------------------|
| <b>Success Group (50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                             | <b>A -</b> Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                             | <b>B -</b> Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                             | <b>C -</b> Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                             | <b>D -</b> Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                             | <b>E -</b> Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group (0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                                  | <b>FX –</b> Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                             | <b>F –</b> Fail         | راسب                | (0-44)   | Considerable amount of work required  |
| <p><b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.</p> |                         |                     |          |                                       |

## MODULE DESCRIPTION FORM

### نموذج وصف المادة الدراسية

| Module Information                 |                       |                               |                                                                                                                                                                                                                                          |                                                                  |
|------------------------------------|-----------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| معلومات المادة الدراسية            |                       |                               |                                                                                                                                                                                                                                          |                                                                  |
| Module Title                       | <u>Parasitology</u>   |                               | Module Delivery                                                                                                                                                                                                                          |                                                                  |
| Module Type                        | <u>Elective</u>       |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |                                                                  |
| Module Code                        | <u>Bio-3517</u>       |                               |                                                                                                                                                                                                                                          |                                                                  |
| ECTS Credits                       | 4                     |                               |                                                                                                                                                                                                                                          |                                                                  |
| SWL (hr/sem)                       | <u>100</u>            |                               |                                                                                                                                                                                                                                          |                                                                  |
| Module Level                       | 3                     | Semester of Delivery          | 5                                                                                                                                                                                                                                        |                                                                  |
| Administering Department           | Dept. of Biology      | College                       | College of Science                                                                                                                                                                                                                       |                                                                  |
| Module Leader                      | Dr.Asraa Dawod Farhan |                               | e-mail                                                                                                                                                                                                                                   | <a href="mailto:Asraa@uodiyala.edu.iq">Asraa@uodiyala.edu.iq</a> |
| Module Leader's Acad. Title        | Lecturer              | Module Leader's Qualification | Ph.D.                                                                                                                                                                                                                                    |                                                                  |
| Module Tutor                       | Dr.Asraa Dawod Farhan |                               | e-mail                                                                                                                                                                                                                                   | <a href="mailto:Asraa@uodiyala.edu.iq">Asraa@uodiyala.edu.iq</a> |
| Peer Reviewer Name                 |                       | e-mail                        |                                                                                                                                                                                                                                          |                                                                  |
| Scientific Committee Approval Date |                       | Version Number                | 1.0                                                                                                                                                                                                                                      |                                                                  |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى |  |          |  |
|------------------------------------------------------------------|--|----------|--|
| Prerequisite module                                              |  | Semester |  |
| Co-requisites module                                             |  | Semester |  |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Objectives</b><br>أهداف المادة الدراسية                                                                  | <ol style="list-style-type: none"> <li>1. To understand the basic principles of parasitology.</li> <li>2. Identifying and studying parasites that infect humans and animals in detail</li> <li>3. Studying aspects of the life of each parasite in terms of external appearance, life cycle, pathological and epidemiological causes, and methods of diagnosis and prevention .For all parasites that cause diseases</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية                                                   | <p>At the end of this module students should be able to:</p> <ol style="list-style-type: none"> <li>1. Student Learning Outcome.</li> <li>2. By the end of the course, the students are being able to develop advanced academic knowledge about the concepts and principles of parasitology.</li> <li>3. List the different terms associated with parasitology.</li> <li>4. Detail knowledge about the parasitology and its applications.</li> <li>5. Conducting discussions that enable the student to link causes with natural causes.</li> <li>6. Having knowledge about the up-to-date advancing and development in this field of subject</li> <li>7. In addition to learning practically the technique of examining, using, how to collect the different type of specimens and how to prepare it for examinations and be familiar with the results and writing reports.</li> <li>8. Define the relationships between the parasite and the host.</li> <li>9. Identify the most important phylums and species that infect humans and animals.</li> <li>10. Discuss the different characteristics of parasites.</li> </ol> |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                                                                  | <p>Emotional and value goals</p> <ol style="list-style-type: none"> <li>1.Enable students to cooperate with each other in solving practical assignments.</li> <li>2.Enabling students to focus on the topic of the lesson and harmony and interaction with it.</li> <li>3.Enabling students to organize the information and data they receive during the lesson.</li> <li>4.Enabling the students to recreate their way of thinking towards living beings and appreciating the greatness of the Almighty Creator.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                               | <ol style="list-style-type: none"> <li>1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another.</li> <li>2. Where applicable students will be assigned problems to solve and encouraged to assess one another.</li> </ol> |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system.</p> <p>4. Students will also be regularly referred to relevant section of the prescribed text book.</p> <p>5. Most of the tutorial work will be done as self-study or with the assistance of a tutor.</p> <p>6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.</p> |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| <b>Student Workload (SWL)</b><br><b>الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا</b> |     |                                                                           |     |
|---------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|-----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل        | 63  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 4.2 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل  | 37  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 2.4 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل               | 100 |                                                                           |     |

| <b>Module Evaluation</b><br><b>تقييم المادة الدراسية</b> |                    |             |                  |            |                           |
|----------------------------------------------------------|--------------------|-------------|------------------|------------|---------------------------|
|                                                          |                    | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| <b>Formative assessment</b>                              | <b>Quizzes</b>     | 2           | 10% (10)         | 5 and 10   | LO #1, #2 and #10, #11    |
|                                                          | <b>Assignments</b> | 2           | 10% (10)         | 2 and 12   | LO #3, #4 and #6, #7      |
|                                                          | <b>Projects /</b>  | 1           | 10% (10)         | Continuous | All                       |
|                                                          | <b>Report</b>      | 1           | 10% (10)         | 13         | LO #5, #8 and #10         |
| <b>Summative assessment</b>                              | <b>Midterm</b>     | 2hr         | 10% (10)         | 7          | LO #1 - #7                |
|                                                          | <b>Final Exam</b>  | 3hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>                                  |                    |             | 100% (100 Marks) |            |                           |

| <b>Delivery Plan (Weekly Syllabus)</b><br><b>المنهاج الاسبوعي النظري</b> |                                                                                       |
|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                                                          | Material Covered                                                                      |
| <b>Week 1</b>                                                            | General introduction, history of science Parasites and public relations among animals |
| <b>Week 2</b>                                                            | Parasitism features, types Parasitism, types parasites, and hosts                     |
| <b>Week 3</b>                                                            | Protozoa and Protozoan Diseases and Life cycle                                        |
| <b>Week 4</b>                                                            | Complementing the genera belonging to the phylum Protozoa                             |

|               |                                                                                   |
|---------------|-----------------------------------------------------------------------------------|
| <b>Week 5</b> | Tissue and Blood flagellates (Leishmania spp.)                                    |
| <b>Week 6</b> | Flagellate: Family Trypanosomatidae, Genus Trypanosoma (African trypanosomiasis / |
| <b>Week 7</b> | SubPhylum: Ciliophora                                                             |
| <b>Week 8</b> | <b>Exam</b>                                                                       |
| <b>Week 9</b> | Phylum Sporozoa (blood and tissue sprozoa parasites)( Plasmodium species)         |
| <b>Week</b>   | Toxoplasma gondii (toxoplasmosis)                                                 |
| <b>Week</b>   | Phylum :Platyhelminthes                                                           |
| <b>Week</b>   | Heterophyes heterophyes (heterophysiasis)                                         |
| <b>Week</b>   | Liver and lung trematodes (Flukes)                                                |
| <b>Week</b>   | Fasciola hepatica (Sheep liver fluke infection / fascioliasis)                    |
| <b>Week</b>   | <b>Exam</b>                                                                       |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                                                                    |
|--------------------------------------------------------------------------------|--------------------------------------------------------------------|
|                                                                                | <b>Material Covered</b>                                            |
| <b>Week 1</b>                                                                  | Lab 1: Protozoa                                                    |
| <b>Week 2</b>                                                                  | Lab 2: Phylum: Sarcomastigophora.                                  |
| <b>Week 3</b>                                                                  | Lab 3: Blood and Tissue flagellates of human (type of Leishmania)  |
| <b>Week 4</b>                                                                  | Lab 4: Genus (Trypanosoma)                                         |
| <b>Week 5</b>                                                                  | Lab 5: Subphylum: Ciliophora                                       |
| <b>Week 6</b>                                                                  | Lab 6: Sporozoa(Plasmodium(Toxoplasma gondii)                      |
| <b>Week 7</b>                                                                  | Lab 7: <b>Exam</b>                                                 |
| <b>Week 8</b>                                                                  | Lab 8: Sporozoa(Plasmodium(Malaria)                                |
| <b>Week 9</b>                                                                  | Lab 9: Flat worms (Platyhelminthes)                                |
| <b>Week</b>                                                                    | Lab 10: Trematodes (Flukes)                                        |
| <b>Week</b>                                                                    | Lab 11: Blood flukes(Schistosoma)                                  |
| <b>Week</b>                                                                    | Lab 12: Class: Cestoda                                             |
| <b>Week</b>                                                                    | Lab 13: Taenia saginata (Beef worm),Taenia solium (Pork tape worm) |
| <b>Week</b>                                                                    | Lab 14: Phylum Nematelminthes:                                     |
| <b>Week</b>                                                                    | Lab 15: <b>Exam</b>                                                |

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس</b> |                                                                                                               |                                  |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|----------------------------------|
|                                                                        | <b>Text</b>                                                                                                   | <b>Available in the Library?</b> |
| <b>Required Texts</b>                                                  | Gunn, A., & Pitt, S. J. (2022). Parasitology: an integrated approach. John Wiley & Sons.                      | Yes                              |
| <b>Recommended Texts</b>                                               | Parija, S. C., & Chaudhury, A. (Eds.). (2022). Textbook of parasitic zoonoses. Singapore: Springer.           | Yes                              |
| <b>Websites</b>                                                        | <a href="https://www.britannica.com/science/parasitology">https://www.britannica.com/science/parasitology</a> |                                  |

|                       |
|-----------------------|
| <b>Grading Scheme</b> |
|-----------------------|

| مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                                                |                         |                     |          |                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                       | Grade                   | التقدير             | Marks %  | Definition                            |
| <b>Success Group (50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                             | <b>A -</b> Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                             | <b>B -</b> Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                             | <b>C -</b> Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                             | <b>D -</b> Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                             | <b>E -</b> Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group (0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                                  | <b>FX –</b> Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                             | <b>F –</b> Fail         | راسب                | (0-44)   | Considerable amount of work required  |
| <p><b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.</p> |                         |                     |          |                                       |

## MODULE DESCRIPTION FORM

### نموذج وصف المادة الدراسية

| Module Information                 |                          |                               |                                                                                                                                                                                                                                          |  |  |  |
|------------------------------------|--------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
| معلومات المادة الدراسية            |                          |                               |                                                                                                                                                                                                                                          |  |  |  |
| Module Title                       | <u>Genetics</u>          |                               | Module Delivery                                                                                                                                                                                                                          |  |  |  |
| Module Type                        | <u>Core</u>              |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |  |  |  |
| Module Code                        | <u>Bio-3611</u>          |                               |                                                                                                                                                                                                                                          |  |  |  |
| ECTS Credits                       | <b>5</b>                 |                               |                                                                                                                                                                                                                                          |  |  |  |
| SWL (hr/sem)                       | <u>125</u>               |                               |                                                                                                                                                                                                                                          |  |  |  |
| Module Level                       | 3                        | Semester of Delivery          | 6                                                                                                                                                                                                                                        |  |  |  |
| Administering Department           | Dept. of Biology         | College                       | College of Science                                                                                                                                                                                                                       |  |  |  |
| Module Leader                      | Dr.Ibrahim Hadi Mohammed | e-mail                        | <a href="mailto:dr.ibrahimhadi@uodiyala.edu.iq">dr.ibrahimhadi@uodiyala.edu.iq</a>                                                                                                                                                       |  |  |  |
| Module Leader's Acad. Title        | Professor                | Module Leader's Qualification | Ph.D.                                                                                                                                                                                                                                    |  |  |  |
| Module Tutor                       | Dr.Ibrahim Hadi Mohammed | e-mail                        | <a href="mailto:dr.ibrahimhadi@uodiyala.edu.iq">dr.ibrahimhadi@uodiyala.edu.iq</a>                                                                                                                                                       |  |  |  |
| Peer Reviewer Name                 |                          | e-mail                        |                                                                                                                                                                                                                                          |  |  |  |
| Scientific Committee Approval Date |                          | Version Number                | 1.0                                                                                                                                                                                                                                      |  |  |  |

| <b>Relation with other Modules</b><br><b>العلاقة مع المواد الدراسية الأخرى</b> |  |                 |  |
|--------------------------------------------------------------------------------|--|-----------------|--|
| <b>Prerequisite module</b>                                                     |  | <b>Semester</b> |  |
| <b>Co-requisites module</b>                                                    |  | <b>Semester</b> |  |

| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br><b>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Objectives</b><br><b>أهداف المادة الدراسية</b>                                                                         | Knowledge of genetic material and Mendel first and second laws and Chromosomes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Module Learning Outcomes</b><br><b>مخرجات التعلم للمادة الدراسية</b>                                                          | Knowledge of genetic material and the nature of its function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Indicative Contents</b><br><b>المحتويات الإرشادية</b>                                                                         | <ol style="list-style-type: none"> <li>Introduction to Genetics <ul style="list-style-type: none"> <li>Definition, scope, and historical milestones</li> <li>Contributions of Mendel and other pioneers</li> </ul> </li> <li>Cell Structure and Chromosomes <ul style="list-style-type: none"> <li>Structure and function of chromosomes</li> <li>Chromosome number, morphology, and classification</li> <li>Cell division: mitosis and meiosis</li> </ul> </li> <li>Mendelian Genetics <ul style="list-style-type: none"> <li>Laws of inheritance (segregation, independent assortment)</li> <li>Monohybrid and dihybrid crosses</li> <li>Test crosses and back crosses</li> </ul> </li> <li>Extensions of Mendelian Genetics <ul style="list-style-type: none"> <li>Incomplete dominance, codominance, multiple alleles</li> <li>Lethal alleles, pleiotropy, and polygenic inheritance</li> </ul> </li> <li>Linkage, Crossing Over, and Genetic Mapping <ul style="list-style-type: none"> <li>Concept of linkage and recombination</li> <li>Mapping genes on chromosomes</li> </ul> </li> <li>Sex Determination and Sex-Linked Inheritance <ul style="list-style-type: none"> <li>Mechanisms of sex determination in different organisms</li> <li>Sex-linked, sex-influenced, and sex-limited traits</li> </ul> </li> <li>Mutation <ul style="list-style-type: none"> <li>Types of mutations: gene, chromosomal, and genomic</li> <li>Causes and effects of mutations</li> <li>Mutagenic agents and repair mechanisms</li> </ul> </li> <li>DNA Structure and Function <ul style="list-style-type: none"> <li>Discovery and molecular structure of DNA and RNA</li> <li>DNA replication, transcription, and translation</li> </ul> </li> <li>Regulation of Gene Expression <ul style="list-style-type: none"> <li>Prokaryotic and eukaryotic gene regulation</li> <li>Operon models and epigenetic mechanisms</li> </ul> </li> <li>Genetic Variation and Population Genetics <ul style="list-style-type: none"> <li>Sources of genetic variation</li> <li>Hardy–Weinberg principle and factors affecting equilibrium</li> </ul> </li> <li>Genetics in Practice <ul style="list-style-type: none"> <li>Genetic engineering and biotechnology applications</li> <li>Genetic counseling and ethical considerations</li> </ul> </li> <li>Laboratory and Analytical Techniques in Genetics</li> </ol> |

|  |                                                                                                                                           |
|--|-------------------------------------------------------------------------------------------------------------------------------------------|
|  | <ul style="list-style-type: none"> <li>• Microscopy, karyotyping, and gel electrophoresis</li> <li>• PCR and molecular markers</li> </ul> |
|--|-------------------------------------------------------------------------------------------------------------------------------------------|

| <b>Learning and Teaching Strategies</b><br><b>استراتيجيات التعلم والتعليم</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                             | <ol style="list-style-type: none"> <li>1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another.</li> <li>2. Where applicable students will be assigned problems to solve and encouraged to assess one another.</li> <li>3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system.</li> <li>4. Students will also be regularly referred to relevant section of the prescribed text book.</li> <li>5. Most of the tutorial work will be done as self-study or with the assistance of a tutor.</li> <li>6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.</li> </ol> |

| <b>Student Workload (SWL)</b><br><b>الحمل الدراسي للطالب محسوب لـ 15 اسبوعا</b> |            |                                                                           |            |
|---------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------|------------|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل        | <b>63</b>  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | <b>4.2</b> |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل  | <b>62</b>  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | <b>4.1</b> |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل               | <b>125</b> |                                                                           |            |

| <b>Module Evaluation</b><br><b>تقييم المادة الدراسية</b> |                    |                    |                       |                 |                                  |
|----------------------------------------------------------|--------------------|--------------------|-----------------------|-----------------|----------------------------------|
|                                                          |                    | <b>Time/Number</b> | <b>Weight (Marks)</b> | <b>Week Due</b> | <b>Relevant Learning Outcome</b> |
| <b>Formative assessment</b>                              | <b>Quizzes</b>     | 2                  | 10% (10)              | 5 and 10        | LO #1, #2 and #10, #11           |
|                                                          | <b>Assignments</b> | 2                  | 10% (10)              | 2 and 12        | LO #3, #4 and #6, #7             |
|                                                          | <b>Projects /</b>  | 1                  | 10% (10)              | Continuous      | All                              |
|                                                          | <b>Report</b>      | 1                  | 10% (10)              | 13              | LO #5, #8 and #10                |
| <b>Summative assessment</b>                              | <b>Midterm</b>     | 2hr                | 10% (10)              | 7               | LO #1 - #7                       |
|                                                          | <b>Final Exam</b>  | 3hr                | 50% (50)              | 16              | All                              |

|                         |                        |  |  |
|-------------------------|------------------------|--|--|
| <b>Total assessment</b> | 100%<br>(100<br>Marks) |  |  |
|-------------------------|------------------------|--|--|

| <b>Delivery Plan (Weekly Syllabus)</b><br>المنهاج الاسبوعي النظري |                                                                    |
|-------------------------------------------------------------------|--------------------------------------------------------------------|
|                                                                   | <b>Material Covered</b>                                            |
| <b>Week 1</b>                                                     | Introduction to Genetics                                           |
| <b>Week 2</b>                                                     | Mendel First –Law of Segregation and Law of Independent assortment |
| <b>Week 3</b>                                                     | Sex Limited inheritance and Sex linked inheritance                 |
| <b>Week 4</b>                                                     | Mitosis and Meiosis                                                |
| <b>Week 5</b>                                                     | Chromosome of Human                                                |
| <b>Week 6</b>                                                     | DNA and RNA                                                        |
| <b>Week 7</b>                                                     | <b>Exam</b>                                                        |
| <b>Week 8</b>                                                     | Translation                                                        |
| <b>Week 9</b>                                                     | Replication and Multiplication                                     |
| <b>Week</b>                                                       | Reproductive Cloning                                               |
| <b>Week</b>                                                       | Gen Expression                                                     |
| <b>Week</b>                                                       | Codon                                                              |
| <b>Week</b>                                                       | Genetic Engineering                                                |
| <b>Week</b>                                                       | Genetic diseases                                                   |
| <b>Week</b>                                                       | <b>Exercises</b>                                                   |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br>المنهاج الاسبوعي للمختبر |                                                                                     |
|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                                                         | <b>Material Covered</b>                                                             |
| <b>Week 1</b>                                                           | Lab 1: Introduction to Genetics                                                     |
| <b>Week 2</b>                                                           | Lab 2: Exercises Mendel First –Law of Segregation and Law of Independent assortment |
| <b>Week 3</b>                                                           | Lab 3: Exercises Sex Limited inheritance and Sex linked inheritance                 |
| <b>Week 4</b>                                                           | Lab 4: Study Mitosis and Meiosis in cell                                            |
| <b>Week 5</b>                                                           | Lab 5: Study and selection Chromosome of Human                                      |
| <b>Week 6</b>                                                           | Lab 6: Study purification DNA                                                       |
| <b>Week 7</b>                                                           | Lab 7: Study purification RNA                                                       |
| <b>Week 8</b>                                                           | Lab 8: <b>Exercises</b>                                                             |
| <b>Week 9</b>                                                           | Lab 9: Study purification protein                                                   |
| <b>Week</b>                                                             | Lab 10: Study wastran blotting                                                      |
| <b>Week</b>                                                             | Lab 11: Study PCR                                                                   |
| <b>Week</b>                                                             | Lab 12: Electrophoresis                                                             |
| <b>Week</b>                                                             | Lab 13: plasmid                                                                     |
| <b>Week</b>                                                             | Lab 14: study genetic diseases                                                      |
| <b>Week</b>                                                             | Lab 15: <b>Exercises</b>                                                            |

|                                        |
|----------------------------------------|
| <b>Learning and Teaching Resources</b> |
|----------------------------------------|

| مصادر التعلم والتدريس |                                                                                                                                                                                            |                           |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                       | Text                                                                                                                                                                                       | Available in the Library? |
| Required Texts        | Bodmer, W. F., & Charlesworth, B. (2025). Mendelian genetics and eugenics. The American Journal of Human Genetics, 112(1), 196-197.                                                        | Yes                       |
| Recommended Texts     | Martens, A. T., & Hilser, V. J. (2025). Chaperone saturation mediates translation and protein folding efficiency. bioRxiv, 2025-06.                                                        | Yes                       |
| Websites              | <a href="https://www.britannica.com/science/genetics">https://www.britannica.com/science/genetics</a><br><a href="https://medlineplus.gov/genetics/">https://medlineplus.gov/genetics/</a> |                           |

| Grading Scheme<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                       |                  |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade            | التقدير             | Marks %  | Definition                            |
| Success Group<br>(50 - 100)                                                                                                                                                                                                                                                                                                                                                          | A - Excellent    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | B - Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | C - Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | D - Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | E - Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| Fail Group<br>(0 - 49)                                                                                                                                                                                                                                                                                                                                                               | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | F – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                  |                     |          |                                       |

## MODULE DESCRIPTION FORM

### نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية |                                |                                                                                                                           |
|-----------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Module Title                                  | <u>Environmental Pollution</u> | Module Delivery                                                                                                           |
| Module Type                                   | <u>Core</u>                    | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab |
| Module Code                                   | <u>Bio-3612</u>                |                                                                                                                           |

|                                    |                        |                  |                               |                                                                                                             |       |
|------------------------------------|------------------------|------------------|-------------------------------|-------------------------------------------------------------------------------------------------------------|-------|
| ECTS Credits                       | 5                      |                  |                               | <input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |       |
| SWL (hr/sem)                       | 125                    |                  |                               |                                                                                                             |       |
| Module Level                       |                        | 3                | Semester of Delivery          |                                                                                                             | 6     |
| Administering Department           |                        | Dept. of Biology | College                       | College of Science                                                                                          |       |
| Module Leader                      | Dr.Munther Hamza Rathi |                  | e-mail                        | <a href="mailto:Prof.dr.rathi@uodiyala.edu.iq">Prof.dr.rathi@uodiyala.edu.iq</a>                            |       |
| Module Leader's Acad. Title        |                        | Professor        | Module Leader's Qualification |                                                                                                             | Ph.D. |
| Module Tutor                       | Dr.Munther Hamza Rathi |                  | e-mail                        | <a href="mailto:Prof.dr.rathi@uodiyala.edu.iq">Prof.dr.rathi@uodiyala.edu.iq</a>                            |       |
| Peer Reviewer Name                 |                        |                  | e-mail                        |                                                                                                             |       |
| Scientific Committee Approval Date |                        |                  | Version Number                |                                                                                                             | 1.0   |

| <b>Relation with other Modules</b><br>العلاقة مع المواد الدراسية الأخرى |  |          |  |
|-------------------------------------------------------------------------|--|----------|--|
| Prerequisite module                                                     |  | Semester |  |
| Co-requisites module                                                    |  | Semester |  |

| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Objectives</b><br>أهداف المادة الدراسية                                                                         | A. Knowledge and Understanding:<br>1. Acquire fundamental knowledge of the sources, types, and causes of environmental pollution.<br>2. Understand the physical, chemical, and biological impacts of pollution on ecosystems and human health.<br>3. Recognize international and local regulations, standards, and policies related to environmental protection.<br>B. Intellectual Skills:<br>1. Analyze the relationships between pollution sources, environmental processes, and their effects.<br>2. Evaluate scientific data related to pollution measurement and control.<br>3. Propose solutions and mitigation strategies for different types of environmental pollution.<br>C. Practical and Professional Skills:<br>1. Apply appropriate techniques to measure and monitor air, water, and soil pollutants.<br>2. Interpret laboratory and field data to assess pollution levels.<br>3. Implement basic environmental management practices in real-world scenarios. |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية                                                          | By the end of this course, students will be able to:<br>1. Knowledge and Understanding: <ul style="list-style-type: none"> <li>Define the main types and sources of environmental pollution .</li> <li>Explain the chemical, physical, and biological mechanisms through which pollutants affect ecosystems and human health.</li> <li>Describe relevant environmental laws, policies, and standards.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

|                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                           | <p>2. Intellectual Skills</p> <ul style="list-style-type: none"> <li>Analyze environmental problems using scientific data and evidence.</li> <li>Evaluate pollution control technologies and management strategies.</li> <li>Propose practical solutions to reduce or prevent pollution.</li> </ul> <p>3. Practical and Professional Skills:</p> <ul style="list-style-type: none"> <li>Perform basic laboratory and field measurements for air, water, and soil pollutants.</li> <li>Interpret pollution monitoring results to assess environmental quality.</li> <li>Apply safety and environmental protection guidelines during field and lab work.</li> </ul>                                                                                                         |
| <p><b>Indicative Contents</b><br/>المحتويات الإرشادية</p> | <p>Indicative Contents: Environmental Pollution</p> <ol style="list-style-type: none"> <li>Introduction to Environmental Pollution: definitions, scope, and significance.</li> <li>Types of Pollution: air, water, soil, noise, and radioactive pollution.</li> <li>Sources and Causes of Pollution: natural vs. anthropogenic sources.</li> <li>Air Pollution: major pollutants, sources, effects, and control methods.</li> <li>Water Pollution: types of pollutants, sources, impact on aquatic life and human health.</li> <li>Soil Pollution: contaminants, causes, and effects on agriculture and ecosystems.</li> <li>Noise Pollution: sources, measurement, and health impacts.</li> <li>Radioactive Pollution: sources, hazards, and safety measures.</li> </ol> |

| <p><b>Learning and Teaching Strategies</b><br/>استراتيجيات التعلم والتعليم</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Strategies</b></p>                                                       | <ol style="list-style-type: none"> <li>Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another.</li> <li>Where applicable students will be assigned problems to solve and encouraged to assess one another.</li> <li>Learning material will be supplied to students in class or uploaded on Blackboard learning management system.</li> <li>Students will also be regularly referred to relevant section of the prescribed text book.</li> <li>Most of the tutorial work will be done as self-study or with the assistance of a tutor.</li> <li>The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.</li> </ol> |

|                                                                                  |
|----------------------------------------------------------------------------------|
| <p><b>Student Workload (SWL)</b><br/>الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا</p> |
|----------------------------------------------------------------------------------|

|                                                                                |            |                                                                           |            |
|--------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------|------------|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | <b>63</b>  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | <b>4.2</b> |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | <b>62</b>  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | <b>4.1</b> |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | <b>125</b> |                                                                           |            |

| <b>Module Evaluation</b><br>تقييم المادة الدراسية |                    |                    |                       |                 |                                  |
|---------------------------------------------------|--------------------|--------------------|-----------------------|-----------------|----------------------------------|
|                                                   |                    | <b>Time/Number</b> | <b>Weight (Marks)</b> | <b>Week Due</b> | <b>Relevant Learning Outcome</b> |
| <b>Formative assessment</b>                       | <b>Quizzes</b>     | 2                  | 10% (10)              | 5 and 10        | LO #1, #2 and #10, #11           |
|                                                   | <b>Assignments</b> | 2                  | 10% (10)              | 2 and 12        | LO #3, #4 and #6, #7             |
|                                                   | <b>Projects /</b>  | 1                  | 10% (10)              | Continuous      | All                              |
|                                                   | <b>Report</b>      | 1                  | 10% (10)              | 13              | LO #5, #8 and #10                |
| <b>Summative assessment</b>                       | <b>Midterm</b>     | 2hr                | 10% (10)              | 7               | LO #1 - #7                       |
|                                                   | <b>Final Exam</b>  | 3hr                | 50% (50)              | 16              | All                              |
| <b>Total assessment</b>                           |                    |                    | 100% (100 Marks)      |                 |                                  |

| <b>Delivery Plan (Weekly Syllabus)</b><br>المناهج الاسبوعي النظري |                                                                                     |
|-------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                                                   | <b>Material Covered</b>                                                             |
| <b>Week 1</b>                                                     | Definition , Degrees of Ecological pollution , pollutants , Some terms of pollution |
| <b>Week 2</b>                                                     | The effects of environmental pollution on (Human , Animals , Plants , Materials)    |
| <b>Week 3</b>                                                     | Air pollution                                                                       |
| <b>Week 4</b>                                                     | Air pollution                                                                       |
| <b>Week 5</b>                                                     | Global air pollutants                                                               |
| <b>Week 6</b>                                                     | Smog, Plastic pollution                                                             |
| <b>Week 7</b>                                                     | <b>Exam</b>                                                                         |
| <b>Week 8</b>                                                     | Water pollution                                                                     |
| <b>Week 9</b>                                                     | Thermal pollution                                                                   |
| <b>Week</b>                                                       | Oil pollution                                                                       |
| <b>Week</b>                                                       | Food pollution                                                                      |
| <b>Week</b>                                                       | Soil pollution                                                                      |
| <b>Week</b>                                                       | Nuclear pollution                                                                   |
| <b>Week</b>                                                       | Bioremediation , monitoring pollution , Environmental sanitation                    |
| <b>Week</b>                                                       | <b>Exam</b>                                                                         |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر |                                                                |
|------------------------------------------------------------------|----------------------------------------------------------------|
|                                                                  | Material Covered                                               |
| Week 1                                                           | Lab 1: Dissolved oxygen (DO)                                   |
| Week 2                                                           | Lab 2: Biological Oxygen Demand (BOD)                          |
| Week 3                                                           | Lab 3: Free CO <sub>2</sub> in water                           |
| Week 4                                                           | Lab 4: Measuring Of Salinity                                   |
| Week 5                                                           | Lab 5: Soil pollution                                          |
| Week 6                                                           | Lab 6: Determination of Calcium in Water                       |
| Week 7                                                           | Lab 7: Determination of Magnesium in Water                     |
| Week 8                                                           | Lab 8: Exam                                                    |
| Week 9                                                           | Lab 9: Air pollution (Air Pollution Catcher)                   |
| Week                                                             | Lab 10: Micro plastic Pollution and Its Impact on Human Health |
| Week                                                             | Lab 11: Acidity in water                                       |
| Week                                                             | Lab 12: alkalinity in water                                    |
| Week                                                             | Lab 13: Free chlorine Information                              |
| Week                                                             | Lab 14: Total hardness of water                                |
| Week                                                             | Lab 15: Exam                                                   |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس |                                                                                                                                                                                                                                                                                          |                           |
|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                                          | Text                                                                                                                                                                                                                                                                                     | Available in the Library? |
| Required Texts                                           | Warouw, Z. W. M., Purba, E. R., Tumewu, W. A., Wowor, E. C., & Wola, B. R. (2024). Development of interactive multimedia on environmental pollution topics with STEM approach for junior high school students. BIO-INOVED: Jurnal Biologi-Inovasi Pendidikan, 6(3), 342-352.             | Yes                       |
| Recommended Texts                                        | Kehar, N., Suhag, A. K., Chandio, M., Kehar, B. U. Z., & Shah, S. (2025). Examining the Environmental Education Themes Presented in Grade 8 Social Studies Sindh Textbook Board Jamshoro, Sindh. Regional Lens, 4(1), 151-161.                                                           | Yes                       |
| Websites                                                 | <a href="https://www.enelgreenpower.com/learning-hub/environmental-pollution">https://www.enelgreenpower.com/learning-hub/environmental-pollution</a><br><a href="https://www.britannica.com/science/pollution-environment">https://www.britannica.com/science/pollution-environment</a> |                           |

| Grading Scheme<br>مخطط الدرجات |               |         |          |                                |
|--------------------------------|---------------|---------|----------|--------------------------------|
| Group                          | Grade         | التقدير | Marks %  | Definition                     |
| Success Group<br>(50 - 100)    | A - Excellent | امتياز  | 90 - 100 | Outstanding Performance        |
|                                | B - Very Good | جيد جدا | 80 - 89  | Above average with some errors |
|                                | C - Good      | جيد     | 70 - 79  | Sound work with notable errors |

|                                                                                                                                                                                                                                                                                                                                                                                             |                  |                     |         |                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|---------|---------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                             | D - Satisfactory | متوسط               | 60 - 69 | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                             | E - Sufficient   | مقبول               | 50 - 59 | Work meets minimum criteria           |
| <b>Fail Group (0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                                  | FX – Fail        | راسب (قيد المعالجة) | (45-49) | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                             | F – Fail         | راسب                | (0-44)  | Considerable amount of work required  |
| <p><b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.</p> |                  |                     |         |                                       |

## MODULE DESCRIPTION FORM

### نموذج وصف المادة الدراسية

| Module Information                 |                              |                               |                                                                                                                                                                                                                                          |  |
|------------------------------------|------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| معلومات المادة الدراسية            |                              |                               |                                                                                                                                                                                                                                          |  |
| Module Title                       | <u>Animal Physiology</u>     |                               | Module Delivery                                                                                                                                                                                                                          |  |
| Module Type                        | <u>Core</u>                  |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |  |
| Module Code                        | <u>Bio-3613</u>              |                               |                                                                                                                                                                                                                                          |  |
| ECTS Credits                       | <b>4</b>                     |                               |                                                                                                                                                                                                                                          |  |
| SWL (hr/sem)                       | <u>100</u>                   |                               |                                                                                                                                                                                                                                          |  |
| Module Level                       | 3                            | Semester of Delivery          | 6                                                                                                                                                                                                                                        |  |
| Administering Department           | Dept. of Biology             | College                       | College of Science                                                                                                                                                                                                                       |  |
| Module Leader                      | Dr.Anwar Abdulameer Mohammed | e-mail                        | <a href="mailto:anwarabdulameer@uodiyala.edu.iq">anwarabdulameer@uodiyala.edu.iq</a>                                                                                                                                                     |  |
| Module Leader's Acad. Title        | Assistant professor          | Module Leader's Qualification | Ph.D.                                                                                                                                                                                                                                    |  |
| Module Tutor                       | Dr.Anwar Abdulameer Mohammed | e-mail                        | <a href="mailto:anwarabdulameer@uodiyala.edu.iq">anwarabdulameer@uodiyala.edu.iq</a>                                                                                                                                                     |  |
| Peer Reviewer Name                 |                              | e-mail                        |                                                                                                                                                                                                                                          |  |
| Scientific Committee Approval Date |                              | Version Number                | 1.0                                                                                                                                                                                                                                      |  |

## Relation with other Modules

### العلاقة مع المواد الدراسية الأخرى

|                     |  |          |  |
|---------------------|--|----------|--|
| Prerequisite module |  | Semester |  |
|---------------------|--|----------|--|

|                             |  |                 |  |
|-----------------------------|--|-----------------|--|
| <b>Co-requisites module</b> |  | <b>Semester</b> |  |
|-----------------------------|--|-----------------|--|

| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br><b>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</b> |  |
|----------------------------------------------------------------------------------------------------------------------------------|--|
|----------------------------------------------------------------------------------------------------------------------------------|--|

|                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Objectives</b><br><b>أهداف المادة الدراسية</b>                | Introduction to physiology , understand function of each system of human body                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Module Learning Outcomes</b><br><b>مخرجات التعلم للمادة الدراسية</b> | Students have to know role of each system in the body to maintain homeostasis.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Indicative Contents</b><br><b>المحتويات الإرشادية</b>                | <ol style="list-style-type: none"> <li>1. Introduction to Animal Physiology <ul style="list-style-type: none"> <li>• Definition and scope</li> <li>• Relationship between structure and function</li> <li>• Levels of organization in animals</li> </ul> </li> <li>2. Nervous System Physiology <ul style="list-style-type: none"> <li>• Structure and function of neurons</li> <li>• Nerve impulse transmission</li> <li>• Synaptic transmission</li> <li>• Reflex actions and neural integration</li> </ul> </li> <li>3. Circulatory System <ul style="list-style-type: none"> <li>• Structure and function of the heart</li> <li>• Blood vessels and circulation</li> <li>• Blood composition and functions</li> <li>• Cardiac cycle and regulation</li> </ul> </li> <li>4. Digestive System Physiology <ul style="list-style-type: none"> <li>• Structure and function of digestive organs</li> <li>• Enzymatic digestion and absorption</li> <li>• Regulation of digestive processes</li> </ul> </li> <li>5. Endocrine System <ul style="list-style-type: none"> <li>• Hormones and their functions</li> <li>• Mechanism of hormone action</li> <li>• Major endocrine glands and physiological roles</li> </ul> </li> </ol> |

| <b>Learning and Teaching Strategies</b><br><b>استراتيجيات التعلم والتعليم</b> |  |
|-------------------------------------------------------------------------------|--|
|-------------------------------------------------------------------------------|--|

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b> | <ol style="list-style-type: none"> <li>1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or b exchanging ideas and question one another.</li> <li>2. Where applicable students will be assigned problems to solve and encouraged to assess one another.</li> <li>3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system.</li> <li>4. Students will also be regularly referred to relevant section of the prescribed text book.</li> <li>5. Most of the tutorial work will be done as self-study or with the assistance of a tutor.</li> <li>6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative</li> </ol> |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|  |                                                                                                                                                                                                                                     |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination. |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| <b>Student Workload (SWL)</b><br><b>الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا</b> |            |                                                                           |            |
|---------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------|------------|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل        | <b>63</b>  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | <b>4.2</b> |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل  | <b>37</b>  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | <b>2.4</b> |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب الفصل                    | <b>100</b> |                                                                           |            |

| <b>Module Evaluation</b><br><b>تقييم المادة الدراسية</b>                 |                                                                                       |             |                  |            |                           |
|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------|------------------|------------|---------------------------|
|                                                                          |                                                                                       | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| <b>Formative assessment</b>                                              | <b>Quizzes</b>                                                                        | 2           | 10% (10)         | 5 and 10   | LO #1, #2 and #10 - #11   |
|                                                                          | <b>Assignments</b>                                                                    | 2           | 10% (10)         | 2 and 12   | LO #3, #4 and #6 - #7     |
|                                                                          | <b>Projects /</b>                                                                     | 1           | 10% (10)         | Continuous | All                       |
|                                                                          | <b>Report</b>                                                                         | 1           | 10% (10)         | 13         | LO #5, #8 and #10         |
| <b>Summative assessment</b>                                              | <b>Midterm</b>                                                                        | 2hr         | 10% (10)         | 7          | LO #1 - #7                |
|                                                                          | <b>Final Exam</b>                                                                     | 3hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>                                                  |                                                                                       |             | 100% (100 Marks) |            |                           |
| <b>Delivery Plan (Weekly Syllabus)</b><br><b>المنهاج الاسبوعي النظري</b> |                                                                                       |             |                  |            |                           |
|                                                                          | <b>Material Covered</b>                                                               |             |                  |            |                           |
| <b>Week 1</b>                                                            | Introduction to physiology , principles of physiology and its association with        |             |                  |            |                           |
| <b>Week 2</b>                                                            | Physiology of nervous system , divisions of the system , characteristics of plasma    |             |                  |            |                           |
| <b>Week 3</b>                                                            | Plasma membrane polarization , rest potential , action potential , threshold          |             |                  |            |                           |
| <b>Week 4</b>                                                            | Synapses , types of synapses , neurotransmitters                                      |             |                  |            |                           |
| <b>Week 5</b>                                                            | Conductivity of nerve impulses , stages of changing acetyl-choline and nor-           |             |                  |            |                           |
| <b>Week 6</b>                                                            | <b>Exam</b>                                                                           |             |                  |            |                           |
| <b>Week 7</b>                                                            | Endocrine of system , mechanism of hormone action                                     |             |                  |            |                           |
| <b>Week 8</b>                                                            | Pituitary gland structure , anterior lobe and posterior lobe hormones                 |             |                  |            |                           |
| <b>Week 9</b>                                                            | Thyroid gland and parathyroid description and hormones , important role of the        |             |                  |            |                           |
| <b>Week 10</b>                                                           | Adrenal gland cortex and medulla , description of each part of the gland and          |             |                  |            |                           |
| <b>Week 11</b>                                                           | Physiology of digestive system , introduction to digestion ,role of salivary gland in |             |                  |            |                           |
| <b>Week 12</b>                                                           | Role of stomach in digestion , role of gastric gland in digestion                     |             |                  |            |                           |

|                |                                                  |
|----------------|--------------------------------------------------|
| <b>Week 13</b> | Intestinal stage of digestion in small intestine |
| <b>Week 14</b> | Second midterm exam                              |
| <b>Week 15</b> | <b>Exam</b>                                      |

### Delivery Plan (Weekly Lab. Syllabus)

#### المناهج الأسبوعي للمختبر

|               | Material Covered                                                                       |
|---------------|----------------------------------------------------------------------------------------|
| <b>Week 1</b> | Lab 1: Physiology of circulatory system , the blood ,PCV and ESR                       |
| <b>Week 2</b> | Lab 2: Counting of erythrocytes and leukocytes                                         |
| <b>Week 3</b> | Lab 3: Estimation level of Hb and clotting time                                        |
| <b>Week 4</b> | Lab 4: Blood groups and RH                                                             |
| <b>Week 5</b> | Lab 5: principles of estimation blood glucose level                                    |
| <b>Week 6</b> | Lab 6: <b>Exam</b>                                                                     |
| <b>Week 7</b> | Lab 7: Physiology of plasma membrane ( selective permeability , hydrostatic pressure ) |
| <b>Week 8</b> | Lab 8: Physiology of digestive enzymes like amylase , lipase , trypsin                 |
| <b>Week 9</b> | Lab 9: Estimation of albumin with laboratory                                           |
| <b>Week</b>   | Lab 10: Estimation of cholesterol and HLD                                              |
| <b>Week</b>   | Lab 11: Estimation of urea and creatinin                                               |
| <b>Week</b>   | Lab 12: Action of liver enzymes                                                        |
| <b>Week</b>   | Lab 13: <b>Exam</b>                                                                    |
| <b>Week</b>   | Lab 14: different modern available fast and easy test for hormones                     |
| <b>Week</b>   | Lab 15: important available test in laboratory for different pathological conditions   |

### Learning and Teaching Resources

#### مصادر التعلم والتدريس

|                          | Text                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Available in the Library? |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Required Texts</b>    | Khan, M., Khinchi, P. J., Sampath, M. V., & Hemavathi, B. (2023). A textbook of animal physiology. Academic Guru Publishing House.                                                                                                                                                                                                                                                                                                                      | Yes                       |
| <b>Recommended Texts</b> | Khurana, I., & Khurana, A. (2025). Concise Textbook of Physiology-E-Book. Elsevier Health Sciences.                                                                                                                                                                                                                                                                                                                                                     | Yes                       |
| <b>Websites</b>          | <a href="https://www.britannica.com/science/physiology">https://www.britannica.com/science/physiology</a><br><a href="https://www.physiology.org/career/teaching-learning-resources/student-resources/what-is-physiology?SSO=Y">https://www.physiology.org/career/teaching-learning-resources/student-resources/what-is-physiology?SSO=Y</a><br><a href="https://health-sciences.nwu.ac.za/physiology">https://health-sciences.nwu.ac.za/physiology</a> |                           |

### Grading Scheme

#### مخطط الدرجات

| Group | Grade         | التقدير | Marks %  | Definition              |
|-------|---------------|---------|----------|-------------------------|
|       | A - Excellent | امتياز  | 90 - 100 | Outstanding Performance |

|                                     |                         |                     |         |                                       |
|-------------------------------------|-------------------------|---------------------|---------|---------------------------------------|
| <b>Success Group<br/>(50 - 100)</b> | <b>B - Very Good</b>    | جيد جدا             | 80 - 89 | Above average with some errors        |
|                                     | <b>C - Good</b>         | جيد                 | 70 - 79 | Sound work with notable errors        |
|                                     | <b>D - Satisfactory</b> | متوسط               | 60 - 69 | Fair but with major shortcomings      |
|                                     | <b>E - Sufficient</b>   | مقبول               | 50 - 59 | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b>      | <b>FX – Fail</b>        | راسب (قيد المعالجة) | (45-49) | More work required but credit awarded |
|                                     | <b>F – Fail</b>         | راسب                | (0-44)  | Considerable amount of work required  |

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

## MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| Module Information                 |                        |                               |                                                                                                                                                                                                                                          |
|------------------------------------|------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                        |                               |                                                                                                                                                                                                                                          |
| Module Title                       | <u>Biototoxicology</u> |                               | Module Delivery                                                                                                                                                                                                                          |
| Module Type                        | <u>Elective</u>        |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | <u>Bio-3614</u>        |                               |                                                                                                                                                                                                                                          |
| ECTS Credits                       | 4                      |                               |                                                                                                                                                                                                                                          |
| SWL (hr/sem)                       | <u>100</u>             |                               |                                                                                                                                                                                                                                          |
| Module Level                       | 3                      | Semester of Delivery          | 6                                                                                                                                                                                                                                        |
| Administering Department           | Dept. of Biology       | College                       | College of Science                                                                                                                                                                                                                       |
| Module Leader                      | Dr.Anaam Fuad Hussain  | e-mail                        | <a href="mailto:anaamfuad@uodiyala.edu.iq">anaamfuad@uodiyala.edu.iq</a>                                                                                                                                                                 |
| Module Leader's Acad. Title        | Professor              | Module Leader's Qualification | Ph.D.                                                                                                                                                                                                                                    |
| Module Tutor                       | Dr.Anaam Fuad Hussain  | e-mail                        | <a href="mailto:anaamfuad@uodiyala.edu.iq">anaamfuad@uodiyala.edu.iq</a>                                                                                                                                                                 |
| Peer Reviewer Name                 |                        | e-mail                        |                                                                                                                                                                                                                                          |
| Scientific Committee Approval Date |                        | Version Number                | 1.0                                                                                                                                                                                                                                      |

| Relation with other Modules       |  |          |  |
|-----------------------------------|--|----------|--|
| العلاقة مع المواد الدراسية الأخرى |  |          |  |
| Prerequisite module               |  | Semester |  |
| Co-requisites module              |  | Semester |  |

| Module Aims, Learning Outcomes and Indicative Contents   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Module Objectives</b><br>أهداف المادة الدراسية        | <ol style="list-style-type: none"> <li>Introducing the student to the science of toxicology in terms of the history of interest in it, its characteristics and its importance to humans and animals, and in the transformations carried out by living organisms on organic and mineral materials because they are organisms with enzymatic activity and the role of these organisms in producing toxins inside and outside the body of the living organism.</li> <li>Study the effects of toxins on the physiologic, metabolic, reproductive, and developmental processes and body organ functions</li> <li>Introducing the student to the technical developments taking place in this science, such as chemical and molecular methods.</li> </ol> |

|                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                  | 4. Introducing the student to harmful toxins, studying their properties, how to remove them from the body, and knowing those that are used in the chemical and therapeutic industries.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية | Knowledge and Understanding<br>1. Define biological toxins and classify them according to their origin, structure, and mode of action.<br>2. Describe the sources of toxins produced by plants, animals, bacteria, fungi, and marine organisms.<br>3. Explain the biochemical mechanisms of toxicity and the physiological effects on target organisms.<br>4. Identify factors affecting toxin stability, potency, and environmental persistence.<br>Cognitive Skills<br>1. Analyze case studies of toxin-related illnesses and outbreaks.<br>2. Interpret laboratory results related to toxin detection and quantification.<br>3. Evaluate the risks of biological toxins in food, water, and the environment.<br>Practical and Laboratory Skills<br>1. Apply standard laboratory techniques for isolation, identification, and quantification of biological toxins.<br>2. Follow biosafety guidelines in handling and disposal of toxic biological materials. |
| <b>Indicative Contents</b><br>المحتويات الإرشادية                | 1. Toxins and their sources<br>2. Biological toxins, their sources, and their effects on the organism producing and exposed to them<br>3. Know the benefits and harms of biotoxins<br>4. Study the biological transformations of toxins and manage the risks resulting from them<br>5. How to deal with toxic organisms<br>6. How to detect biotoxins<br>7. Isolation and purification of toxins<br>8. Knowing the lethal dose of toxins<br>9. Knowing the time period for the toxic effect to appear<br>10. How to detoxify and get rid of toxin from the body<br>11. The possibility of benefiting from toxic secondary metabolites in living organisms                                                                                                                                                                                                                                                                                                       |

| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                      | 1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another.<br>2. Where applicable students will be assigned problems to solve and encouraged to assess one another.<br>3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system.<br>4. Students will also be regularly referred to relevant section of the prescribed text book.<br>5. Most of the tutorial work will be done as self-study or with the assistance of a tutor.<br>6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative |

|  |                                                                                                                                                                                                                                     |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination. |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Student Workload (SWL)<br>الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا              |            |                                                                           |            |
|--------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------|------------|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | <b>63</b>  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | <b>4.2</b> |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | <b>37</b>  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | <b>2.4</b> |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب الفصل                   | <b>100</b> |                                                                           |            |

| Module Evaluation<br>تقييم المادة الدراسية |                    |             |                  |            |                           |
|--------------------------------------------|--------------------|-------------|------------------|------------|---------------------------|
|                                            |                    | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| <b>Formative assessment</b>                | <b>Quizzes</b>     | 2           | 10% (10)         | 5 and 10   | LO #1, #2 and #10 - #11   |
|                                            | <b>Assignments</b> | 2           | 10% (10)         | 2 and 12   | LO #3, #4 and #6 - #7     |
|                                            | <b>Projects /</b>  | 1           | 10% (10)         | Continuous | All                       |
|                                            | <b>Report</b>      | 1           | 10% (10)         | 13         | LO #5, #8 and #10         |
| <b>Summative assessment</b>                | <b>Midterm</b>     | 2hr         | 10% (10)         | 7          | LO #1 - #7                |
|                                            | <b>Final Exam</b>  | 3hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>                    |                    |             | 100% (100 Marks) |            |                           |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري |                                                               |
|------------------------------------------------------------|---------------------------------------------------------------|
|                                                            | Material Covered                                              |
| <b>Week 1</b>                                              | Toxicology (Definition & History of toxicity and biotoxins ). |
| <b>Week 2</b>                                              | Scope and ethical principles of Toxicology                    |
| <b>Week 3</b>                                              | Biotransformation of Xenobiotics and Toxikinetics             |
| <b>Week 4</b>                                              | Hepatotoxicity: Mycotoxins                                    |
| <b>Week 5</b>                                              | Hepatotoxicity: Pyrrolizidines                                |
| <b>Week 6</b>                                              | Algal hepatotoxicity                                          |
| <b>Week 7</b>                                              | <b>Exam</b>                                                   |
| <b>Week 8</b>                                              | Neurotoxicity                                                 |
| <b>Week 9</b>                                              | Nephrotoxicity                                                |
| <b>Week</b>                                                | Toxicity of the Skin and Intestine                            |
| <b>Week</b>                                                | Respiratory Toxicity                                          |

|             |                                                 |
|-------------|-------------------------------------------------|
| <b>Week</b> | Cardiovascular Toxicity                         |
| <b>Week</b> | Toxicity of Male and Female Reproductive System |
| <b>Week</b> | Interesting of biotoxins                        |
| <b>Week</b> | <b>Exam</b>                                     |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                                                                                                                                             |
|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                | <b>Material Covered</b>                                                                                                                     |
| <b>Week 1</b>                                                                  | Lab 1: Laboratory Planning and Preparation for Use                                                                                          |
| <b>Week 2</b>                                                                  | Lab 2: Laboratory Equipment used in Toxicology Lab.                                                                                         |
| <b>Week 3</b>                                                                  | Lab 3: Toxin Use Practices (reconstitution, dilution, administration)                                                                       |
| <b>Week 4</b>                                                                  | Lab4: Colorimetric method for detection of toxic secondary metabolites                                                                      |
| <b>Week 5</b>                                                                  | Lab5: Detection for Alkaloids by Precipitation Reactions                                                                                    |
| <b>Week 6</b>                                                                  | Lab 6: Detection the cellular toxicity                                                                                                      |
| <b>Week 7</b>                                                                  | Lab 7: Detection the chemical contents for secondary metabolites of toxic organisms<br>Gas Chromatography Mass Spectrometry(GCMS) Technique |
| <b>Week 8</b>                                                                  | Lab 8: <b>Exam</b>                                                                                                                          |
| <b>Week 9</b>                                                                  | Lab 9: Detection of biotoxins by Thin layer chromatography (TLC) technique                                                                  |
| <b>Week</b>                                                                    | Lab 10: Detection of biotoxins by High Liquid Performance Chromatography (HPLC) techniques                                                  |
| <b>Week</b>                                                                    | Lab11: Detection of biotoxins by enzyme linked Immunosorbent assay (ELISA) techniques                                                       |
| <b>Week</b>                                                                    | Lab 12: Determination of (Lethal Dose 50) LD50 toxin in experimental animal                                                                 |
| <b>Week</b>                                                                    | Lab 13: Cytotoxicity Assay of snake venom ( <i>In Vitro</i> )                                                                               |
| <b>Week</b>                                                                    | Lab 14: Histological effects of biotoxins ( <i>In Vivo</i> )                                                                                |
| <b>Week</b>                                                                    | Lab 14: <b>Exam</b>                                                                                                                         |

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس</b> |                                                                                                                                                                                                                                                                                                                          |                                  |
|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                                                                        | <b>Text</b>                                                                                                                                                                                                                                                                                                              | <b>Available in the Library?</b> |
| <b>Required Texts</b>                                                  | Mycotoxins, (2008) Editor: Leslie.<br>Poisonous plants in Iraq,(1980). Editor:Ali Alrawi<br>Poisonous plants in southern united states,(2005). Editor: John W. Everest et al<br>Algae (2006) Editor: Barsanti and Gualtieri<br>Antibiotics Resistance of Bacteria to Antibiotics(2010) Dr. Editor:Mohammed F. Al-Marjani | Yes                              |
| <b>Recommen ded Texts</b>                                              | Manual Of Methods Of Analysis Of Foods,(2016). By: Food Safety And Standards Authority Of India Ministry Of Health And Family Welfare Government Of India , New Delhi.<br>The Pesticide Manual,(2012). Editor: C. MacBean.                                                                                               | Yes                              |

|                 |                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Websites</b> | <a href="https://poisoncontrol.utah.edu/publiced/plants">https://poisoncontrol.utah.edu/publiced/plants</a><br><a href="https://poisonousplants.cvmbs.colostate.edu/home">https://poisonousplants.cvmbs.colostate.edu/home</a><br><a href="https://www.biotoxdoc.eu/">https://www.biotoxdoc.eu/</a><br><a href="https://mycotoxinsite.com/home/?lang=en">https://mycotoxinsite.com/home/?lang=en</a> |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| <b>Grading Scheme</b><br><b>مخطط الدرجات</b>                                                                                                                                                                                                                                                                                                                                         |                         |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade                   | التقدير             | Marks %  | Definition                            |
| <b>Success Group (50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                      | <b>A -</b><br>Excellent | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>B -</b> Very Good    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>C -</b> Good         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>D -</b> Satisfactory | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>E -</b> Sufficient   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group (0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                           | <b>FX –</b> Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>F –</b> Fail         | راسب                | (0-44)   | Considerable amount of work required  |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                         |                     |          |                                       |

## MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| Module Information                 |                                               |                               |                                                                                                                                                                                                                                          |
|------------------------------------|-----------------------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                                               |                               |                                                                                                                                                                                                                                          |
| Module Title                       | <b><u>Microbiology (Aquatic and Soil)</u></b> |                               | Module Delivery                                                                                                                                                                                                                          |
| Module Type                        | <b><u>Core</u></b>                            |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | <b><u>Bio-3615</u></b>                        |                               |                                                                                                                                                                                                                                          |
| ECTS Credits                       | <b>4</b>                                      |                               |                                                                                                                                                                                                                                          |
| SWL (hr/sem)                       | <b><u>100</u></b>                             |                               |                                                                                                                                                                                                                                          |
| Module Level                       | 3                                             | Semester of Delivery          | 6                                                                                                                                                                                                                                        |
| Administering Department           | Dept. of Biology                              | College                       | College of Science                                                                                                                                                                                                                       |
| Module Leader                      | Dr. Iman Abbas Ali                            | e-mail                        | <a href="mailto:imanabbas@uodiyala.edu.iq">imanabbas@uodiyala.edu.iq</a>                                                                                                                                                                 |
| Module Leader's Acad. Title        | Assistant professor                           | Module Leader's Qualification | Ph.D.                                                                                                                                                                                                                                    |
| Module Tutor                       | Dr. Iman Abbas Ali                            | e-mail                        | <a href="mailto:imanabbas@uodiyala.edu.iq">imanabbas@uodiyala.edu.iq</a>                                                                                                                                                                 |
| Peer Reviewer Name                 |                                               | e-mail                        |                                                                                                                                                                                                                                          |
| Scientific Committee Approval Date |                                               | Version Number                | 1.0                                                                                                                                                                                                                                      |

| Relation with other Modules       |  |          |  |
|-----------------------------------|--|----------|--|
| العلاقة مع المواد الدراسية الأخرى |  |          |  |
| Prerequisite module               |  | Semester |  |
| Co-requisites module              |  | Semester |  |

| Module Aims, Learning Outcomes and Indicative Contents   |                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Module Objectives</b><br>أهداف المادة الدراسية        | 1. Enabling students to gain knowledge and understanding of microorganisms in soil and water<br>2. Enabling students to gain knowledge and understanding of life cycles in soil<br>3. Enabling students to gain knowledge and understanding of the most important cycles in water<br>4. Enabling students to gain knowledge and understanding of the decomposition of materials in soil and the role of microorganisms in it. |
| <b>Module Learning Outcomes</b>                          | Understand :Different types of environmental pollution and their effects.<br>Understand: The importance of biodiversity in maintaining ecological balance.<br>Application: Water management techniques in agriculture.                                                                                                                                                                                                        |

|                                                   |                                                                                                                                                                                                                                      |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| مخرجات التعلم للمادة<br>الدراسية                  | Analysis: The impact of fertilizer use on soil quality.<br>Evaluation: The impact of industrial activities on air and water pollution.<br>Innovation: Innovative solutions to the problem of water pollution.                        |
| <b>Indicative Contents</b><br>المحتويات الإرشادية | The guiding contents of the Water Environment and Soil Pollution course include a study of the sources of water and soil pollution, their effects on the environment and health, in addition to methods of prevention and treatment. |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                               | <ol style="list-style-type: none"> <li>1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another.</li> <li>2. Where applicable students will be assigned problems to solve and encouraged to assess one another.</li> <li>3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system.</li> <li>4. Students will also be regularly referred to relevant section of the prescribed text book.</li> <li>5. Most of the tutorial work will be done as self-study or with the assistance of a tutor.</li> <li>6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.</li> </ol> |

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ 15 اسبوعا              |     |                                                                           |     |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|-----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 63  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | 4.2 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 37  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 2.4 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 100 |                                                                           |     |

| Module Evaluation<br>تقييم المادة الدراسية |                    |             |                |            |                           |
|--------------------------------------------|--------------------|-------------|----------------|------------|---------------------------|
|                                            |                    | Time/Number | Weight (Marks) | Week Due   | Relevant Learning Outcome |
| <b>Formative assessment</b>                | <b>Quizzes</b>     | 2           | 10% (10)       | 5 and 10   | LO #1, #2 and #10, #11    |
|                                            | <b>Assignments</b> | 2           | 10% (10)       | 2 and 12   | LO #3, #4 and #6, #7      |
|                                            | <b>Projects /</b>  | 1           | 10% (10)       | Continuous | All                       |

|                             |                   |     |                  |    |                   |
|-----------------------------|-------------------|-----|------------------|----|-------------------|
|                             | <b>Report</b>     | 1   | 10% (10)         | 13 | LO #5, #8 and #10 |
| <b>Summative assessment</b> | <b>Midterm</b>    | 2hr | 10% (10)         | 7  | LO #1 - #7        |
|                             | <b>Final Exam</b> | 3hr | 50% (50)         | 16 | All               |
| <b>Total assessment</b>     |                   |     | 100% (100 Marks) |    |                   |

| <b>Delivery Plan (Weekly Syllabus)</b><br><b>المنهاج الاسبوعي النظري</b> |                                                                                            |
|--------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
|                                                                          | <b>Material Covered</b>                                                                    |
| <b>Week 1</b>                                                            | Soil Physical Properties                                                                   |
| <b>Week 2</b>                                                            | Biotic factors                                                                             |
| <b>Week 3</b>                                                            | Soil Microorganisms                                                                        |
| <b>Week 4</b>                                                            | Contribution of Microbes to Nutrient Cycling                                               |
| <b>Week 5</b>                                                            | <b>Exam</b>                                                                                |
| <b>Week 6</b>                                                            | Climate Change and its impact on the microbial environment                                 |
| <b>Week 7</b>                                                            | Pesticides and Microbes as Agents For Recycling Wastes (Detoxification and Biodegradation) |
| <b>Week 8</b>                                                            | Microbes as Agents for Recycling Wastes(Detoxification and Biodegradation)                 |
| <b>Week 9</b>                                                            | Water microbiology                                                                         |
| <b>Week</b>                                                              | <b>Exam</b>                                                                                |
| <b>Week</b>                                                              | What is a Salt water                                                                       |
| <b>Week</b>                                                              | What is a Drinking Water Treatment Plant                                                   |
| <b>Week 13</b>                                                           | Liquid Waste (Sewage/Wastewater) Treatment                                                 |
| <b>Week</b>                                                              | Transporting Microorganisms throw waste water                                              |
| <b>Week</b>                                                              | <b>Exam</b>                                                                                |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                                                              |
|--------------------------------------------------------------------------------|--------------------------------------------------------------|
|                                                                                | <b>Material Covered</b>                                      |
| <b>Week 1</b>                                                                  | Lab 1: Components of Soil                                    |
| <b>Week 2</b>                                                                  | Lab 2: Enumeration of Soil Microorganism                     |
| <b>Week 3</b>                                                                  | Lab 3: Isolation of soil yeast                               |
| <b>Week 4</b>                                                                  | Lab 4: Isolation of Actinomycetes                            |
| <b>Week 5</b>                                                                  | Lab 5: <b>Exam</b>                                           |
| <b>Week 6</b>                                                                  | Lab 6: Study of starch degradation by soil bacteria isolates |
| <b>Week 7</b>                                                                  | Lab 7: Nitrogen cycle                                        |
| <b>Week 8</b>                                                                  | Lab 8: Carbon Cycle                                          |
| <b>Week 9</b>                                                                  | Lab 9: Isolation of Soil                                     |
| <b>Week</b>                                                                    | Lab 10: <b>Exam</b>                                          |
| <b>Week</b>                                                                    | Lab 11: Cellulytic Microorganism                             |
| <b>Week</b>                                                                    | Lab 12: Winogradsky column                                   |
| <b>Week</b>                                                                    | Lab 13: Isolation of <i>E.Coli</i> bacteria from water       |

|             |                                      |
|-------------|--------------------------------------|
| <b>Week</b> | Lab 14: The method bacterial culture |
| <b>Week</b> | Lab 15: Exam                         |

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس</b> |                                                                                                                                                                                                                                          |                                  |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                                                                        | <b>Text</b>                                                                                                                                                                                                                              | <b>Available in the Library?</b> |
| <b>Required Texts</b>                                                  | Dubey, R. C., & Maheshwari, D. K. (2023). A textbook of microbiology. S. Chand Publishing.                                                                                                                                               | Yes                              |
| <b>Recommended Texts</b>                                               | Pandey, P. K., Mallik, S. K., & Yumnam, R. (Eds.). (2024). Handbook of Aquatic Microbiology. CRC Press.<br><br>Gentry, T., Fuhrmann, J. J., & Zuberer, D. A. (Eds.). (2021). Principles and applications of soil microbiology. Elsevier. | Yes                              |
| <b>Websites</b>                                                        | <a href="https://www.mdpi.com/journal/sustainability/special_issues/Microbial_Ecosystems">https://www.mdpi.com/journal/sustainability/special_issues/Microbial_Ecosystems</a>                                                            |                                  |

| <b>Grading Scheme</b><br><b>مخطط الدرجات</b>                                                                                                                                                                                                                                                                                                                                         |                         |                     |                |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|----------------|---------------------------------------|
| <b>Group</b>                                                                                                                                                                                                                                                                                                                                                                         | <b>Grade</b>            | <b>التقدير</b>      | <b>Marks %</b> | <b>Definition</b>                     |
| <b>Success Group (50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                      | <b>A - Excellent</b>    | امتياز              | 90 - 100       | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>B - Very Good</b>    | جيد جدا             | 80 - 89        | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>C - Good</b>         | جيد                 | 70 - 79        | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>D - Satisfactory</b> | متوسط               | 60 - 69        | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>E - Sufficient</b>   | مقبول               | 50 - 59        | Work meets minimum criteria           |
| <b>Fail Group (0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                           | <b>FX – Fail</b>        | راسب (قيد المعالجة) | (45-49)        | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>F – Fail</b>         | راسب                | (0-44)         | Considerable amount of work required  |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                         |                     |                |                                       |

## MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| Module Information                 |                             |                               |                                                                                                                                                                                                                                          |
|------------------------------------|-----------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                             |                               |                                                                                                                                                                                                                                          |
| Module Title                       | <u>Microbial Physiology</u> |                               | Module Delivery                                                                                                                                                                                                                          |
| Module Type                        | <u>Core</u>                 |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | <u>Bio-3616</u>             |                               |                                                                                                                                                                                                                                          |
| ECTS Credits                       | <b>4</b>                    |                               |                                                                                                                                                                                                                                          |
| SWL (hr/sem)                       | <u>100</u>                  |                               |                                                                                                                                                                                                                                          |
| Module Level                       | 3                           | Semester of Delivery          | 6                                                                                                                                                                                                                                        |
| Administering Department           | Dept. of Biology            | College                       | College of Science                                                                                                                                                                                                                       |
| Module Leader                      | Dr.Ibtihal Hameed Mohsin    | e-mail                        | <a href="mailto:ibtihalhameed@uodiyala.edu.iq">ibtihalhameed@uodiyala.edu.iq</a>                                                                                                                                                         |
| Module Leader's Acad. Title        | Assistant professor         | Module Leader's Qualification | Ph.D.                                                                                                                                                                                                                                    |
| Module Tutor                       | Dr.Ibtihal Hameed Mohsin    | e-mail                        | <a href="mailto:ibtihalhameed@uodiyala.edu.iq">ibtihalhameed@uodiyala.edu.iq</a>                                                                                                                                                         |
| Peer Reviewer Name                 |                             | e-mail                        |                                                                                                                                                                                                                                          |
| Scientific Committee Approval Date |                             | Version Number                |                                                                                                                                                                                                                                          |

| Relation with other Modules       |  |          |  |
|-----------------------------------|--|----------|--|
| العلاقة مع المواد الدراسية الأخرى |  |          |  |
| Prerequisite module               |  | Semester |  |
| Co-requisites module              |  | Semester |  |

| Module Aims, Learning Outcomes and Indicative Contents    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Module Objectives<br>أهداف المادة الدراسية                | 1.Introduce the principles of microbial physiology as a branch of the life sciences.<br>2.Differentiate between eukaryotic and prokaryotic microorganisms.<br>3.Identify bacterial cell structures and understand their functions.<br>4.Understand the nutritional aspects of microorganisms and their methods of obtaining energy.<br>5.Study bacterial growth and learn methods for its estimation and calculation.<br>6.Understand catabolic and anabolic metabolic pathways in bacterial cells. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | A. Subject-Specific Skills:<br>1. Develop understanding and familiarity with the fundamental concepts presented within the various facts encountered in practical work.<br>2. Understand the interconnections between these concepts.<br>3. Establish a strong and solid foundation in microbial physiology.                                                                                                                                                                                        |

|                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                           | <p>4. Develop the ability to read and comprehend related scientific research and literature.</p> <p>B .Course-Specific Skills Objectives</p> <ol style="list-style-type: none"> <li>1.Knowledge and Recall Skills</li> <li>2.Comprehension and Analysis Skills</li> <li>3. Application and Development Skills</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <p><b>Indicative Contents</b><br/>المحتويات الإرشادية</p> | <ol style="list-style-type: none"> <li>1. Introduction to Microbial Physiology <ul style="list-style-type: none"> <li>• Scope and importance of microbial physiology</li> <li>• Overview of microbial cell structure and function</li> </ul> </li> <li>2. Microbial Cell Structure <ul style="list-style-type: none"> <li>• Prokaryotic vs. eukaryotic microorganisms</li> <li>• Cell wall composition and differences (Gram-positive, Gram-negative, Archaea)</li> <li>• Cell membrane structure and transport systems</li> </ul> </li> <li>3. Microbial Growth <ul style="list-style-type: none"> <li>• Growth phases and growth curve</li> <li>• Measurement of microbial growth</li> <li>• Factors affecting growth: temperature, pH, osmotic pressure, oxygen</li> </ul> </li> <li>4. Nutritional Requirements of Microorganisms <ul style="list-style-type: none"> <li>• Macronutrients and micronutrients</li> <li>• Types of microbial nutrition (autotrophs, heterotrophs, phototrophs, chemotrophs)</li> <li>• Uptake and transport of nutrients</li> </ul> </li> <li>5. Microbial Metabolism <ul style="list-style-type: none"> <li>• Overview of catabolism and anabolism</li> <li>• Enzymes and coenzymes</li> <li>• Energy production pathways: glycolysis, TCA cycle, oxidative phosphorylation</li> <li>• Fermentation pathways</li> </ul> </li> <li>6. Bacterial Respiration and Photosynthesis <ul style="list-style-type: none"> <li>• Aerobic and anaerobic respiration</li> <li>• Electron transport chain</li> <li>• Photosynthetic microorganisms and pigments</li> </ul> </li> <li>7. Regulation of Microbial Metabolism <ul style="list-style-type: none"> <li>• Feedback inhibition</li> <li>• Enzyme regulation</li> <li>• Genetic control of metabolic pathways</li> </ul> </li> <li>8. Adaptations to Extreme Environments <ul style="list-style-type: none"> <li>• Psychrophiles, thermophiles, acidophiles, alkaliphiles, halophiles</li> <li>• Mechanisms of adaptation</li> </ul> </li> <li>9. Microbial Communication and Interaction <ul style="list-style-type: none"> <li>• Quorum sensing</li> <li>• Biofilm formation</li> <li>• Symbiosis and antagonism</li> </ul> </li> </ol> |

### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

|                   |                                                                                                                                                                                                                                                                  |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b> | <ol style="list-style-type: none"> <li>1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or b exchanging ideas and question one another.</li> </ol> |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <ol style="list-style-type: none"> <li>Where applicable students will be assigned problems to solve and encouraged to assess one another.</li> <li>Learning material will be supplied to students in class or uploaded on Blackboard learning management system.</li> <li>Students will also be regularly referred to relevant section of the prescribed text book.</li> <li>Most of the tutorial work will be done as self-study or with the assistance of a tutor.</li> <li>The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.</li> </ol> |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| <b>Student Workload (SWL)</b><br><b>الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا</b> |            |                                                                           |            |
|---------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------|------------|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل        | <b>63</b>  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | <b>4.2</b> |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل  | <b>37</b>  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | <b>2.4</b> |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطلاب الفصل                    | <b>100</b> |                                                                           |            |

| <b>Module Evaluation</b><br><b>تقييم المادة الدراسية</b> |                    |             |                  |            |                           |
|----------------------------------------------------------|--------------------|-------------|------------------|------------|---------------------------|
|                                                          |                    | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| <b>Formative assessment</b>                              | <b>Quizzes</b>     | 2           | 10% (10)         | 5 and 10   | LO #1, #2 and #10, #11    |
|                                                          | <b>Assignments</b> | 2           | 10% (10)         | 2 and 12   | LO #3, #4 and #6, #7      |
|                                                          | <b>Projects /</b>  | 1           | 10% (10)         | Continuous | All                       |
|                                                          | <b>Report</b>      | 1           | 10% (10)         | 13         | LO #5, #8 and #10         |
| <b>Summative assessment</b>                              | <b>Midterm</b>     | 2hr         | 10% (10)         | 7          | LO #1 - #7                |
|                                                          | <b>Final Exam</b>  | 3hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>                                  |                    |             | 100% (100 Marks) |            |                           |

| <b>Delivery Plan (Weekly Syllabus)</b><br><b>المنهاج الاسبوعي النظري</b> |                                            |
|--------------------------------------------------------------------------|--------------------------------------------|
|                                                                          | <b>Material Covered</b>                    |
| <b>Week 1</b>                                                            | Bacterial cell: Structure and Function     |
| <b>Week 2</b>                                                            | Microbial Nutrition                        |
| <b>Week 3</b>                                                            | Uptake of Nutrients (transport mechanisms) |

|                |                                                                                                                                     |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>Week 4</b>  | Microbial Growth                                                                                                                    |
| <b>Week 5</b>  | Influence of Environmental Factors on Growth: Solutes and Water Activity, pH, Temperature, Oxygen concentration , Radiation.        |
| <b>Week 6</b>  | Metabolism; Energy                                                                                                                  |
| <b>Week 7</b>  | Oxidation-Reduction Reactions                                                                                                       |
| <b>Week 8</b>  | Electron Carriers                                                                                                                   |
| <b>Week 9</b>  | Energy Release and Conservation                                                                                                     |
| <b>Week</b>    | Catabolism of Carbohydrates                                                                                                         |
| <b>Week</b>    | Catabolism of Proteins                                                                                                              |
| <b>Week</b>    | Catabolism of Lipids                                                                                                                |
| <b>Week 13</b> | Anabolism (Biosynthesis); Synthesis of Sugars, Polysaccharides, synthesis of Purines, Pyrimidines, Nucleotides and Lipid synthesis. |
| <b>Week</b>    | Synthesis of Amino Acids                                                                                                            |
| <b>Week</b>    | <b>Exam</b>                                                                                                                         |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                                                           |
|--------------------------------------------------------------------------------|-----------------------------------------------------------|
|                                                                                | <b>Material Covered</b>                                   |
| <b>Week 1</b>                                                                  | Lab 1: Culture Media                                      |
| <b>Week 2</b>                                                                  | Lab 2: Bacterial Counting                                 |
| <b>Week 3</b>                                                                  | Lab 3: Bacterial Growth Curve                             |
| <b>Week 4</b>                                                                  | Lab 4: Growth Yield                                       |
| <b>Week 5</b>                                                                  | Lab 5: growth requirements                                |
| <b>Week 6</b>                                                                  | Lab 6: The Effects of pH on Growth                        |
| <b>Week 7</b>                                                                  | Lab 7: The Effects of Osmotic pressure on Growth          |
| <b>Week 8</b>                                                                  | Lab 8: The Effects of Temperature on Growth               |
| <b>Week 9</b>                                                                  | Lab 9: Effect of antimicrobial agents on microbial growth |
| <b>Week</b>                                                                    | Lab 10: Major groups of antimicrobial agents              |
| <b>Week</b>                                                                    | Lab 11: Phenol and phenolic compounds.                    |
| <b>Week</b>                                                                    | Lab 12: Alcohol, Halogens                                 |
| <b>Week</b>                                                                    | Lab 13: Heavy metals.                                     |
| <b>Week</b>                                                                    | Lab 14: Dey's, Detergents                                 |
| <b>Week</b>                                                                    | Lab 15: <b>Exam</b>                                       |

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس</b> |                                                                                                                                                                                                             |                                  |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                                                                        | <b>Text</b>                                                                                                                                                                                                 | <b>Available in the Library?</b> |
| <b>Required Texts</b>                                                  | Mohammadi, A. T., Karami, S., Jahandideh, A., Sarejloo, S., Vaseghi, S., Rezaei, M. D., ... & Gholami, S. (2022). Human diseases Research and textbook 1: Heart, Diabetes, Bacterial, ADHD, skin. Nobel TM. | Yes                              |

|                          |                                                                                                                                                                                                                                                                                                                                                          |     |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Recommended Texts</b> | Mahon, C. R. (2022). Bacterial cell structure, physiology, metabolism, and genetics. Textbook of Diagnostic Microbiology, 1.                                                                                                                                                                                                                             | Yes |
| <b>Websites</b>          | <a href="https://www.omicsonline.org/microbial-physiology/articles.php">https://www.omicsonline.org/microbial-physiology/articles.php</a><br><a href="https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/microbial-physiology">https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/microbial-physiology</a> |     |

| <b>Grading Scheme</b><br><b>مخطط الدرجات</b>                                                                                                                                                                                                                                                                                                                                         |                         |                     |          |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                | Grade                   | التقدير             | Marks %  | Definition                            |
| <b>Success Group (50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                      | <b>A - Excellent</b>    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>B - Very Good</b>    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>C - Good</b>         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>D - Satisfactory</b> | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>E - Sufficient</b>   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group (0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                           | <b>FX – Fail</b>        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                      | <b>F – Fail</b>         | راسب                | (0-44)   | Considerable amount of work required  |
| <b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. |                         |                     |          |                                       |

## MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| Module Information                 |                           |                               |                                                                                                                                                                                                                                          |
|------------------------------------|---------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                           |                               |                                                                                                                                                                                                                                          |
| Module Title                       | <u>Biological Control</u> |                               | Module Delivery                                                                                                                                                                                                                          |
| Module Type                        | <u>Core</u>               |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | <u>Bio-3617</u>           |                               |                                                                                                                                                                                                                                          |
| ECTS Credits                       | <b>4</b>                  |                               |                                                                                                                                                                                                                                          |
| SWL (hr/sem)                       | <u>100</u>                |                               |                                                                                                                                                                                                                                          |
| Module Level                       | 3                         | Semester of Delivery          |                                                                                                                                                                                                                                          |
| Administering Department           | Dept. of Biology          | College                       | College of Science                                                                                                                                                                                                                       |
| Module Leader                      | Dr.Sanna Najim Abed       |                               | e-mail <a href="mailto:sanaa.abed@uodiyala.edu.iq">sanaa.abed@uodiyala.edu.iq</a>                                                                                                                                                        |
| Module Leader's Acad. Title        | Assistant professor       | Module Leader's Qualification | Ph.D.                                                                                                                                                                                                                                    |
| Module Tutor                       | Dr.Sanna Najim Abed       |                               | e-mail <a href="mailto:sanaa.abed@uodiyala.edu.iq">sanaa.abed@uodiyala.edu.iq</a>                                                                                                                                                        |
| Peer Reviewer Name                 |                           | e-mail                        |                                                                                                                                                                                                                                          |
| Scientific Committee Approval Date |                           | Version Number                | 1.0                                                                                                                                                                                                                                      |

| Relation with other Modules       |  |          |  |
|-----------------------------------|--|----------|--|
| العلاقة مع المواد الدراسية الأخرى |  |          |  |
| Prerequisite module               |  | Semester |  |
| Co-requisites module              |  | Semester |  |

| Module Aims, Learning Outcomes and Indicative Contents   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Module Objectives<br>أهداف المادة الدراسية               | Upon completion of this course, students will be able to: <ol style="list-style-type: none"> <li>1. Explain the principles and history of biological control.</li> <li>2. Identify different types of natural enemies (predators, parasitoids, pathogens).</li> <li>3. Understand ecological interactions influencing biological control.</li> <li>4. Evaluate the advantages and limitations of biological control strategies.</li> <li>5. Apply laboratory and field techniques to study biological control agents.</li> </ol> |
| Module Learning Outcomes                                 | 1. Knowledge and Understanding <ul style="list-style-type: none"> <li>• Define the principles and concepts of biological control in pest management.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                  |

|                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>مخرجات التعلم للمادة<br/>الدراسية</p>                      | <ul style="list-style-type: none"> <li>Identify major biological control agents, including predators, parasitoids, and pathogens.</li> <li>Explain the ecological and environmental factors influencing the success of biological control.</li> <li>Describe classical, augmentative, and conservation biological control strategies.</li> </ul> <p>2. Intellectual Skills</p> <ul style="list-style-type: none"> <li>Analyze case studies of successful and unsuccessful biological control programs.</li> <li>Evaluate the advantages, limitations, and potential risks of using biological control agents.</li> <li>Compare biological control methods with chemical and cultural pest control strategies.</li> </ul> <p>3. Practical and Professional Skills</p> <ul style="list-style-type: none"> <li>Demonstrate techniques for identifying and monitoring biological control agents in the field or laboratory.</li> <li>Apply appropriate methods for introducing and managing beneficial organisms.</li> <li>Design a basic biological control program for a selected pest species.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <p><b>Indicative<br/>Contents</b><br/>المحتويات الإرشادية</p> | <p>1. Introduction to Biological Control</p> <ul style="list-style-type: none"> <li>Definition, history, and importance in pest management.</li> <li>Role in sustainable agriculture and integrated pest management (IPM).</li> </ul> <p>2. Types of Biological Control</p> <ul style="list-style-type: none"> <li>Classical biological control – introduction of natural enemies from the pest’s origin.</li> <li>Augmentative biological control – mass production and periodic release of natural enemies.</li> <li>Conservation biological control – protecting and enhancing existing natural enemies.</li> </ul> <p>3. Agents of Biological Control</p> <ul style="list-style-type: none"> <li>Predators: characteristics, examples, and ecological role.</li> <li>Parasitoids: life cycles, host specificity, and applications.</li> <li>Pathogens: fungi, bacteria, viruses, and nematodes in pest control.</li> </ul> <p>4. Ecological Principles of Biological Control</p> <ul style="list-style-type: none"> <li>Pest–natural enemy interactions.</li> <li>Population dynamics and control thresholds.</li> <li>Factors affecting effectiveness (climate, habitat, crop diversity).</li> </ul> <p>5. Mass Rearing and Release Methods</p> <ul style="list-style-type: none"> <li>Laboratory rearing techniques for beneficial organisms.</li> <li>Field release strategies and timing.</li> </ul> <p>6. Evaluation of Biological Control Programs</p> <ul style="list-style-type: none"> <li>Monitoring and assessment methods.</li> <li>Success indicators and impact measurement.</li> </ul> |

## Learning and Teaching Strategies

### استراتيجيات التعلم والتعليم

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b> | <ol style="list-style-type: none"> <li>1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another.</li> <li>2. Where applicable students will be assigned problems to solve and encouraged to assess one another.</li> <li>3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system.</li> <li>4. Students will also be regularly referred to relevant section of the prescribed text book.</li> <li>5. Most of the tutorial work will be done as self-study or with the assistance of a tutor.</li> <li>6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.</li> </ol> |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Student Workload (SWL)

### الحمل الدراسي للطالب محسوب لـ 15 اسبوعا

|                                                                                |            |                                                                           |            |
|--------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------|------------|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | <b>63</b>  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعيا       | <b>4.2</b> |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | <b>37</b>  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | <b>2.4</b> |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | <b>100</b> |                                                                           |            |

## Module Evaluation

### تقييم المادة الدراسية

|                             |                    | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
|-----------------------------|--------------------|-------------|------------------|------------|---------------------------|
| <b>Formative assessment</b> | <b>Quizzes</b>     | 2           | 10% (10)         | 5 and 10   | LO #1, #2 and #10 - #11   |
|                             | <b>Assignments</b> | 2           | 10% (10)         | 2 and 12   | LO #3, #4 and #6 - #7     |
|                             | <b>Projects /</b>  | 1           | 10% (10)         | Continuous | All                       |
|                             | <b>Report</b>      | 1           | 10% (10)         | 13         | LO #5, #8 and #10         |
| <b>Summative assessment</b> | <b>Midterm</b>     | 2hr         | 10% (10)         | 7          | LO #1 - #7                |
|                             | <b>Final Exam</b>  | 3hr         | 50% (50)         | 16         | All                       |
| <b>Total assessment</b>     |                    |             | 100% (100 Marks) |            |                           |

| <b>Delivery Plan (Weekly Syllabus)</b><br><b>المنهاج الاسبوعي النظري</b> |                                                                        |
|--------------------------------------------------------------------------|------------------------------------------------------------------------|
|                                                                          | <b>Material Covered</b>                                                |
| <b>Week 1</b>                                                            | Introduction to Biological Control: Concepts and History               |
| <b>Week 2</b>                                                            | Types of Biological Control: Classical, Augmentative, and Conservation |
| <b>Week 3</b>                                                            | Natural Enemies: Predators, Parasitoids, and Pathogens                 |
| <b>Week 4</b>                                                            | Ecological Principles of Biological Control                            |
| <b>Week 5</b>                                                            | Host-Parasite and Host-Predator Interactions                           |
| <b>Week 6</b>                                                            | Microbial Control Agents: Bacteria, Fungi, Viruses, and Nematodes      |
| <b>Week 7</b>                                                            | Entomopathogenic Fungi and Their Applications                          |
| <b>Week 8</b>                                                            | Entomopathogenic Nematodes in Pest Management                          |
| <b>Week 9</b>                                                            | Plant-Microbe Interactions in Biological Control                       |
| <b>Week</b>                                                              | Role of Biological Control in Integrated Pest Management (IPM)         |
| <b>Week</b>                                                              | Case Studies of Successful Biological Control Programs                 |
| <b>Week</b>                                                              | Risks and Non-target Effects of Biological Control                     |
| <b>Week</b>                                                              | Regulatory and Ethical Considerations                                  |
| <b>Week</b>                                                              | Recent Advances and Future Trends in Biological Control                |
| <b>Week</b>                                                              | <b>Exam</b>                                                            |

| <b>Delivery Plan (Weekly Lab. Syllabus)</b><br><b>المنهاج الاسبوعي للمختبر</b> |                                                                                |
|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
|                                                                                | <b>Material Covered</b>                                                        |
| <b>Week 1</b>                                                                  | Lab 1: Identification of Natural Enemies in the Laboratory                     |
| <b>Week 2</b>                                                                  | Lab 2: Rearing of Predators and Parasitoids                                    |
| <b>Week 3</b>                                                                  | Lab 3: Maintenance of Predators and Parasitoids                                |
| <b>Week 4</b>                                                                  | Lab 4: Isolation of Entomopathogenic Fungi                                     |
| <b>Week 5</b>                                                                  | Lab 5: Culturing of Entomopathogenic Fungi                                     |
| <b>Week 6</b>                                                                  | Lab 6: Bioassays for Testing Pathogenicity of Microbial Control Agents         |
| <b>Week 7</b>                                                                  | Lab 7: Application Methods of Biological Control Agents in the Field           |
| <b>Week 8</b>                                                                  | Lab 8: <b>Exam</b>                                                             |
| <b>Week 9</b>                                                                  | Lab 9: Monitoring and Evaluating Biological Control Efficacy                   |
| <b>Week</b>                                                                    | Lab 10: Sampling Techniques for Pests and Natural Enemies                      |
| <b>Week</b>                                                                    | Lab 11: Microscopy Techniques for Studying Pathogens/1                         |
| <b>Week</b>                                                                    | Lab 12: Microscopy Techniques for Studying Pathogens/2                         |
| <b>Week</b>                                                                    | Lab 13: Data Collection and Statistical Analysis in Biological Control Studies |
| <b>Week</b>                                                                    | Lab 14: Student Project Presentations on Selected Biological Control Agents    |
| <b>Week</b>                                                                    | Lab 15: <b>Exam</b>                                                            |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                           |
|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                                                          | Text                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Available in the Library? |
| <b>Required Texts</b>                                    | <p>Tanda, A. S. (2024). Advances in Biological Control Pest Management Technology. IK International Pvt Ltd.</p> <p>Corley, J. C., &amp; Villacide, J. M. (2025). Ecology and biological control. In Biological Control of Insect Pests in Plantation Forests (pp. 95-113). Cham: Springer Nature Switzerland.</p> <p>Copping, L. G. (2009). The manual of biocontrol agents (formerly the Biopesticide Manual). British Crop Production Council (BCPC), Farnham.</p> | Yes                       |
| <b>Recommended Texts</b>                                 | Mason, P. G. (2021). Biological control: global impacts, challenges and future directions of pest management. Csiro Publishing.                                                                                                                                                                                                                                                                                                                                       | Yes                       |
| <b>Websites</b>                                          | <a href="https://www.nj.gov/agriculture/divisions/pi/prog/buglab/what-is-biological-control/">https://www.nj.gov/agriculture/divisions/pi/prog/buglab/what-is-biological-control/</a><br><a href="https://www.cabi.org/what-we-do/invasive-species/biocontrol/">https://www.cabi.org/what-we-do/invasive-species/biocontrol/</a>                                                                                                                                      |                           |

| Grading Scheme<br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                              |                  |                     |          |                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                       | Grade            | التقدير             | Marks %  | Definition                            |
| <b>Success Group (50 – 100)</b>                                                                                                                                                                                                                                                                                                                                                             | A – Excellent    | امتياز              | 90 – 100 | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                             | B – Very Good    | جيد جدا             | 80 – 89  | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                             | C – Good         | جيد                 | 70 – 79  | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                             | D – Satisfactory | متوسط               | 60 – 69  | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                             | E – Sufficient   | مقبول               | 50 – 59  | Work meets minimum criteria           |
| <b>Fail Group (0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                                  | FX – Fail        | راسب (قيد المعالجة) | (45-49)  | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                             | F – Fail         | راسب                | (0-44)   | Considerable amount of work required  |
| <p><b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone “near-pass fails” so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.</p> |                  |                     |          |                                       |
|                                                                                                                                                                                                                                                                                                                                                                                             |                  |                     |          |                                       |

### 3. Contact

**Program Manager:**

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