

**Ministry of Higher Education and Scientific Research  
Scientific Supervision and Scientific Evaluation Apparatus  
Directorate of Quality Assurance and Academic Accreditation  
Accreditation Department**



# **Academic Program and Course Description Guide**

**2024-2025**

## **Introduction:**

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

## **Concepts and terminology:**

**Academic Program Description:** The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

**Course Description:** Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

**Program Vision:** An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

**Program Mission:** Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

**Program Objectives:** They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

**Curriculum Structure:** All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process)

whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

**Learning Outcomes:** A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

**Teaching and learning strategies:** They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

## Academic Program Description Forum

University Name: Mustansiriyah University

Faculty: College of Sciences

Scientific Department: Biology

Academic or Professional Program Name: Bachelor

Final Certificate Name: Bachelor in microbiology, Bachelor in biotechnology, Bachelor in biology.

Academic Systems: Course

Description Preparation Date: 1/9/2024

File completion Date: 1/9/2024

Signature

Head of department Name:

Khetam Habeb Rasool

Date



Signature:

Scientific Associate Name:

Date

The file is checked by: Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance department

Date:

Signature



Approval of the Dean

### 1. Program Vision

Excellence in providing academic programmes that are characterized by modernity and scientific sobriety and have an impact on the growth and development of society

### 2. Program Mission

Preparing qualified academic outcomes by offering various educational programmes that contribute to the solidity of scientific research in a manner consistent with the aspirations of the college and the best investment of human resources.

### 3. Program Objectives

1. Preparing students and qualifying them for the labour market by preparing specialised cadres in life sciences capable of working in the field of specialisation.
2. Comprehensive knowledge of science and basic principles related to life science.
3. Preparing and qualifying them to continue studying in postgraduate studies by developing their intellectual, scientific, and research skills.
4. Expanding and deepening students' information and skills in the field of life sciences.
5. Enabling students with methods of scientific thinking and writing.
6. Providing students with the ability to research and teach in the fields of life sciences.
7. Providing service to the community in all areas of life sciences, including health, environmental and agricultural research, etc.
8. Refine the student's scientific and laboratory personalities so that he can serve and develop society.
9. Providing students with applied and experimental skills through scientific and laboratory topics.
10. Introducing students to the latest developments in the fields of life sciences and technology emerging from them

### 4. Program Accreditation

No

### 5. Other external influences

Training courses, workshops, and continuing education seminars

### 6. Program Structure

| Program Structure | Number of Courses | Credit hours | Percentage | Reviews* |
|-------------------|-------------------|--------------|------------|----------|
|-------------------|-------------------|--------------|------------|----------|

|                                 |            |     |  |  |
|---------------------------------|------------|-----|--|--|
| <b>Institution Requirements</b> | <b>37</b>  | 164 |  |  |
| <b>College Requirements</b>     | <b>37</b>  | 164 |  |  |
| <b>Department Requirements</b>  | <b>37</b>  | 164 |  |  |
| <b>Summer Training</b>          | <b>Yes</b> |     |  |  |
| <b>Other</b>                    | <b>/</b>   |     |  |  |

\* This can include notes whether the course is basic or optional.

| <b>7. Program Description</b>    |                    |                           |                     |                  |
|----------------------------------|--------------------|---------------------------|---------------------|------------------|
| <b>Year/Level</b>                | <b>Course Code</b> | <b>Course Name</b>        | <b>Credit Hours</b> |                  |
| <b>Second year<br/>2023 2024</b> |                    |                           | <b>Theoretical</b>  | <b>Practical</b> |
|                                  |                    | Plant anatomy             | 2                   | 3                |
|                                  |                    | Plant groups              | 2                   | 3                |
|                                  |                    | Albaath crimes            | 2                   | none             |
|                                  |                    | Entomology I              | 2                   | 3                |
|                                  |                    | Biochemistry I            | 2                   | 3                |
|                                  |                    | Invertebrates             | 2                   | 3                |
|                                  |                    | Microbiology I            | 2                   | 3                |
|                                  |                    | Biochemistry II           | 2                   | 3                |
|                                  |                    | Plant taxonomy            | 2                   | 3                |
|                                  |                    | Microbiology II           | 2                   | 3                |
|                                  |                    | Entomology II             | 2                   | 3                |
|                                  |                    | English language          | 2                   | none             |
|                                  |                    | Parasitology              | 2                   | 3                |
| <b>Third year<br/>2023 2024</b>  |                    | Genetic engineering       | 2                   | 3                |
|                                  |                    | Immunology                | 2                   | 3                |
|                                  |                    | Pathogenic bacteria       | 2                   | 3                |
|                                  |                    | Bacterial physiology      | 2                   | 3                |
|                                  |                    | Medical mycology          | 2                   | 3                |
|                                  |                    | Medical parasitology      | 2                   | 3                |
|                                  |                    | Microbiology environments | 2                   | 3                |
|                                  |                    | Microbiology heredity     | 2                   | 3                |
|                                  |                    | Soil microbiology         | 2                   | 3                |
|                                  |                    | Bacterial taxonomy        | 2                   | 3                |
|                                  |                    | General histology         | 2                   | 3                |
|                                  |                    | Parasitology              | 2                   | 3                |

|                                  |  |                                    |   |      |
|----------------------------------|--|------------------------------------|---|------|
|                                  |  | Plant anatomy                      | 2 | 3    |
|                                  |  | Evolution and biodiversity         | 2 | 3    |
|                                  |  | General physiology                 | 2 | 3    |
|                                  |  | Sera and vaccines                  | 2 | 3    |
|                                  |  | Plant taxonomy                     | 2 | 3    |
|                                  |  | Biological controls                | 2 | 3    |
|                                  |  | Plant physiology                   | 2 | 3    |
|                                  |  | Water and sewage microbiology      | 2 | 3    |
|                                  |  | Microbiology physiology            | 2 | 3    |
|                                  |  | Bacterial diagnosis                | 2 | 3    |
|                                  |  | Immunology techniques              | 2 | None |
|                                  |  | English language                   | 2 | None |
|                                  |  | Animal and plant physiology        | 2 | 3    |
|                                  |  | Gentic technology                  | 2 | None |
|                                  |  | Medical viruses                    | 2 | None |
|                                  |  | Molecular biology                  | 2 | 3    |
| <b>Fourth year<br/>2023 2024</b> |  | Plant diseases                     | 2 | 3    |
|                                  |  | Pathological analysis              | 2 | 3    |
|                                  |  | Microbial toxins                   | 2 | 3    |
|                                  |  | Antibiotics                        | 2 | 3    |
|                                  |  | Plant tissue breeding              | 2 | 3    |
|                                  |  | Medical plants                     | 2 | 3    |
|                                  |  | Plant physiology                   | 2 | 3    |
|                                  |  | English language                   | 2 | None |
|                                  |  | Research project                   | 2 | None |
|                                  |  | Parasitology                       | 2 | 3    |
|                                  |  | Fungus taxonomy and physiology     | 2 | 3    |
|                                  |  | Secondary metabolic compounds      | 2 | 3    |
|                                  |  | Comparative anatomy                | 2 | 3    |
|                                  |  | Environmental management technique | 2 | 3    |
|                                  |  | Bio separation technique           | 2 | 3    |
|                                  |  | Fermentation                       | 2 | 3    |

|  |  |                               |   |   |
|--|--|-------------------------------|---|---|
|  |  | technology                    |   |   |
|  |  | Endocrinology                 | 2 | 3 |
|  |  | Food microbiology             | 2 | 3 |
|  |  | Pathogenic bacteria           | 2 | 3 |
|  |  | Medical viruses               | 2 | 3 |
|  |  | Medical Mycology              | 2 | 3 |
|  |  | Water and sewage microbiology | 2 | 3 |
|  |  | Industrial microbiology       | 2 | 3 |
|  |  | Embryology                    | 2 | 3 |
|  |  | Immunology                    | 2 | 3 |
|  |  | Nano biotechnology            | 2 | 3 |
|  |  | Biological treatment          | 2 | 3 |
|  |  | Biological control            | 2 | 3 |
|  |  | Food technology               | 2 | 3 |
|  |  | Antibiotics technology        | 2 | 3 |
|  |  | Sera technology               |   |   |

## 8. Expected learning outcomes of the program

### Knowledge

1. Knowledge of life sciences and their various specialisations (general life sciences and biotechnology).
2. Understanding the relationship between the biological environment and the branches it studies.
- 3: Comprehension and understanding of the material with regard to the required (programmed) vocabulary.
- 4: Preparing brief reports on some topics.
- Conduct laboratory and scientific experiments.
- 6: Conducting scientific and academic trips for students.

### Skills

- 1- Must have experience in classifying living organisms.
- 2 - The ability to perform many pathological analyzes to diagnose the causes of diseases.
- 3- Using means of explanation.

### Ethics

1. Working to refine the student's personality and discover his inclinations and talents through scientific, cultural, and sporting activities.
2. Consolidating values and ideals, including respecting instructions and discipline, respecting the institution to which the student belongs, and preserving its property.
3. Deepening the spirit of citizenship and patriotism among students.
- 4: Enhancing the spirit of teamwork through students'

Learning Outcomes Statement

participation in laboratory work or completing joint scientific research.

5: Dealing positively with pressure.

6: Instilling the values of respect for opinions and other opinions, cooperation and tolerance, working in a team spirit, initiative, and creativity.

7: Consolidating ideals and a system of values.

8: Maintaining professional ethics and work secrets.

9: Raising students to respect human dignity.

10: Forming positive inclinations and trends towards studying life sciences.

11: Strengthening the student's self-confidence and his academic and professional personalities.

12: Train students on scientific honesty in presenting scientific information.

13: Raising students in the culture of integrity and fighting corruption in all its forms.

## 9. Teaching and Learning Strategies

1- Lectures

2: Practical sessions to provide students with practical skills.

3. A procedure to train students to analyse the results and reach conclusions.

4: In light of the interactive classification of teaching and learning, the learner continues to learn from a person by confrontation, from a computer programme, or from the modern media and communication means that have spread in our daily lives.

5: Diversity in educational technologies, provided that educational technologies, devices, programmes, and methods are viewed in one system and the way humans use them may be added, which supports teaching systems.

## 10. Evaluation methods

Conducting quarterly exams for theoretical and practical lessons, in addition to daily exams.

2: Periodic visits to all academic levels and every subject.

3. Fill out the (Visiting Fellow) form and submit it to the relevant committee in the scientific department.

| 11.  | 12. Faculty     |                |         |                                             |                              |          |
|------|-----------------|----------------|---------|---------------------------------------------|------------------------------|----------|
|      | Faculty Members |                |         |                                             |                              |          |
| Name | Academic Rank   | Specialization |         | Special Requirements/Skills (if applicable) | Number of the teaching staff |          |
|      |                 | General        | Special |                                             | Staff                        | Lecturer |

|                                  |           |               |                                          |  |  |       |  |
|----------------------------------|-----------|---------------|------------------------------------------|--|--|-------|--|
| Abd alameer<br>Nasir Ghalob      | Professor | Zoology       | Cellular genetics                        |  |  | Staff |  |
| Majid<br>Mohammed<br>Mahmood     | Professor | Biology       | Immunology                               |  |  | Staff |  |
| Sawsan Sajid<br>Mohammed Ali     | Professor | Microbiology  | Molecular biology                        |  |  | Staff |  |
| Sawsan Hassan<br>Authman         | Professor | Microbiology  | Pathogenic bacteria                      |  |  | Staff |  |
| Jehan Abdul<br>Sattar Salman     | Professor | Microbiology  | Probiotics                               |  |  | Staff |  |
| Sahira Nsayef<br>Muslim          | Professor | Microbiology  | Biotechnology/<br>Bioseparation          |  |  | Staff |  |
| Shatha Ali Shafiq                | Professor | Botany        | mycotoxins                               |  |  | Staff |  |
| Sabaa taheer<br>mohammed         | Professor | Biology       | Parasitology                             |  |  | Staff |  |
| Hamzia ali Ajah                  | Professor | Microbiology  | Medical mycology                         |  |  | Staff |  |
| Hashim Khadhm<br>Mohammed        | Professor | Biology plant | Plant tissue culture                     |  |  | Staff |  |
| Maan Abdul<br>Azeez Shafeeq      | Professor | Entomology    | Biological Control                       |  |  | Staff |  |
| Alaa Jabbar Taha                 | Professor | Botany        | Plant tissue culture                     |  |  | Staff |  |
| .Noori<br>Mohammed<br>Luaibi     | Professor | Zoology       | Physiology/Endocrinolog<br>y             |  |  | Staff |  |
| Khawlah Jebur<br>Khalf           | Professor | Microbiology  | Bacterial toxin                          |  |  | Staff |  |
| Alia Essam<br>Mahmood<br>Alubadi | Professor | Biology       | Immunology                               |  |  | Staff |  |
| Likaa Mahdi<br>Hameid            | Professor | Microbiology  | Biotechniques for<br>pathogenic bacteria |  |  | Staff |  |
| Ali Hussein<br>Alwan             | Professor | Zoology       | Immunology                               |  |  | Staff |  |
| Suzan Saadi<br>Hussain           | Professor | Microbiology  | Pathogenic bacteria                      |  |  | Staff |  |
| Shatha Khudhaier<br>Abbas        | Professor | Zoology       | Tissue parasites                         |  |  | Staff |  |
| Munim Radhwan<br>Ali             | Professor | Microbiology  | Molecular genetic                        |  |  | Staff |  |
| Raggad Dhyea<br>Abdul Jalill     | Professor | Biology       | Plant extraction<br>technique            |  |  | Staff |  |
| Ahmed Sahi<br>Dwaish             | Professor | Botany        | Algae                                    |  |  | Staff |  |
| Reyam Naji Ajmi                  | Professor | Ecology       | Pollution                                |  |  | Staff |  |
| Nebraska Faleh<br>Chachain       | Professor | Biology       | Zoology                                  |  |  | Staff |  |

|                                     |                     |                          |                                 |  |  |       |  |
|-------------------------------------|---------------------|--------------------------|---------------------------------|--|--|-------|--|
| Ekhlass Noori Ali                   | Professor           | Microbiology             | Immunology                      |  |  | Staff |  |
| Sana'a Noori Hussein                | Professor           | Biology/<br>Microbiology | Bacterial toxins                |  |  | Staff |  |
| Neihaya Heikmat Zaki                | Professor           | Microbiology             | Bacterial physiology            |  |  | Staff |  |
| Tahreer Hadi saleh                  | Professor           | Microbiology             | Molecular pathogenic            |  |  | Staff |  |
| Dina Yousif Mohammed                | Professor           | Botany                   | Biological control              |  |  | Staff |  |
| Amel Hussain Mussa                  | Professor           | Microbiology             | soil microbiology               |  |  | Staff |  |
| Huda Farooq Zaki                    | Professor           | Botany                   | Environment                     |  |  | Staff |  |
| SABA Riad KHUDHAIR                  | Professor           | Ecology                  | Biological treatment            |  |  | Staff |  |
| Ibtisam Ghadban Auda                | Professor           | Microbiology             | Molecular biology               |  |  | Staff |  |
| Saba Talib Hashim                   | Professor           | Biology                  | Microbiology                    |  |  | Staff |  |
| Sadeq Abdulridha Gatea              | Professor           | Medical microbiology     | Pathogenic bacteria             |  |  | Staff |  |
| Ali Haider Alsakini                 | Professor           | Microbiology             | Pathogenic microbiology         |  |  | Staff |  |
| Sahar Abdel Hadi mohammad jauid     | Professor           | Biology/<br>Zoology      | Histology                       |  |  | Staff |  |
| Farha Abid Ali Shafi                | Professor           | Biology                  | Genetics                        |  |  | Staff |  |
| Areej Abbas Zabbon                  | Professor           | Zoology                  | Physiology                      |  |  | Staff |  |
| Khetam Habeeb Rasool                | Professor           | Microbiology             | Immunology                      |  |  | Staff |  |
| Nadheema Hammood Hussein            | Professor           | Microbiology             | Molecular biology               |  |  | Staff |  |
| Fatima Ramadan Abdul                | Professor           | Microbiology             | immunity of pathogenic bacteria |  |  | Staff |  |
| Ghaidaa husain Abd ali              | Professor           | Botany                   | Algae                           |  |  | Staff |  |
| <b>Hala Abdul hafud Abdul razaq</b> | Assistant professor | Microbiology             | Soil microbiology               |  |  | Staff |  |
| Hassan Abdul Razaq Ali              | Assistant professor |                          |                                 |  |  | Staff |  |
| Majid Ahmed Al-Bayati               | Assistant professor | Microbiology             | Molecular biology               |  |  | Staff |  |
| Raghad Abdulatif Abdulrazaq         | Assistant professor | Microbiology             | Bacterial toxin                 |  |  | Staff |  |
| Yusra Mohammed bagir Mohsin         | Assistant professor | Microbiology             | Food microbiology               |  |  | Staff |  |

|                                    |                     |                                       |                                   |  |  |       |  |
|------------------------------------|---------------------|---------------------------------------|-----------------------------------|--|--|-------|--|
| Haidar Jasim muhammed              | Assistant professor | Zoology                               | Molecular biology                 |  |  | Staff |  |
| Abbas Arrak Abbas                  | Assistant professor | Microbiology                          | Virology                          |  |  | Staff |  |
| Yasir Hussein Zaidan               | Assistant professor | Botany                                | Cytology                          |  |  | Staff |  |
| Ali Murtatha Hasan                 | Assistant professor | Microbiology                          | Bacterial taxonomy                |  |  | Staff |  |
| Huda Zuheir Majeed                 | Assistant professor | Biology                               | Medical bacteriology              |  |  | Staff |  |
| Saba hadi bneed                    | Assistant professor | Botany                                | Biochemistry/enzymes              |  |  | Staff |  |
| Asseel munther mohammed saeid habh | Assistant professor | Plant physiology                      | Physiology and plant biochemistry |  |  | Staff |  |
| Hadeel Kareem Musafer              | Assistant professor | Microbiology                          | Molecular                         |  |  | Staff |  |
| Sundus Hameed Ahmed                | Assistant professor | Biotechnology and genetic engineering | Medicinal plant                   |  |  | Staff |  |
| Adel Hamdan Alwan                  | Assistant professor | Botany                                | Mycology                          |  |  | Staff |  |
| israa hussein hamzah               | Assistant professor | Biology/zoology                       | Molecular genetic                 |  |  | Staff |  |
| Sawsan Mohammed Kareem             | Assistant professor | Microbiology                          | Molecular                         |  |  | Staff |  |
| Zaid Raad Abbas                    | Assistant professor | Ecology                               | Environment and pollution         |  |  | Staff |  |
| Nehad Abid Taher                   | Assistant professor | Biotechnology                         | Enzymology                        |  |  | Staff |  |
| Amna Mohammed ali                  | Assistant professor | Microbiology                          | Medical microbiology              |  |  | Staff |  |
| Luma Qasim Ali                     | Assistant professor | Biology                               | Hormonal physiology               |  |  | Staff |  |
| Methak Jasim Hussein               | Assistant professor | Biotechnology                         | Molecular physiology              |  |  | Staff |  |
| Bydaa Hussein Alwan                | Assistant professor | Microbiology                          | Bacterial toxins                  |  |  | Staff |  |
| Zina Khalil Ibrahim                | Assistant professor | Botany                                | Plant classification and anatomy  |  |  | Staff |  |
| Luma Ghaeb Al-Saadi                | Assistant professor | Microbiology                          | Medical viruses                   |  |  | Staff |  |
| Aqeel Mohammed Majeed              | Assistant professor | Microbiology                          | Soil bacteria                     |  |  | Staff |  |
| Hadeel Radawi Hussein              | Assistant professor | Botany                                | Plant classification and anatomy  |  |  | Staff |  |

|                               |                     |                                       |                                               |  |  |       |  |
|-------------------------------|---------------------|---------------------------------------|-----------------------------------------------|--|--|-------|--|
| Nada Zaki Mahdi               | Assistant professor | Microbiology                          | Biotechnology/Enzymes                         |  |  | Staff |  |
| susan Abdularhman ibrahim     | Assistant professor | Biology                               | Molecular biology                             |  |  | Staff |  |
| Nadal Abdulameer Ali          | Assistant professor | Biology                               | Molecular biology                             |  |  | Staff |  |
| Rana Sabah Jawad              | Assistant professor | Biology /zoology                      | genetic Physiology                            |  |  | Staff |  |
| Nassreen Noori Mzhr           | Assistant professor | Biology                               | Entomology                                    |  |  | Staff |  |
| Ban Oday Abdulsattar          | Assistant professor | Biology/micro biology                 | Gene therapy                                  |  |  | Staff |  |
| Rawaa Abdulameer Abduljabbar  | Assistant professor | Zoology                               | Immunogenetics                                |  |  | Staff |  |
| Hanaa Farhan Abbas            | Assistant professor | Microbiology                          | Bacterial genetics                            |  |  | Staff |  |
| Noor Talib Hamdan             | Assistant professor | Botany                                | Mycology                                      |  |  | Staff |  |
| Zaid Shker Naji               | Assistant professor | Microbiology                          | Mycology                                      |  |  | Staff |  |
| Maysoon Khaleefa Abbas        | Assistant professor | Biology                               | Pathogenic bacteria                           |  |  | Staff |  |
| Wafaa Hassan Muslem           | Assistant professor | Biology                               | Environmental Biotechnology                   |  |  | Staff |  |
| Manal Khalid Mohammed         | Assistant professor | Microbiology                          | Pathogenic bacteria                           |  |  | Staff |  |
| Anmar Saady Abood             | Assistant professor | Microbiology                          | soil microbiology                             |  |  | Staff |  |
| Mohammed Abed Aljaleel Khalil | Assistant professor | Botany                                | soil microbiology                             |  |  | Staff |  |
| Nidaa mohammed sulaiman       | Assistant professor | Zoology                               | Parasitology                                  |  |  | Staff |  |
| Noor Al-Huda Ali Abdulhassein | Assistant professor | Zoology                               | Immunology                                    |  |  | Staff |  |
| Samal Hakeem kareem           | Assistant professor | Veterinary Medicine                   | Animal physiology                             |  |  | Staff |  |
| Intesar Ali mezeal            | Assistant professor | Botany                                | Mycology                                      |  |  | Staff |  |
| Rasha Mohamed Sajet AL-Oqaili | Assistant professor | Genetic engineering and Biotechnology | Genetic engineering and Biotechnology         |  |  | Staff |  |
| Baan Munim AbdulRazzaq Twaij  | Assistant professor | Plant                                 | Plant tissue culture and secondary metabolite |  |  | Staff |  |
| Israa mohammed AlKadmy        | Assistant professor | Microbiology                          | Molecular biology                             |  |  | Staff |  |

|                                    |                        |                      |                                 |  |  |       |  |
|------------------------------------|------------------------|----------------------|---------------------------------|--|--|-------|--|
| Alaa naseer<br>Mohammed ali        | Assistant<br>professor | Biotechnology        | Citogenic                       |  |  | Staff |  |
| Ban Talib Fadhil                   | Assistant<br>professor | Animal<br>physiology | Animal physiology               |  |  | Staff |  |
| Seeham Ali<br>Qasim                | Assistant<br>professor | Biology              | Animal physiology               |  |  | Staff |  |
| Butheina<br>Mohammed Taha          | Assistant<br>professor | Microbiology         | Pathogenic bacteria             |  |  | Staff |  |
| Istabreq<br>Muhammed Ali<br>Salman | Assistant<br>professor | Biology              | Microbiology                    |  |  | Staff |  |
| Sura Basil Kamal                   | Assistant<br>professor | Zoology              | Invertebrates<br>classification |  |  | Staff |  |
| Zahraa Shakir<br>Mahmood           | Lecturer               | Microbiology         | Pathogenic bacteria             |  |  | Staff |  |
| Ansam Safaa<br>Husen               | Lecturer               | Microbiology         | Bacteriology                    |  |  | Staff |  |
| Enas waleed<br>shakir              | Lecturer               | Zoology              | Animals tissues                 |  |  | Staff |  |
| Ashwaq<br>AbdulJabbar<br>Kadhim    | Lecturer               | Biotechnology        | Immunology                      |  |  | Staff |  |
| Nadia Kamil<br>Bashar              | Lecturer               | Botany               | Environmental pollution         |  |  | Staff |  |
| Shaymaa Khudhr<br>Al-Alak          | Lecturer               | Microbiology         | Molecular biology               |  |  | Staff |  |
| Saba Saadoon<br>Khazaal            | Lecturer               | Microbiology         | Medical microbiology            |  |  | Staff |  |
| Abeer Salih Ali                    | Lecturer               | Zoology              | Zoology physiology              |  |  | Staff |  |
| Liqa Jameel<br>Ibraheem            | Lecturer               | Botany               | Medical plants                  |  |  | Staff |  |
| Zaid Naji<br>Hassan                | Lecturer               | Zoology              | Invertebrates                   |  |  | Staff |  |
| Rana Fadhil<br>Abbas               | Lecturer               | Ecology              | Ecology                         |  |  | Staff |  |
| Moayad Salih<br>Hussin             | Lecturer               | Botany               | Fungi                           |  |  | Staff |  |
| Rasha Saatam<br>Hameed             | Lecturer               | Zoology              | Biological control              |  |  | Staff |  |
| Wissam Adnan<br>Dari               | Lecturer               | Food Science         | Dairy                           |  |  | Staff |  |
| Shiamaa Salman<br>Dawood           | Lecturer               | Zoology              | Parasitology                    |  |  | Staff |  |
| Dalal Abd Al-<br>Sattar Asaad      | Lecturer               | Zoology              | Embryology                      |  |  | Staff |  |
| Raghad Jasim<br>Fayyad             | Lecturer               | Botany               | Algology                        |  |  | Staff |  |
| Yasamin<br>Abdalmir<br>Khadum      | Lecturer               | Zoology              | Comparative histology           |  |  | Staff |  |

|                           |                    |                  |                           |  |  |       |  |
|---------------------------|--------------------|------------------|---------------------------|--|--|-------|--|
| Siham neamah lafta        | Lecturer           | Anatomy          | Alga                      |  |  | Staff |  |
| Estabraq Mohammed Ati     | Lecturer           | Biology          | Environment and Pollution |  |  | Staff |  |
| Rafal Noaman Abbas        | Lecturer           | Zoology          | Cytology                  |  |  | Staff |  |
| Farah Abdul Razzaq Raheem | Lecturer           | English language | English Literature        |  |  | Staff |  |
| Rawaa Najim Abdullah      | Lecturer           | Zoology          | Immunogenetic             |  |  | Staff |  |
| Entkhab Muhsen AbedAli    | Lecturer           | Biology          | Molecular Biology         |  |  | Staff |  |
| Sarah Ibrahim Mahmood     | Lecturer           | Zoology          | Biological control        |  |  | Staff |  |
| Baidaa Mijbeel Ali        | Lecturer           | Microbiology     | Pathogenic bacteria       |  |  | Staff |  |
| Rasha Saad Nuaman         | Assistant lecturer | Botany           | Plant Pathology           |  |  | Staff |  |
| Zena Hassan Jazar         | Assistant lecturer | Botany           | Plant tissue culture      |  |  | Staff |  |
| Ruaa Fadhil Mansoor       | Assistant lecturer | Botany           | Plant Taxonomy            |  |  | Staff |  |
| Mohammed Sakban Baqir     | Assistant lecturer | Microbiology     | Microbiology Soil         |  |  | Staff |  |
| Suhad Abass Abid          | Assistant lecturer | Biotechnology    | Nanotechnology            |  |  | Staff |  |
| Liqaa shaker kadhim       | Assistant lecturer | Zoology          | Entomology                |  |  | Staff |  |
| Ali Ibrahim Mohammed      | Assistant lecturer | Zoology          | Embryology                |  |  | Staff |  |

### Professional Development

#### Mentoring new faculty members

1. Involving teachers in laboratory practical teaching and preparing questions
2. Follow up with and evaluate students.

#### Professional development of faculty members

1. The teacher himself prepares a course programme for each subject.
2. Follow the programme carefully.

3. Preparing summer questions and discussions and evaluating students for their roles.

4. Paying attention to practical laboratory experiments on the part of the teacher himself and emphasizing them

### **13. Acceptance Criterion**

1. Adopting the central admission conditions referred to in the regulations of the Ministry of Higher Education and Scientific Research.

2. Approving the absorptive capacity of the scientific department.

### **14. The most important sources of information about the program**

1. The visions of the Ministry of Higher Education and Scientific Research regarding the development of education in Iraq and the opening of new branches in the department.

2. Adopting reliable international sources in addition to local books, references, periodicals, and theses.

### **15. Program Development Plan**

1. Using new concepts in the field of life sciences and biotechnology and using electronic devices and modern scientific equipment to conduct experiments.

| Program Skills Outline   |             |                 |                   |                                    |    |    |    |        |    |    |    |        |    |    |    |
|--------------------------|-------------|-----------------|-------------------|------------------------------------|----|----|----|--------|----|----|----|--------|----|----|----|
|                          |             |                 |                   | Required program Learning outcomes |    |    |    |        |    |    |    |        |    |    |    |
| Year/Level               | Course Code | Course Name     | Basic or optional | Knowledge                          |    |    |    | Skills |    |    |    | Ethics |    |    |    |
|                          |             |                 |                   | A1                                 | A2 | A3 | A4 | B1     | B2 | B3 | B4 | C1     | C2 | C3 | C4 |
| Second year<br>2023 2024 |             | Plant anatomy   | Basic             | √                                  |    | √  |    | √      | √  |    |    | √      | √  | √  |    |
|                          |             | Plant groups    | Basic             | √                                  |    | √  |    | √      | √  |    |    | √      | √  | √  |    |
|                          |             | Albaath crimes  | Basic             | √                                  |    | √  |    | √      | √  |    |    | √      | √  | √  |    |
|                          |             | Entomology I    | Basic             | √                                  |    | √  |    | √      | √  |    |    | √      | √  | √  |    |
|                          |             | Biochemistry I  | Basic             | √                                  |    | √  |    | √      | √  |    |    | √      | √  | √  |    |
|                          |             | Invertebrates   | Basic             | √                                  |    | √  |    | √      | √  |    |    | √      | √  | √  |    |
|                          |             | Microbiology I  | Basic             | √                                  |    | √  |    | √      | √  |    |    | √      | √  | √  |    |
|                          |             | Biochemistry II | Basic             | √                                  |    | √  |    | √      | √  |    |    | √      | √  | √  |    |

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|---------------------------------|--|---------------------|--------------|---|--|---|--|---|---|--|--|---|---|---|--|
|                                 |  | Plant taxonomy      | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|                                 |  | Microbiology II     | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|                                 |  | Entomology II       | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|                                 |  | English language    | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|                                 |  | Parasitology        | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
| <b>Third year<br/>2023 2024</b> |  | Genetic engineering | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|                                 |  | Immunology          | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|                                 |  | Pathogenic bacteria | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|                                 |  | Bacterial           | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |

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|  |  | physiology                           |              |   |  |   |  |   |   |  |  |   |   |   |  |
|  |  | Medical<br>mycology                  | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Medical<br>parasitology              | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Microbiolog<br>y<br>environment<br>s | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Microbiolog<br>y heredity            | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Soil<br>microbiolog<br>y             | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Bacterial<br>taxonomy                | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |

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|  |  | General histology          | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Parasitology               | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Plant anatomy              | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Evolution and biodiversity | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | General physiology         | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Sera and vaccines          | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Plant taxonomy             | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Biological controls        | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |

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|  |  | Plant physiology              | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Water and sewage microbiology | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Microbiology physiology       | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Bacterial diagnosis           | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Immunology techniques         | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | English language              | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Animal and                    | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |

|                                  |  |                          |              |   |  |   |  |   |   |  |  |   |   |   |  |
|----------------------------------|--|--------------------------|--------------|---|--|---|--|---|---|--|--|---|---|---|--|
|                                  |  | plant<br>physiology      |              |   |  |   |  |   |   |  |  |   |   |   |  |
|                                  |  | Genetic<br>technology    | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|                                  |  | Medical<br>viruses       | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|                                  |  | Molecular<br>biology     | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ |   |  |
| <b>Fourth year<br/>2023 2024</b> |  | Plant<br>diseases        | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|                                  |  | Pathological<br>analysis | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|                                  |  | Microbial<br>toxins      | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|                                  |  | Antibiotics              | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |

|  |  |                                         |              |   |  |   |  |   |   |  |  |   |   |   |  |
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|  |  | Plant tissue<br>breeding                | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Medical<br>plants                       | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Plant<br>physiology                     | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | English<br>language                     | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Research<br>project                     | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Parasitology                            | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Fungus<br>taxonomy<br>and<br>physiology | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |

|  |  |                                               |              |   |  |   |  |   |   |  |  |   |   |   |  |
|--|--|-----------------------------------------------|--------------|---|--|---|--|---|---|--|--|---|---|---|--|
|  |  | Secondary<br>metabolic<br>compounds           | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Comparativ<br>e anatomy                       | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Environmen<br>tal<br>manageme<br>nt technique | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Bio<br>separation<br>technique                | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Fermentatio<br>n<br>technology                | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Endocrinolo                                   | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |

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|  |  | gy                            |              |   |  |   |  |   |   |  |  |   |   |   |  |
|  |  | Food microbiology             | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Pathogenic bacteria           | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Medical viruses               | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Medical Mycology              | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Microbial toxins              | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Water and sewage microbiology | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |

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|  |  | Industrial microbiology | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Embryology              | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Immunology              | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Nano biotechnology      | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Biological treatment    | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Biological control      | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Food technology         | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |
|  |  | Antibiotics             | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |

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|  |  | technology         |              |   |  |   |  |   |   |  |  |   |   |   |  |
|  |  | Sera<br>technology | <b>Basic</b> | √ |  | √ |  | √ | √ |  |  | √ | √ | √ |  |

- Please tick the boxes corresponding to the individual program learning outcomes under evaluation.

## Course Description Form

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |                                   |                             |                        |                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------------------------|-----------------------------|------------------------|--------------------------|
| Course Name: plant pathology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |              |                                   |                             |                        |                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |                                   |                             |                        |                          |
| Course Code:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |              |                                   |                             |                        |                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |                                   |                             |                        |                          |
| Semester / Year: 2nd semester 2023-2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |              |                                   |                             |                        |                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |                                   |                             |                        |                          |
| Description Preparation Date: 14-2-2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |              |                                   |                             |                        |                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |                                   |                             |                        |                          |
| Available Attendance Forms:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |                                   |                             |                        |                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |                                   |                             |                        |                          |
| Number of Credit Hours (Total) / Number of Units (Total)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |              |                                   |                             |                        |                          |
| ours ( 2 theory and 3 hours practical(<br>5 hours (2 theory 3 h practical )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |                                   |                             |                        |                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |                                   |                             |                        |                          |
| Course administrator's name (mention all, if more than one name)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |              |                                   |                             |                        |                          |
| Name: Dr. Adel Hamdan Alwan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |                                   |                             |                        |                          |
| Email: phdadel@uomustansiriyah.edu.iq                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |              |                                   |                             |                        |                          |
| Course Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |              |                                   |                             |                        |                          |
| <b>Course Objectives</b><br><b>Knowing causal agents of plant pathogens</b><br><b>Protecting plant from pathogen</b><br><b>Using new technical to producing resistant plant</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |                                   |                             |                        |                          |
| Teaching and Learning Strategies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |              |                                   |                             |                        |                          |
| <p>Teaching and learning plant pathogens effectively requires a combination of traditional and innovative strategies to engage students and facilitate their understanding of complex concepts. Here are some brief teaching and learning strategies tailored for Plant pathology</p> <p><b>Active Learning:</b> Encourage active participation through discussions, case studies, and group activities. This helps students apply theoretical knowledge to real-life scenarios, enhancing comprehension and retention.</p> <p><b>Visual Aids:</b> Utilize visual aids such as diagrams, models, and animations to illustrate disease structures and mode of action. Visual representation enhances understanding and makes abstract concepts more tangible.</p> <p><b>Laboratory Sessions:</b> Provide hands-on laboratory sessions to allow students to observe, manipulate, and analyze plant disease directly. Practical experience reinforces theoretical concepts and fosters critical thinking skills.</p> |              |                                   |                             |                        |                          |
| Course Structure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |              |                                   |                             |                        |                          |
| <b>Week</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Hours</b> | <b>Required Learning Outcomes</b> | <b>Unit or subject name</b> | <b>Learning method</b> | <b>Evaluation method</b> |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2            |                                   | What is Plant Pathology     |                        |                          |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2            |                                   | Types of plant diseases     |                        |                          |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2            |                                   | Development of              |                        |                          |
| 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2            |                                   | disease in plant            |                        |                          |
| 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2            |                                   | The most important          |                        |                          |
| 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2            |                                   | diseases of symptoms        |                        |                          |

|    |   |  |                                                       |  |  |
|----|---|--|-------------------------------------------------------|--|--|
| 7  | 2 |  | Stages in the development of disease or disease cycle |  |  |
| 8  | 2 |  | Effect of pathogen on plants physiological functions  |  |  |
| 9  | 2 |  | How plants defend themselves against pathogens        |  |  |
| 10 | 2 |  | Plant Disease Diagnostics                             |  |  |
| 11 | 2 |  | Plant diseases control                                |  |  |
| 12 | 2 |  | Disease caused by Fungi                               |  |  |
|    |   |  | Disease caused by bacteria                            |  |  |
|    |   |  | Disease caused by virus                               |  |  |

#### Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

#### Learning and Teaching Resources

|                                                                    |                                                         |
|--------------------------------------------------------------------|---------------------------------------------------------|
| Required textbooks (curricular books, if any)                      | Plant Pathology and Plant Diseases david B. coling 2020 |
| Main references (sources)                                          | Plant Pathology, Fifth Edition George N. agrious 1990   |
| Recommended books and references (scientific journals, reports...) | Plant pathology and plant pathogens                     |
| Electronic References, Websites                                    |                                                         |

Course Name: clinical analysis

Course Code: /

Semester / Year: first /2023-2024

Description Preparation Date:1/9/2023

Available Attendance Forms: attendance sheet

Number of Credit Hours (Total) / Number of Units (Total)

5 hours (3practical and 2 theoretical )/3 units

Course administrator's name (mention all, if more than one name)

Name: Dr.Khetam Habeeb Rasool

Email:dr.khr@uomustansiriyah.edu.iq

#### Course Objectives

How to identify the infectious agents that affect the body.

How to collect different samples from patients.

How to prepare the samples for diagnosing.

How to do different biological and chemical tests on different samples.

How to report the result to doctor.

#### Teaching and Learning Strategies

Clinical Analysis course give the student of Biology/ fourth class/ basic information about how body systems work in normal situation and the diseases that effects certain area in these systems mainly that caused by microorganisms (Bacteria ,Parasites ,Virus ,Fungi),to identify the

different causes for human diseases the student learn how to collect different samples from patients e.g.(Urine ,Stool ,Blood ,Sputum ,CSF, Seminal fluid...) and diagnose the disease causative agents in lab. and the antibiotic sensitivity of these microbes. Final step reporting the results ,which help doctors to give the suitable drugs that helps in controlling the infection and recovery from the disease. Other laboratory tests to blood ,semen and CSF.

#### Course Structure

| Week | Hours | Required Learning Outcomes                                                   | Unit or subject name                       | Learning method           | Evaluation method                          |
|------|-------|------------------------------------------------------------------------------|--------------------------------------------|---------------------------|--------------------------------------------|
| 1-15 | 5     | How to analysis body fluids and who write the analysis report to the doctors | Clinical analysis for different body fluid | Theoretical and practical | Questions, quizzes and writing examination |

#### Course Evaluation

|  |          |          |           |          |             |  |
|--|----------|----------|-----------|----------|-------------|--|
|  | 1st exam | 2nd exam | Practical | Activity | Final exam. |  |
|  | 12       | 12       | 12        | 4        | 60          |  |

#### Learning and Teaching Resources

|                                                                    |                                                                                                                     |
|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Required textbooks (curricular books, if any)                      | 1-Immunology : Overview and laboratory manual (2021)<br>2-Medical Microbiology ( 2021)<br>Clinical Pathology (2021) |
| Main references (sources)                                          | /                                                                                                                   |
| Recommended books and references (scientific journals, reports...) | Clinical Pathology (2021)                                                                                           |
| Electronic References, Websites                                    | /                                                                                                                   |

Course Name: Toxins

Course Code:

Semester / Year: second / 2023 2024

Description Preparation Date: 21-4-2024

Available Attendance Forms:

Number of Credit Hours (Total) / Number of Units (Total)

2 hours theoretical and 6 practical) eight hours weekly (

Course administrator's name (mention all, if more than one name)

Name: Prof.Dr.Shatha Ali Shafiq, Prof.Dr. Sana'a Noori Hussein

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#### Course Objectives

-Knowledge types of mycotoxins and bacterial toxins

-Knowledge toxigenic fungi and bacteria

Study mode of action of each mycotoxins and bacterial toxins and their physiological and chemical properties

Knowledge biotransformation by toxigenic fungi and bacteria

| Teaching and Learning Strategies                                  |       |                                                                                                                                                                                                                                                                                  |                                                         |                 |                   |
|-------------------------------------------------------------------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------|-------------------|
| Course Structure                                                  |       |                                                                                                                                                                                                                                                                                  |                                                         |                 |                   |
| Week                                                              | Hours | Required Learning Outcomes                                                                                                                                                                                                                                                       | Unit or subject name                                    | Learning method | Evaluation method |
| 1                                                                 | 2     | Review of endotoxins and exotoxins                                                                                                                                                                                                                                               | Bacterial Toxigenesis                                   | Theoretical,ppt | Theoretical test  |
| 2                                                                 | 2     | Knowing of <i>S.aureus</i> toxins                                                                                                                                                                                                                                                | Toxins of <i>S. aureus</i>                              | Theoretical,ppt |                   |
| 3                                                                 | 2     | Knowing of LT,ST,Shiga-like toxins                                                                                                                                                                                                                                               | Toxins of <i>E.coli</i>                                 | Theoretical,ppt |                   |
| 4                                                                 | 2     | Knowing of tetanospasmin and botulinum toxin                                                                                                                                                                                                                                     | Toxins of <i>C. tetani</i> and <i>C. botulinum</i>      |                 |                   |
| 5                                                                 | 1     |                                                                                                                                                                                                                                                                                  |                                                         |                 |                   |
| 6                                                                 | 1     | Introduction to mycotoxins                                                                                                                                                                                                                                                       | Exam                                                    | =               |                   |
| 7                                                                 | 1     | Mycotoxins produce by Toxigenic Aspergillus                                                                                                                                                                                                                                      | Mycotoxins and their characteristics                    | =               |                   |
| 8                                                                 | 1     | Mycotoxins produce by Toxigenic Penicillium                                                                                                                                                                                                                                      | Aflatoxins , Ochratoxins ,                              | =               |                   |
| 9                                                                 | 1     | Mycotoxins produce by toxigenicFusarium                                                                                                                                                                                                                                          | Patulin , penicillic acid and roquofortines             | =               |                   |
| 10-                                                               | 1     | Ergot Alkaloids                                                                                                                                                                                                                                                                  | Types of trichothescenes                                | =               |                   |
|                                                                   |       |                                                                                                                                                                                                                                                                                  | Toxigenic fungi of ergot , its types and mode of action |                 |                   |
|                                                                   |       |                                                                                                                                                                                                                                                                                  | Exam                                                    |                 |                   |
| Course Evaluation                                                 |       |                                                                                                                                                                                                                                                                                  |                                                         |                 |                   |
| 28 degrees for theoretical exam and 12 degrees for practical exam |       |                                                                                                                                                                                                                                                                                  |                                                         |                 |                   |
| Learning and Teaching Resources                                   |       |                                                                                                                                                                                                                                                                                  |                                                         |                 |                   |
| Required textbooks (curricular books, if any)                     |       |                                                                                                                                                                                                                                                                                  |                                                         |                 |                   |
| Main references (sources)                                         |       | -James R. Hanson, 2008 The Chemistry of Fungi. Published by The Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge CB4 0WF,<br>-Mycotoxins : risks in plant ,animal and human systems .council for agricultural sciences and technology 2002. |                                                         |                 |                   |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Brooks,G.F.; Carroll,K.C.; Bitel,J.S...Jawetz, Melnick and Adelberg's Medical Microbiology.(2013).26 <sup>th</sup> edi. Mc Graw Hill Lange. USA. |
| Recommended books and references (scientific journals, reports...)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Talaro,K.P. and Chess,B. Foundations in Microbiolgy.(2015). 9 <sup>th</sup> edi. Mc Graw Hill Lange. NewYork.                                    |
| Electronic References, Websites                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | www.rsc.org                                                                                                                                      |
| Course Name: Bacterial toxins II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                  |
| Course Code:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                  |
| Semester / Year: 2 <sup>nd</sup> semester 2023-2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                  |
| Description Preparation Date: 14/02/2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                  |
| Available Attendance Forms: Attendance sheets                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                  |
| Number of Credit Hours (Total) / Number of Units (Total)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                  |
| 5 hours ( 2 theory and 3 hours practical)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                  |
| 5 hours (2 theory 3 h practical ) 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                  |
| Course administrator's name (mention all, if more than one name)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                  |
| Name: Prof. Dr .khawlah jebur khalaf<br>Email: <a href="mailto:khawlah.falah@uomustansiriyah.edu.iq">khawlah.falah@uomustansiriyah.edu.iq</a> Dr . Raghad Abdel latif Dr.Ahmed Khamis Dr. Hoda Zuhair                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                  |
| Course Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                  |
| <p>The purpose of this semester of bacterial toxins is to familiarize the student with those concepts that are basic to type of toxins . Lecture is the foundation of the course, as the laboratories are designed to give the student the basic laboratory techniques necessary to identify many toxins. The student is responsible for assignments (such as specific papers</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                  |
| Teaching and Learning Strategies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                  |
| <p>Teaching and learning bacterial toxins effectively requires a combination of traditional and innovative strategies to engage students and facilitate their understanding of complex concepts. Here are some brief teaching and learning strategies tailored for bacterial toxins:</p> <p>Active Learning: Encourage active participation through discussions, case studies, and group activities. This helps students apply theoretical knowledge to real-life scenarios, enhancing comprehension and retention.</p> <p>Visual Aids: Utilize visual aids such as diagrams, models, and animations to illustrate toxins structures and mode of action. Visual representation enhances understanding and makes abstract concepts more tangible.</p> <p>Laboratory Sessions: Provide hands-on laboratory sessions to allow students to observe, manipulate, and analyze bacterial toxins directly. Practical experience reinforces theoretical concepts and fosters critical thinking skills.</p> <p>Peer Teaching: Encourage peer teaching and collaboration by assigning group projects or peer-</p> |                                                                                                                                                  |

led discussions. This approach promotes active engagement, reinforces learning through teaching, and fosters a supportive learning community among students.

Assessment for Learning: Implement varied assessment methods such as quizzes, assignments, presentations, and concept maps to assess student understanding at different levels. Provide timely feedback to guide student progress and address misconceptions

#### Course Structure

| Week | Hours | Required Learning Outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Unit or subject name | Learning method | Evaluation method |
|------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------|-------------------|
|      |       | <p>Introduction and identified some terms/ introduction microbial toxins</p> <p>Endotoxins and exotoxins and Major effects of endotoxins / methods of exploration for toxins</p> <p>Staphylococcus aureus toxins / Staphylococcus aureus toxins</p> <p>Streptococcus pyogenes toxins / toxins secreted by Streptococcus pyogenes</p> <p>Shiga enterotoxins / shigella toxin</p> <p>Escherichia coli toxins / toxins produced by Escherichia coli</p> <p>first exam / first exam</p> <p>Cholera toxin / vibrio cholera toxin</p> <p>Clostridium tetani / tetanospasmin</p> <p>Clostridium botulinum /botulinum toxins</p> <p>Diphtheria toxin / diphtheria toxin</p> <p>Anthrax toxin /anthrax toxin</p> <p>Pertussis toxin / enzyme linked immune sorbent assay (ELISA)</p> <p>Mycotoxins / Mycotoxin</p> |                      |                 | Theoretical test  |

|                                                                                                                                                                                                                                  |  |                          |                                                                        |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------|------------------------------------------------------------------------|--|--|
|                                                                                                                                                                                                                                  |  | Second exam /second exam |                                                                        |  |  |
| <b>Course Evaluation</b>                                                                                                                                                                                                         |  |                          |                                                                        |  |  |
| Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc 28 marks ( theory +12 marks practical ) 40 final exam 60 mar |  |                          |                                                                        |  |  |
| <b>Learning and Teaching Resources</b>                                                                                                                                                                                           |  |                          |                                                                        |  |  |
| Required textbooks (curricular books, if any)                                                                                                                                                                                    |  |                          |                                                                        |  |  |
| Main references (sources)                                                                                                                                                                                                        |  |                          | Jawetz, melnick & adelbergs (2013) .medical microbiology 26 th edition |  |  |
| Recommended books and references (scientific journals, reports...)                                                                                                                                                               |  |                          | Medical toxicology of natural substances (2008) .Donald G.             |  |  |
| Electronic References, Websites                                                                                                                                                                                                  |  |                          |                                                                        |  |  |

**Course Name: Antibiotics**

**Course Code:**

**Semester / Year:2023-2024**

**Description Preparation Date: 1/9/2023**

**Available Attendance Forms:**

**Number of Credit Hours (Total) / Number of Units (Total)**

125hr/

**Course administrator's name (mention all, if more than one name)**

Name : Prof.Dr Sawsan Sajid

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Name: Dr Nadal Abdulameer

E mail: dr.nadalali@uomustansiriyah.edu.iq

Name: Dr Susan AbdulRhaman

E mail; dr.susan.ibrahim@uomustansiriyah.edu.iq

**Course Objectives**

- Knowing how antibiotics work
- Identify antibiotic-resistant bacteria.
- Identify the microorganisms that produce antibiotics and how to increase their production.....

**Teaching and Learning Strategies**

**Course Structure**

| Week | Hours | Required Learning Outcomes                                                                                                                 | Unit or subject name | Learning method                                                                                  | Evaluation method                                                                                  |
|------|-------|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| 15   | 125   | The student is familiar with the most important groups of antibiotics, the organisms that produce them, and the resistance mechanism shown | Anitibiotics         | Lectures / lab experiments<br>Students have to be prepared for quizzes and discussions in class. | 1-Exam includes:<br>A-Multiple choices<br>B-Thinking based questions<br>C-Defination of many terms |

|  |  |                            |  |  |                                                                              |
|--|--|----------------------------|--|--|------------------------------------------------------------------------------|
|  |  | by microorganisms to them. |  |  | D- short written questions<br>E-T/F<br>2-quizzes<br>3-reports<br>4-home work |
|--|--|----------------------------|--|--|------------------------------------------------------------------------------|

#### Course Evaluation

| Assessment                      | Score |
|---------------------------------|-------|
| First term Exam                 | 15%   |
| Second term Exam                | 15%   |
| Assignment, reports and quizzes | 10%   |
| Final Exam                      | 60%   |
| Grade                           | 100%  |

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

#### Learning and Teaching Resources

|                                                                    |                                                                                                                                                                                                                                                   |
|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Required textbooks (curricular books, if any)                      | Antimicrobial Chemotherapy . 2007 by David Greenwood , Roger Finch , Peter Davey , Mark Wilcox                                                                                                                                                    |
| Main references (sources)                                          | Multidrug-Resistant Bacteria: Their Mechanism of Action and Prophylaxis<br>Alok Bharadwaj , Amisha Rastogi , Swadha Pandey , Saurabh Gupta , and Jagdip Singh Sohal<br>Department of Biotechnology, GLA University, Mathura (U.P.)-281 406, India |
| Recommended books and references (scientific journals, reports...) | Genetic Factors That Contribute to Antibiotic Resistance through Intrinsic and Acquired Bacterial Genes in Urinary Tract Infections<br>Mohammed Harris *, Tracy Fasolino, Diana Ivankovic, *                                                      |
| Electronic References, Websites                                    |                                                                                                                                                                                                                                                   |

|                                                                                                           |
|-----------------------------------------------------------------------------------------------------------|
| Course Name: Plant tissue culture                                                                         |
| Course Code:                                                                                              |
| Semester / Year:2023-2024                                                                                 |
| Description Preparation Date: 1/3/2024                                                                    |
| Available Attendance Forms:                                                                               |
| Number of Credit Hours (Total) / Number of Units (Total) 8 hrs. (2 hrs. Theoretical and 6 hrs. practical) |
| 7.Course administrator's name ( )                                                                         |
| Name:prof. Dr. Hashim Kadhim Mohammed                                                                     |

| Email: hashimkadhun@yahoo.com                                                                                                                                                                                      |       |                                                                                                                                                                                                                                                                                                      |                                                                                                 |                                                                                        |                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------|
| Course Objectives                                                                                                                                                                                                  |       |                                                                                                                                                                                                                                                                                                      |                                                                                                 |                                                                                        |                               |
| History of plant tissue culture<br>Culture types of plant tissue culture<br>Study the new techniques of plant tissue culture<br>The effect factors on plant tissue culture<br>The problems of plant tissue culture |       |                                                                                                                                                                                                                                                                                                      |                                                                                                 |                                                                                        |                               |
| Teaching and Learning Strategies                                                                                                                                                                                   |       |                                                                                                                                                                                                                                                                                                      |                                                                                                 |                                                                                        |                               |
| Utilizing the strategies of electronic and classroom learning in Education                                                                                                                                         |       |                                                                                                                                                                                                                                                                                                      |                                                                                                 |                                                                                        |                               |
| Course Structure                                                                                                                                                                                                   |       |                                                                                                                                                                                                                                                                                                      |                                                                                                 |                                                                                        |                               |
| Week                                                                                                                                                                                                               | Hours | Required Learning Outcomes                                                                                                                                                                                                                                                                           | Unit or subject name<br>Description depends on the<br>Timing table (Theoretical<br>& Practical) | Learning method                                                                        | Evaluation method             |
|                                                                                                                                                                                                                    |       | <i>At the end of the course, students are expected to learn</i><br>1. History of plant tissue culture<br>2. Culture types of plant tissue culture<br>3. Study the new techniques of plant tissue culture<br>4. The effect factors on plant tissue culture<br>5. The problems of plant tissue culture | Lec.1<br>Lab.1<br>Plant tissue culture<br>, Introduction                                        | Using detailed explanation with discussion beside, on-screen display and illustrations | Discussion and oral questions |
|                                                                                                                                                                                                                    |       |                                                                                                                                                                                                                                                                                                      | Lec.2<br>Lab.2<br>Plasticity and totipotency<br>, The culture environment                       |                                                                                        |                               |
|                                                                                                                                                                                                                    |       |                                                                                                                                                                                                                                                                                                      | Lec.3<br>Lab.3<br>Plant cell culture media                                                      |                                                                                        |                               |
|                                                                                                                                                                                                                    |       |                                                                                                                                                                                                                                                                                                      | Lec.4<br>Lab.4<br>Plant growth regulators                                                       |                                                                                        |                               |

|                                                                                                                                                                    |  |  |                                                                                                                                |  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--------------------------------------------------------------------------------------------------------------------------------|--|--|
|                                                                                                                                                                    |  |  | Lec.5<br>Lab.5<br>Culture types , Callus ,<br>Cell-suspension cultures                                                         |  |  |
|                                                                                                                                                                    |  |  | Lec.6<br>Lab.6<br>Protoplasts , Root cultures<br>, Embryo culture                                                              |  |  |
|                                                                                                                                                                    |  |  | First exam                                                                                                                     |  |  |
|                                                                                                                                                                    |  |  | Lec.8<br>Lab.8<br>Shoot tip and meristem<br>culture , Microspore<br>culture                                                    |  |  |
|                                                                                                                                                                    |  |  | Lec.9<br>Lab.9<br>Organogenesis , Somatic<br>embryogenesis                                                                     |  |  |
|                                                                                                                                                                    |  |  | Lec.10<br>Lab.10<br>Plant regeneration                                                                                         |  |  |
|                                                                                                                                                                    |  |  | Lec.11<br>Lab.11<br>Stages of Plant tissue<br>culture , Initiation stage                                                       |  |  |
|                                                                                                                                                                    |  |  | Lec.12<br>Lab.12<br>Multiplication stage                                                                                       |  |  |
|                                                                                                                                                                    |  |  | Second exam                                                                                                                    |  |  |
|                                                                                                                                                                    |  |  | Lec.14<br>Lab.14<br>Rooting stage,<br>Acclimatization stage                                                                    |  |  |
| Course Evaluation                                                                                                                                                  |  |  |                                                                                                                                |  |  |
| Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports.... etc |  |  |                                                                                                                                |  |  |
| Learning and Teaching Resources                                                                                                                                    |  |  |                                                                                                                                |  |  |
| Required textbooks (curricular books, if any)                                                                                                                      |  |  | Altaf Hussain, Iqbal Ahmed Qarshi, Hummera Nazir and Ikram Ullah (2012).Plant Tissue Culture: Current Status and Opportunities |  |  |
| Main references (sources)                                                                                                                                          |  |  | Libraries and websites                                                                                                         |  |  |
| Recommended books and references (scientific journals,                                                                                                             |  |  | Plant Biotechnology Current and Future Applications of Genetically Modified Crops Edited by NIGEL G. HALFORD                   |  |  |

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| reports...)                     | Crop Performance and Improvement, Rothamsted Research, UK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Electronic References, Websites | <p>Google scholar</p> <p>1- Murashige, T. and Skoog, F. (1962). A revised medium for rapid growth and bioassays with tobacco tissue culture. <i>Physiol. Plant.</i> 15:473-497.</p> <p>2- Al-Oubaidi, H. K. M.; Al-Khafagi, M F. (2018). In vitro increasing medical compounds (tannins and phenols) of <i>punica granatum</i> L. in callus using MgO NPs and CuO NPS. <i>Journal of Pharmaceutical Sciences and Research</i>; 10(5), 1085-1088.</p> <p>3- Céspedes-Méndez, C., Iturriaga-Vásquez, P., &amp; Hormazábal, E. (2021). Secondary metabolites and biological profiles of <i>Datura</i> genus. <i>Journal of the Chilean Chemical Society</i>, 66(2), 5183-5189.</p> <p>4- Al-Karkhi M. H and * Al-oubaidi H. K. M(2022) Effect of Salicylic acid on increasing phenolic compounds of <i>Catharanthus vinca</i> L. G. Don. Using shoot tip in vitro. <i>European Journal of Biomedical and Pharmaceutical Sciences</i> 9 ( 7) 40-44.</p> |

|                                                                                                            |       |                            |                                                                                   |                 |                   |
|------------------------------------------------------------------------------------------------------------|-------|----------------------------|-----------------------------------------------------------------------------------|-----------------|-------------------|
| Course Name: Medicinal Plant                                                                               |       |                            |                                                                                   |                 |                   |
|                                                                                                            |       |                            |                                                                                   |                 |                   |
| Course Code:                                                                                               |       |                            |                                                                                   |                 |                   |
|                                                                                                            |       |                            |                                                                                   |                 |                   |
| Semester / Year:2023-2024                                                                                  |       |                            |                                                                                   |                 |                   |
|                                                                                                            |       |                            |                                                                                   |                 |                   |
| Description Preparation Date: 1/3/2024                                                                     |       |                            |                                                                                   |                 |                   |
|                                                                                                            |       |                            |                                                                                   |                 |                   |
| Available Attendance Forms:                                                                                |       |                            |                                                                                   |                 |                   |
|                                                                                                            |       |                            |                                                                                   |                 |                   |
| Number of Credit Hours (Total) / Number of Units (Total) 8 hrs. (2 hrs. Theoretical and 6 hrs. practical)  |       |                            |                                                                                   |                 |                   |
|                                                                                                            |       |                            |                                                                                   |                 |                   |
| 7.Course administrator's name ( )                                                                          |       |                            |                                                                                   |                 |                   |
| Name:Ass.Prof.Dr. Sundus Hameed Ahmed                                                                      |       |                            |                                                                                   |                 |                   |
| Email: drsundusahmed@uomustansiriyah.edu.iq                                                                |       |                            |                                                                                   |                 |                   |
| Course Objectives                                                                                          |       |                            |                                                                                   |                 |                   |
| comprehensive introduction to medicinal plants and related sciences and knowledge of botanical description |       |                            |                                                                                   |                 |                   |
| Plant distribution areas and their characteristics                                                         |       |                            |                                                                                   |                 |                   |
| Studying the active components of medicinal plants, their therapeutic importance, and extraction methods   |       |                            |                                                                                   |                 |                   |
| Teaching and Learning Strategies                                                                           |       |                            |                                                                                   |                 |                   |
| Utilizing the strategies of electronic and classroom learning in Education                                 |       |                            |                                                                                   |                 |                   |
| Course Structure                                                                                           |       |                            |                                                                                   |                 |                   |
| Week                                                                                                       | Hours | Required Learning Outcomes | Unit or subject name<br>Description depends on the Timing table<br>(Theoretical & | Learning method | Evaluation method |

|                                                                                                                                                                    |  |                                                                                                              | Practical)       |                                                                                                                                                                                                                       |                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
|                                                                                                                                                                    |  | At the end of the course, the student will be able to identify some of the plant families present in Baghdad | Lec.1<br>Lab.1   | At the end of the course, he will be able to learn about the importance of medicinal plants in treatments, their effective components that have a therapeutic effect, their characterization, and extraction methods. | Discussion and oral questions |
|                                                                                                                                                                    |  |                                                                                                              | Lec.2<br>Lab.2   |                                                                                                                                                                                                                       |                               |
|                                                                                                                                                                    |  |                                                                                                              | Lec.3<br>Lab.3   |                                                                                                                                                                                                                       |                               |
|                                                                                                                                                                    |  |                                                                                                              | Lec.4<br>Lab.4   |                                                                                                                                                                                                                       |                               |
|                                                                                                                                                                    |  |                                                                                                              | Lec.5<br>Lab.5   |                                                                                                                                                                                                                       |                               |
|                                                                                                                                                                    |  |                                                                                                              | Lec.6<br>Lab.6   |                                                                                                                                                                                                                       |                               |
|                                                                                                                                                                    |  |                                                                                                              | First exam       |                                                                                                                                                                                                                       |                               |
|                                                                                                                                                                    |  |                                                                                                              | Lec.8<br>Lab.8   |                                                                                                                                                                                                                       |                               |
|                                                                                                                                                                    |  |                                                                                                              | Lec.9<br>Lab.9   |                                                                                                                                                                                                                       |                               |
|                                                                                                                                                                    |  |                                                                                                              | Lec.10<br>Lab.10 |                                                                                                                                                                                                                       |                               |
|                                                                                                                                                                    |  |                                                                                                              | Lec.11<br>Lab.11 |                                                                                                                                                                                                                       |                               |
|                                                                                                                                                                    |  |                                                                                                              | Lec.12<br>Lab.12 |                                                                                                                                                                                                                       |                               |
|                                                                                                                                                                    |  |                                                                                                              | Second exam      |                                                                                                                                                                                                                       |                               |
|                                                                                                                                                                    |  |                                                                                                              | Lec.14<br>Lab.15 |                                                                                                                                                                                                                       |                               |
| Course Evaluation                                                                                                                                                  |  |                                                                                                              |                  |                                                                                                                                                                                                                       |                               |
| Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports.... etc |  |                                                                                                              |                  |                                                                                                                                                                                                                       |                               |

| Learning and Teaching Resources                                    |                                                                                           |
|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Required textbooks (curricular books, if any)                      | Medicinal Plants Hand book,2021                                                           |
| Main references (sources)                                          | Libraries and Internet research                                                           |
| Recommended books and references (scientific journals, reports...) | Journal of Medicinal Plants Research, European Journal of Medicinal Plants                |
| Electronic References, Websites                                    | <a href="https://link.springer.com/journal/606">https://link.springer.com/journal/606</a> |

| Course Name: Plant physiology                                                                                                                                                                                                      |       |                                                                                                                                                                                                                                                                              |                                           |                                                          |                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------------|---------------------------------|
| Course Code:                                                                                                                                                                                                                       |       |                                                                                                                                                                                                                                                                              |                                           |                                                          |                                 |
| Semester / Year: 2024                                                                                                                                                                                                              |       |                                                                                                                                                                                                                                                                              |                                           |                                                          |                                 |
| Description Preparation Date:                                                                                                                                                                                                      |       |                                                                                                                                                                                                                                                                              |                                           |                                                          |                                 |
| Available Attendance Forms:                                                                                                                                                                                                        |       |                                                                                                                                                                                                                                                                              |                                           |                                                          |                                 |
| Number of Credit Hours (Total) / Number of Units (Total) Eight hours a week (two theoretical and six practical)                                                                                                                    |       |                                                                                                                                                                                                                                                                              |                                           |                                                          |                                 |
| Course administrator's name (mention all, if more than one name)                                                                                                                                                                   |       |                                                                                                                                                                                                                                                                              |                                           |                                                          |                                 |
| Name: Dr.ghaidaa husain abd ali                                                                                                                                                                                                    |       |                                                                                                                                                                                                                                                                              |                                           |                                                          |                                 |
| Email: spgh@uomustansiriyah.edu.iq                                                                                                                                                                                                 |       |                                                                                                                                                                                                                                                                              |                                           |                                                          |                                 |
| Course Objectives                                                                                                                                                                                                                  |       |                                                                                                                                                                                                                                                                              |                                           |                                                          |                                 |
| This course provides an introduction to basic principles of plant function, primarily covering physical processes in plants, metabolism, secondary products, cell physiology, and introducing principles of growth and development |       |                                                                                                                                                                                                                                                                              |                                           |                                                          |                                 |
| Teaching and Learning Strategies                                                                                                                                                                                                   |       |                                                                                                                                                                                                                                                                              |                                           |                                                          |                                 |
| Course Structure                                                                                                                                                                                                                   |       |                                                                                                                                                                                                                                                                              |                                           |                                                          |                                 |
| Week                                                                                                                                                                                                                               | Hours | Required Learning Outcomes                                                                                                                                                                                                                                                   | Unit or subject name                      | Learning method                                          | Evaluation method               |
|                                                                                                                                                                                                                                    |       | explain the water solute and sugar transport processes in plants.<br>explain Plant Nutrient<br>explain the importance of photosynthesis for plants.They explain the light and dark reactions of photosynthesis.<br>They compare the dark rections in C3, C4 and CAM plants.T | Lab .1<br>preparation of solution         | شرح مفصل مع المناقشة والعرض على الشاشة والرسوم التوضيحية | مناقشة شفوية وأسئلة حول الموضوع |
|                                                                                                                                                                                                                                    |       |                                                                                                                                                                                                                                                                              | Lab 2<br>Acidity and al kalin and Buffers |                                                          |                                 |
|                                                                                                                                                                                                                                    |       |                                                                                                                                                                                                                                                                              | Lab 3<br>Diffiusion                       |                                                          |                                 |
|                                                                                                                                                                                                                                    |       |                                                                                                                                                                                                                                                                              | Lab 4<br>plasmolysis                      |                                                          |                                 |
|                                                                                                                                                                                                                                    |       |                                                                                                                                                                                                                                                                              | Lab 5<br>permability                      |                                                          |                                 |
|                                                                                                                                                                                                                                    |       |                                                                                                                                                                                                                                                                              | First exam                                |                                                          |                                 |

|  |  |                                                                    |                                     |  |  |
|--|--|--------------------------------------------------------------------|-------------------------------------|--|--|
|  |  | .explain respiration in plant .<br>explain Plant growth regulators | Lab .6<br>Plant nutrient 1          |  |  |
|  |  |                                                                    | Lab .7<br>Plant nutrient 2          |  |  |
|  |  |                                                                    | Lab 8<br>Photosynthesis pigments 1  |  |  |
|  |  |                                                                    | Lab 9<br>Photosynthesis pigments 2  |  |  |
|  |  |                                                                    | Lab 10<br>respiration in plant      |  |  |
|  |  |                                                                    | Lab 11<br>Plant growth regulators 1 |  |  |
|  |  |                                                                    | Lab 12<br>Plant growth regulators 2 |  |  |
|  |  |                                                                    | Second exam                         |  |  |
|  |  |                                                                    | Lab 13 plant tropism                |  |  |
|  |  |                                                                    |                                     |  |  |

Course Name: English Language

Course Code:

Semester / Year: 2nd semester / 2023-2024

Description Preparation Date: 1/2/ 2024

Available Attendance Forms: theoretical

Number of Credit Hours (Total) 2 H./ Number of Units (Total)

Course administrator's name (mention all, if more than one name)

Name: L. Farah A. RAheem

Dr. Yosra Al Hakeem

Dr. Entkhab Muhsen

Course Objectives

Developing skills of using English grammar.

Developing skills of speaking and listening in English.

Developing skills of reading and writing in English.

Developing better abilities to use academic English of 2nd year students in their scientific study.

Teaching and Learning Strategies

Use explanation, and ask questions to stimulate discussion, emphasizing the value of students' answers and encourage them to participate actively. Practice different Language skills inside the class and as a homework for students is a very useful strategy too.

| Course Structure |       |                            |                      |                 |                   |
|------------------|-------|----------------------------|----------------------|-----------------|-------------------|
| Week             | Hours | Required Learning Outcomes | Unit or subject name | Learning method | Evaluation method |
| 1                | 2     |                            | Parts of unit 1      | Explanation     | Asking Questions  |
| 2                | 4     |                            | Parts of unit 2      | n               | Homework          |
| 3                | 6     |                            | Parts of unit 3      | Explanation     | Asking Question   |
| 4                | 8     |                            | Parts of unit 4      | Explanation     | Homework          |
| 5                | 10    |                            | Parts of unit 5      | Explanation     |                   |
| 6                | 12    |                            | Parts of unit 6      | Explanation     | QUIZ              |
| 7                | 14    |                            | Parts of unit 7      | Explanation     | Question          |
| 8                | 16    |                            | Mid term Exam        | Explanation     | Quiz              |
| 9                | 18    |                            | Parts of unit 8      |                 |                   |
| 10               | 20    |                            | Parts of unit 9      | Explanation     | Homework          |
| 11               | 22    |                            | Parts of unit 10     | Explanation     | Asking Questions  |
| 12               | 24    |                            | Parts of unit 11     | Explanation     | Homework          |
| 13               | 26    |                            | Parts of unit 12     | Explanation     | Asking Question   |
| 14               | 28    |                            | Parts of unit 13     | Explanation     |                   |
| 15               | 30    |                            | Parts of unit 14     | Explanation     |                   |

#### Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

Mid term Exam 15 M.

Home works 10 M.

Quiz 5 M.

Final Exam 70 M.

#### Learning and Teaching Resources

|                                                                    |                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Required textbooks<br>(curricular books, if any)                   | Soars, John and Liz. New Headway Plus : pre-intermediate Student's Book, 1st Edition, Oxford University Press, Oxford , (2014). Digital Edition , With DVD- ROM.<br><br>Soars, John and Liz. New Headway Plus : pre-intermediate Workbook without Key , 1st Edition, Oxford University Press, Oxford , (2014). Digital Edition , With new writing Micro- skills |
| Main references (sources)                                          |                                                                                                                                                                                                                                                                                                                                                                 |
| Recommended books and references (scientific journals, reports...) | 1- Murphy, Raymond. English Grammar In Use. 3rd Edition, Oxford University Press, Oxford,( 2012).                                                                                                                                                                                                                                                               |
| Electronic References, Websites                                    | BBC Learning English , <a href="https://www.bbc.co.uk /learning Engl">https://www.bbc.co.uk /learning Engl</a>                                                                                                                                                                                                                                                  |

Course Name: The scientific research approach

Course Code: /

Semester / Year: First /2023 -2024

Description Preparation Date: 1 /9/2023

Available Attendance Forms: attendance forma

| Number of Credit Hours (Total) / Number of Units (Total)<br>1unit /(theoretical lectures) 2 hours .                                                                                                                                                                                                                                                                                                                                               |          |                                                                                             |                                                                                                                                   |                           |                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------------------------------------------|
| Course administrator's name (mention all, if more than one name)                                                                                                                                                                                                                                                                                                                                                                                  |          |                                                                                             |                                                                                                                                   |                           |                                            |
| Instructor's Name: Professor Dr. Khetam Habeeb Rasool<br>Email: Dr.khr@uomustansiriyah.edu.iq<br>Asst. Prof. Dr. Ban Oday Abdulsattar<br>Email: banoday@ uomustansiriyah.edu.iq                                                                                                                                                                                                                                                                   |          |                                                                                             |                                                                                                                                   |                           |                                            |
| Course Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |                                                                                             |                                                                                                                                   |                           |                                            |
| 1. To develop skills and understanding of the basic about how to write graduated research.<br>2. Knowing and understanding the important topic in scientific writing and principles for research organization.<br>3. Learn how to collect data about a topic.<br>4. Learn the principles, procedures, and techniques to select and organize references the in consonant with the research topics                                                  |          |                                                                                             |                                                                                                                                   |                           |                                            |
| Teaching and Learning Strategies                                                                                                                                                                                                                                                                                                                                                                                                                  |          |                                                                                             |                                                                                                                                   |                           |                                            |
| The main goal and strategy that was relied upon in this model is to work on motivating students to exert effort and active and scientific participation in lectures, practice on how to write a bachelor research and how to improve scientific thinking skills and positive posts. With interactive and competitive programs during the semester, this goal can be reached by conducting scientific experiments that concern all student samples |          |                                                                                             |                                                                                                                                   |                           |                                            |
| Course Structure                                                                                                                                                                                                                                                                                                                                                                                                                                  |          |                                                                                             |                                                                                                                                   |                           |                                            |
| Week                                                                                                                                                                                                                                                                                                                                                                                                                                              | Hours    | Required Learning Outcomes                                                                  | Unit or subject name                                                                                                              | Learning method           | Evaluation method                          |
| 1-15                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2        | How to write a scientific paper or research using the standard steps for scientific writing | Steps for scientific research writing                                                                                             | Theoretical and practical | Questions, quizzes and writing examination |
| Course Evaluation                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |                                                                                             |                                                                                                                                   |                           |                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1st exam | 2nd exam                                                                                    | Practical                                                                                                                         | Activity                  | Final Exam                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 12       | 12                                                                                          | 3                                                                                                                                 | 3                         | 70                                         |
| Learning and Teaching Resources                                                                                                                                                                                                                                                                                                                                                                                                                   |          |                                                                                             |                                                                                                                                   |                           |                                            |
| Required textbooks (curricular books, if any)                                                                                                                                                                                                                                                                                                                                                                                                     |          |                                                                                             | Majed, R. (2016) Research methods, practical answers to essential questions; Friedrich Ebert Stiftung ©2016 FES, Lebanon, Beirut. |                           |                                            |
| Main references (sources)                                                                                                                                                                                                                                                                                                                                                                                                                         |          |                                                                                             | How to write a paper in English, writing course ©Adrian Wallwork 2010                                                             |                           |                                            |
| Recommended books and references (scientific journals, reports...)                                                                                                                                                                                                                                                                                                                                                                                |          |                                                                                             | /                                                                                                                                 |                           |                                            |
| Electronic References, Websites                                                                                                                                                                                                                                                                                                                                                                                                                   |          |                                                                                             | /                                                                                                                                 |                           |                                            |

| Course Name: Parasitology                                                                                                                               |       |                                                                                                                     |                      |                 |                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------------------------------------------------------------------------------------------------------------|----------------------|-----------------|-------------------|
| Course Code:                                                                                                                                            |       |                                                                                                                     |                      |                 |                   |
| Semester / Year: 2023-2024                                                                                                                              |       |                                                                                                                     |                      |                 |                   |
| Description Preparation Date: 1\9\2023                                                                                                                  |       |                                                                                                                     |                      |                 |                   |
| Available Attendance Forms:                                                                                                                             |       |                                                                                                                     |                      |                 |                   |
| Number of Credit Hours (Total) / Number of Units (Total)                                                                                                |       |                                                                                                                     |                      |                 |                   |
| 5 hours ( 2 theory and 3 hours practical)                                                                                                               |       |                                                                                                                     |                      |                 |                   |
| 5 hours (2 theory 3 h practical ) 5                                                                                                                     |       |                                                                                                                     |                      |                 |                   |
| Course administrator's name (mention all, if more than one name)                                                                                        |       |                                                                                                                     |                      |                 |                   |
| Name: Prof. Dr sabaa taher –Dr. shatha khudhair ---DrNebraska Faleh Chachain                                                                            |       |                                                                                                                     |                      |                 |                   |
| Email: dr.saba@uomustansiriyah.edu.iq :                                                                                                                 |       |                                                                                                                     |                      |                 |                   |
| <a href="mailto:dr.shatha@uomustansiriyah.edu.iq">dr.shatha@uomustansiriyah.edu.iq</a>                                                                  |       |                                                                                                                     |                      |                 |                   |
| gmoon4444@uomustansiriyah.edu. iq                                                                                                                       |       |                                                                                                                     |                      |                 |                   |
| Course Objectives                                                                                                                                       |       |                                                                                                                     |                      |                 |                   |
| ..... Identify parasites and their types                                                                                                                |       |                                                                                                                     |                      |                 |                   |
| <ul style="list-style-type: none"> <li>● Identify its characteristics and life cycle</li> <li>● Learn about ways to diagnose and prevent it.</li> </ul> |       |                                                                                                                     |                      |                 |                   |
| Teaching and Learning Strategies                                                                                                                        |       |                                                                                                                     |                      |                 |                   |
| Theoretical education                                                                                                                                   |       |                                                                                                                     |                      |                 |                   |
| Practical education: Using visual teaching materials , such as shapes, educational slides, and diagrams                                                 |       |                                                                                                                     |                      |                 |                   |
| Course Structure                                                                                                                                        |       |                                                                                                                     |                      |                 |                   |
| Week                                                                                                                                                    | Hours | Required Learning Outcomes                                                                                          | Unit or subject name | Learning method | Evaluation method |
| 1                                                                                                                                                       |       | Introduction Basic concepts in Parasitology Host-parasite relationships Vector, host, control programs              |                      |                 |                   |
| 2                                                                                                                                                       |       | Introduction into Protozoa & <i>Entamoeba histolytica</i> and human amebiasis                                       |                      |                 |                   |
| 3                                                                                                                                                       |       | <i>Trichomonas</i> , <i>Giardia</i>                                                                                 |                      |                 |                   |
| 4                                                                                                                                                       |       | American Trypanosomes, African Trypanosomes, <i>Leishmania spp</i>                                                  |                      |                 |                   |
| 5                                                                                                                                                       |       | Intro to Apicomplexa <i>Toxoplasma</i> , <i>Cryptosporidium</i>                                                     |                      |                 |                   |
| 6                                                                                                                                                       |       | Malaria, Parasite biology, disease , Pathogenesis & treatment,                                                      |                      |                 |                   |
| 7                                                                                                                                                       |       | Exam                                                                                                                |                      |                 |                   |
| 8                                                                                                                                                       |       | Platyhelminthes – Flukes Introduction into platyhelminth biology, life cycles , human lung and liver fluke disease. |                      |                 |                   |
| 9                                                                                                                                                       |       | Intestine fluke & Schistosomiasis                                                                                   |                      |                 |                   |
| 10                                                                                                                                                      |       | Platyhelminthes – Tapeworms Biology of                                                                              |                      |                 |                   |

|                                                                                                                                                                     |  |                                                                                                                                                              |                                                                                                                                   |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--|--|
|                                                                                                                                                                     |  | cestodes                                                                                                                                                     |                                                                                                                                   |  |  |
| 11                                                                                                                                                                  |  | Nematoda Introduction into the biology of Nematodes Important human diseases caused by nematodes , nematodes, immunity & hygiene hypothesis.. and Ascaradids |                                                                                                                                   |  |  |
| 12                                                                                                                                                                  |  | Exam                                                                                                                                                         |                                                                                                                                   |  |  |
| 13                                                                                                                                                                  |  | Whipworms and Strongyloides, Hookworms and Pinworms                                                                                                          |                                                                                                                                   |  |  |
| 14                                                                                                                                                                  |  | Blood and Tissue Dwelling Nematodes Filariasis, Pathogenesis of river blindness and lymphatic filariasis, control programs                                   |                                                                                                                                   |  |  |
| 15                                                                                                                                                                  |  | Cutaneous and visceral larva migrants'                                                                                                                       |                                                                                                                                   |  |  |
| <b>Course Evaluation</b>                                                                                                                                            |  |                                                                                                                                                              |                                                                                                                                   |  |  |
| Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc |  |                                                                                                                                                              |                                                                                                                                   |  |  |
| <b>Learning and Teaching Resources</b>                                                                                                                              |  |                                                                                                                                                              |                                                                                                                                   |  |  |
| Required textbooks (curricular books, if any)                                                                                                                       |  |                                                                                                                                                              |                                                                                                                                   |  |  |
| Main references (sources)                                                                                                                                           |  |                                                                                                                                                              |                                                                                                                                   |  |  |
| Recommended books and references (scientific journals, reports...)                                                                                                  |  |                                                                                                                                                              | Textbook of Medical Parasitology, 6th Edition by CKJ Paniker<br>Medical Parasitology, 2nd edition by Elizabeth A. Gockel-Blessing |  |  |
| Electronic References, Websites                                                                                                                                     |  |                                                                                                                                                              | <a href="https://www.muhadharaty.com/">https://www.muhadharaty.com/</a>                                                           |  |  |

|                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Course Name:</b>                                                                                                                                                                                                                                                                                                                   |
| <b>Secondary metabolites</b>                                                                                                                                                                                                                                                                                                          |
| <b>Course Code:</b>                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                       |
| <b>Semester / Year:</b>                                                                                                                                                                                                                                                                                                               |
| <b>1<sup>st</sup> semester / 2023-2024</b>                                                                                                                                                                                                                                                                                            |
| <b>Description Preparation Date:</b>                                                                                                                                                                                                                                                                                                  |
| <b>1/09/2023</b>                                                                                                                                                                                                                                                                                                                      |
| <b>Available Attendance Forms:</b>                                                                                                                                                                                                                                                                                                    |
| <b>Yes registration form</b>                                                                                                                                                                                                                                                                                                          |
| <b>Number of Credit Hours (Total) / Number of Units (Total)</b>                                                                                                                                                                                                                                                                       |
| <b>2 hours theory and 3 hours practical</b>                                                                                                                                                                                                                                                                                           |
| <b>Course administrator's name (mention all, if more than one name)</b>                                                                                                                                                                                                                                                               |
| <b>Name: Dr Amna Mohammed Ali</b>                                                                                                                                                                                                                                                                                                     |
| <b>Email: dr.amnaalhashimi@uomustansiriyahi.edu.iq</b>                                                                                                                                                                                                                                                                                |
| <b>Course Objectives</b>                                                                                                                                                                                                                                                                                                              |
| <b>To provide students with a comprehensive understanding of secondary metabolites in microbiology, including their ecological roles, significance in medicine and biotechnology, and the underlying mechanisms of biosynthesis, fostering critical thinking skills and preparing them for research and applications in the field</b> |
| <b>Teaching and Learning Strategies</b>                                                                                                                                                                                                                                                                                               |
| <b>1. Lectures: Delivering structured lectures to introduce key concepts, theories, and examples related to secondary metabolites.</b>                                                                                                                                                                                                |
| <b>2. Laboratory Sessions: Providing hands-on laboratory sessions where students can isolate, identify, and characterize secondary metabolites from microbial cultures</b>                                                                                                                                                            |
| <b>3. Group Discussions: Facilitating group discussions to encourage peer-to-peer learning and</b>                                                                                                                                                                                                                                    |

critical thinking

**4. Research Projects:** Assigning individual or group research projects focused on specific aspects of secondary metabolites, such as biosynthesis pathways, ecological roles, or therapeutic applications

**5. Interactive Online Resources:** Utilizing online platforms, forums, or virtual labs to supplement traditional teaching methods.

#### Course Structure

| Week | Hours | Required Learning Outcomes                                                                                                                                                                                                                                                                                | Unit or subject name                    | Learning method | Evaluation method       |
|------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|-----------------|-------------------------|
| 1.   | 2     | to provide students with a foundational understanding of secondary metabolites in microbiology                                                                                                                                                                                                            | introduction to secondary metabolites   | Lecture         | Daily oral presentation |
| 2.   | 2     | comprehensive understanding of the sources, diversity, methods, and implications of secondary metabolites                                                                                                                                                                                                 | Sources of secondary metabolites        | Lecture         | Daily oral presentation |
| 3.   | 2     | provide students with a comprehensive understanding of the role of secondary metabolites in microbial physiology, ecology, and biotechnology, preparing them for careers in academia, industry, and research institutions, and inspiring further exploration and innovation in the field of microbiology. | Secondary metabolites of microorganisms | Lecture         | Daily oral presentation |
| 4.   | 2     |                                                                                                                                                                                                                                                                                                           | Secondary metabolites production        | Lecture         | Daily oral presentation |
| 5.   | 2     | Production of secondary metabolites methods                                                                                                                                                                                                                                                               | secondary metabolites applications      | Lectures        | Daily oral presentation |
| 6.   | 2     |                                                                                                                                                                                                                                                                                                           |                                         | Lectures        | Daily oral presentation |

|            |          |                                                          |                                                                  |                          |                                |
|------------|----------|----------------------------------------------------------|------------------------------------------------------------------|--------------------------|--------------------------------|
|            |          | <b>Application in different fields</b>                   | <b>plant secondary metabolites</b>                               |                          |                                |
|            |          | <b>Production of secondary metabolites from plants</b>   | <b>Bacterial secondary metabolites</b>                           | <b>lectures</b>          | <b>Daily oral presentation</b> |
| <b>7.</b>  |          | <b>Production of secondary metabolites from bacteria</b> | <b>Assessment</b>                                                | <b>Assessment</b>        | <b>Oral presentation</b>       |
| <b>8.</b>  |          |                                                          | <b>Antibiotic as a secondary metabolites</b>                     | <b>lectures</b>          |                                |
| <b>9.</b>  | <b>2</b> | <b>Assessment</b>                                        | <b>Hormones</b><br><b>Antibiotic as a secondary metabolites</b>  | <b>lectures</b>          | <b>Assessment</b>              |
| <b>10.</b> | <b>2</b> | <b>Role of secondary metabolites as antibiotics</b>      | <b>Factors effect on the production of secondary metabolites</b> | <b>lectures</b>          | <b>presentation</b>            |
| <b>11.</b> | <b>2</b> | <b>Hormones</b>                                          | <b>Second assessment</b>                                         | <b>Second assessment</b> | <b>presentation</b>            |
| <b>12.</b> |          | <b>Factors effect on productions</b>                     | <b>Seminar (for students)</b>                                    |                          | <b>Second assessment</b>       |
|            |          | <b>Second assessment</b>                                 |                                                                  |                          |                                |

#### **Course Evaluation**

**Daily preparation and daily oral 3 grads, monthly written exams 25 grads, reports 3 grades**

#### **Learning and Teaching Resources**

|                                                                           |                                                                                          |
|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| <b>Required textbooks (curricular books, if any)</b>                      | <b>Biotechnology (2005) 2<sup>nd</sup> ed</b>                                            |
| <b>Main references (sources)</b>                                          | <b>R. B harbert(1981). The biosysntehsis of secondary metabolites. 1<sup>st</sup> ed</b> |
| <b>Recommended books and references (scientific journals, reports...)</b> |                                                                                          |
| <b>Electronic References, Websites</b>                                    |                                                                                          |

| Chordata                                                                                                                                                                                                                         |                                   |                            |                      |                  |                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------------------|----------------------|------------------|-------------------------|
|                                                                                                                                                                                                                                  |                                   |                            |                      |                  |                         |
| Course Code:                                                                                                                                                                                                                     |                                   |                            |                      |                  |                         |
|                                                                                                                                                                                                                                  |                                   |                            |                      |                  |                         |
| Semester / Year: 2023- 2024                                                                                                                                                                                                      |                                   |                            |                      |                  |                         |
|                                                                                                                                                                                                                                  |                                   |                            |                      |                  |                         |
| Description Preparation Date: 1/ 9 / 2023                                                                                                                                                                                        |                                   |                            |                      |                  |                         |
|                                                                                                                                                                                                                                  |                                   |                            |                      |                  |                         |
| Available Attendance Forms:apscence paper                                                                                                                                                                                        |                                   |                            |                      |                  |                         |
|                                                                                                                                                                                                                                  |                                   |                            |                      |                  |                         |
| Number of Credit Hours (Total) / Number of Units (Total): 5(2 theoretical +3 practical )                                                                                                                                         |                                   |                            |                      |                  |                         |
|                                                                                                                                                                                                                                  |                                   |                            |                      |                  |                         |
| Course administrator's name (mention all, if more than one name)                                                                                                                                                                 |                                   |                            |                      |                  |                         |
| Name: :Shatha Khydaier abbas                                                                                                                                                                                                     |                                   |                            |                      |                  |                         |
| Email: :Shatha.Kather@yahoo.com                                                                                                                                                                                                  |                                   |                            |                      |                  |                         |
| Course Objectives                                                                                                                                                                                                                |                                   |                            |                      |                  |                         |
| <b>Knowing what Vertebrate</b>                                                                                                                                                                                                   |                                   |                            |                      |                  |                         |
| <b>Study the system of vertebrate and function of organs</b>                                                                                                                                                                     |                                   |                            |                      |                  |                         |
| Teaching and Learning Strategies                                                                                                                                                                                                 |                                   |                            |                      |                  |                         |
| 1:Disccion and dialogue with student                                                                                                                                                                                             |                                   |                            |                      |                  |                         |
| 2:Daily exams                                                                                                                                                                                                                    |                                   |                            |                      |                  |                         |
| 3: Class and extraclass duties                                                                                                                                                                                                   |                                   |                            |                      |                  |                         |
| 4:Activities outside of class                                                                                                                                                                                                    |                                   |                            |                      |                  |                         |
| Course Structure                                                                                                                                                                                                                 |                                   |                            |                      |                  |                         |
| Week                                                                                                                                                                                                                             | Hours                             | Required Learning Outcomes | Unit or subject name | Learning method  | Evaluation method       |
| Once                                                                                                                                                                                                                             | 5<br>3+2                          | Choradata                  | Choradata            | Show and Discuss | Daily and Monthly exams |
| Course Evaluation                                                                                                                                                                                                                |                                   |                            |                      |                  |                         |
| Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, dailyoral, monthly, or written exams, reports .... etc<br>(2 absence + 2 daily exam + 4 activity +20 monthly exams ) |                                   |                            |                      |                  |                         |
| Learning and Teaching Resources                                                                                                                                                                                                  |                                   |                            |                      |                  |                         |
| Required textbooks (curricular books, if any)                                                                                                                                                                                    | Comparative Anatomy of vertebrate |                            |                      |                  |                         |
| Main references (sources)                                                                                                                                                                                                        | Comparative Anatomy of vertebrate |                            |                      |                  |                         |
| Recommended books and references (scientific journals, reports...)                                                                                                                                                               | Chordata                          |                            |                      |                  |                         |
| Electronic References, Websites                                                                                                                                                                                                  | No found                          |                            |                      |                  |                         |
| Course Name: Environmental treatment technology                                                                                                                                                                                  |                                   |                            |                      |                  |                         |
|                                                                                                                                                                                                                                  |                                   |                            |                      |                  |                         |
| Course Code:                                                                                                                                                                                                                     |                                   |                            |                      |                  |                         |
|                                                                                                                                                                                                                                  |                                   |                            |                      |                  |                         |
| Semester / Year: first, 2023 / 2024                                                                                                                                                                                              |                                   |                            |                      |                  |                         |
|                                                                                                                                                                                                                                  |                                   |                            |                      |                  |                         |
| Description Preparation Date:1/9/2023                                                                                                                                                                                            |                                   |                            |                      |                  |                         |
|                                                                                                                                                                                                                                  |                                   |                            |                      |                  |                         |
| Available Attendance Forms: Section: (Biological control ) ; Lecture Room:[ 304] , ;<br>Office No.: (7 )                                                                                                                         |                                   |                            |                      |                  |                         |
|                                                                                                                                                                                                                                  |                                   |                            |                      |                  |                         |
| Number of Credit Hours (Total) / Number of Units (Total): 2hr Theoretical and 3hr Practical                                                                                                                                      |                                   |                            |                      |                  |                         |
|                                                                                                                                                                                                                                  |                                   |                            |                      |                  |                         |

| Course administrator's name (mention all, if more than one name)                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                         |                            |                      |                 |                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|----------------------------|----------------------|-----------------|-------------------|
| Name: 1- Dr. Methak Jasim                      Email: <i>dr.methakjasim1972@gmail.com</i><br>2- Dr. Wafaa Hassan Muslem              wafaahassan2017@uomustansiriyah.edu.iq                                                                                                                                                                                                                                                                                                                                                   |                                         |                            |                      |                 |                   |
| Course Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                         |                            |                      |                 |                   |
| At the end of the Course, students are expected to learn such technologies that play essential role in biodegradation and removed or detoxification contaminates.                                                                                                                                                                                                                                                                                                                                                             |                                         |                            |                      |                 |                   |
| Teaching and Learning Strategies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                         |                            |                      |                 |                   |
| [Biodegradation, bioremediation, phytoremediation, mycoremediation<br>This course provides a comprehensive overview on processes of environmental biotechnology for liquid and solid waste treatment that will help students to obtain fundamental information on biodegradation, bioremediation processes that will expend their biological background.<br>At the end of the Course, students are expected to learn such technologies that play essential role in biodegradation and removed or detoxification contaminates. |                                         |                            |                      |                 |                   |
| Course Structure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                         |                            |                      |                 |                   |
| Week                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Hours                                   | Required Learning Outcomes | Unit or subject name | Learning method | Evaluation method |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Introduction                            |                            |                      |                 |                   |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Environmental Issues                    |                            |                      |                 |                   |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Recent Development                      |                            |                      |                 |                   |
| 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | On Biotreatment Technology              |                            |                      |                 |                   |
| 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Environmental problems                  |                            |                      |                 |                   |
| 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Possible source of contamination        |                            |                      |                 |                   |
| 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Principles of biodegradation&           |                            |                      |                 |                   |
| 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Requirements for Biodegradation         |                            |                      |                 |                   |
| 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Bioremediation                          |                            |                      |                 |                   |
| 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Biodegradation of Herbicide and         |                            |                      |                 |                   |
| 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Pesticide&                              |                            |                      |                 |                   |
| 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Microorganisms used for Bioaugmentation |                            |                      |                 |                   |
| 13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Phytoremediation                        |                            |                      |                 |                   |
| 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Mycoremediation                         |                            |                      |                 |                   |
| 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                         |                            |                      |                 |                   |

| Course Name: Bioseparation                                                                                                                                                              |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------------|
|                                                                                                                                                                                         |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| Course Code: 1                                                                                                                                                                          |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
|                                                                                                                                                                                         |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| Semester / Year:2023-2024                                                                                                                                                               |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
|                                                                                                                                                                                         |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| Description Preparation Date:2024\4\27                                                                                                                                                  |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
|                                                                                                                                                                                         |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| Available Attendance Forms: Recording students names                                                                                                                                    |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
|                                                                                                                                                                                         |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| <b>Number of Credit Hours (Total) / Number of Units (Total):<br/>Five hours a week (two theoretical and three practical)</b>                                                            |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
|                                                                                                                                                                                         |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| Course administrator's name (mention all, if more than one name)                                                                                                                        |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| Name: Dr. Sahira Nsayef Muslim and Dr.Nada Zaki Mahdi                                                                                                                                   |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| Email:: : <a href="mailto:mnt2000ther@gmail.com">mnt2000ther@gmail.com</a> : <a href="mailto:Nada.zeki@yahoo.co.uk">Nada.zeki@yahoo.co.uk</a>                                           |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| Course Objectives                                                                                                                                                                       |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| Extraction and purification of cellular biological products                                                                                                                             |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| Teaching and Learning Strategies                                                                                                                                                        |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| Learn what is the difference between biological and chemical separation.                                                                                                                |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| Knowledge of the most important methods in cell disruption                                                                                                                              |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| Learn how to separate different form of products.                                                                                                                                       |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| Learn the main methods in precipitation of different cell metabolites.                                                                                                                  |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| Learn about column chromatograpy and main types in it                                                                                                                                   |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| Course Structure                                                                                                                                                                        |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| Week                                                                                                                                                                                    | Hours           | Required Learning Outcomes                                  | Unit or subject name                                                                                             | Learning method                                       | Evaluation method                                                |
| 15                                                                                                                                                                                      | 5 hrs in a week | Extraction and purification of cellular biological products | Bioseparation                                                                                                    | Using smart and regular boards and explanatory videos | daily preparation, daily oral, monthly, or written exams,reports |
| Course Evaluation                                                                                                                                                                       |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation(20), daily oral(20), monthly(20), or written exams(20), reports(20) .... etc |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| Learning and Teaching Resources                                                                                                                                                         |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| Required textbooks (curricular books, if any)                                                                                                                                           |                 |                                                             | RAJA GHOSH (2016). Principles Of Bioseparations Engineering World Scientific Publishing Co. Pte. Ltd.            |                                                       |                                                                  |
| Main references (sources)                                                                                                                                                               |                 |                                                             | chapter 10: The recovery and purification of fermentation products                                               |                                                       |                                                                  |
| Recommended books and references (scientific journals, reports...)                                                                                                                      |                 |                                                             | chapter 20: Protein Precipitation Techniques<br>[1]: Principles of Bioseparations Engineering, 2017 (RAIA GHOSH) |                                                       |                                                                  |
| Electronic References, Websites                                                                                                                                                         |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| Course Name: Fermentation technology                                                                                                                                                    |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
|                                                                                                                                                                                         |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| Course Code:                                                                                                                                                                            |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
|                                                                                                                                                                                         |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
| Semester / Year: 2023- 2024                                                                                                                                                             |                 |                                                             |                                                                                                                  |                                                       |                                                                  |
|                                                                                                                                                                                         |                 |                                                             |                                                                                                                  |                                                       |                                                                  |

| Description Preparation Date: 1/ 9 / 2023                                                                                                                                                                                                                   |          |                                                     |                                                                                                                                                             |                  |                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------------|
| Available Attendance Forms:apscence paper                                                                                                                                                                                                                   |          |                                                     |                                                                                                                                                             |                  |                         |
| Number of Credit Hours (Total) / Number of Units (Total): 5(2 theoretical +3 practical )                                                                                                                                                                    |          |                                                     |                                                                                                                                                             |                  |                         |
| Course administrator's name (mention all, if more than one name)                                                                                                                                                                                            |          |                                                     |                                                                                                                                                             |                  |                         |
| Name: :Yusra MB Mohsin                                                                                                                                                                                                                                      |          |                                                     |                                                                                                                                                             |                  |                         |
| Email: :usra_ali75@yahoo.com                                                                                                                                                                                                                                |          |                                                     |                                                                                                                                                             |                  |                         |
| Course Objectives                                                                                                                                                                                                                                           |          |                                                     |                                                                                                                                                             |                  |                         |
| <b>Knowing what fermentation is,types,methods and especially microbial frmentation .</b><br><b>Study the fermenter and its components and the function of each control device</b><br>The role of fermentation in food and chemical industrial with examples |          |                                                     |                                                                                                                                                             |                  |                         |
| Teaching and Learning Strategies                                                                                                                                                                                                                            |          |                                                     |                                                                                                                                                             |                  |                         |
| 1:Discission and dialogue with student<br>2:Daily exams<br>3: Class and extraclass duties<br>4:Activities outside of class                                                                                                                                  |          |                                                     |                                                                                                                                                             |                  |                         |
| Course Structure                                                                                                                                                                                                                                            |          |                                                     |                                                                                                                                                             |                  |                         |
| Week                                                                                                                                                                                                                                                        | Hours    | Required Learning Outcomes                          | Unit or subject name                                                                                                                                        | Learning method  | Evaluation method       |
| Once                                                                                                                                                                                                                                                        | 5<br>3+2 | Knowledge of Fermentation and what is related to it | Fermentation Technology                                                                                                                                     | Show and Discuss | Daily and Monthly exams |
| Course Evaluation                                                                                                                                                                                                                                           |          |                                                     |                                                                                                                                                             |                  |                         |
| Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, dailyoral, monthly, or written exams, reports .... etc<br>(2 absence + 2 daily exam + 4 activity +20 monthly exams )                            |          |                                                     |                                                                                                                                                             |                  |                         |
| Learning and Teaching Resources                                                                                                                                                                                                                             |          |                                                     |                                                                                                                                                             |                  |                         |
| Required textbooks (curricular books, if any)                                                                                                                                                                                                               |          |                                                     | Principles of fermentation technology                                                                                                                       |                  |                         |
| Main references (sources)                                                                                                                                                                                                                                   |          |                                                     | Probiotic                                                                                                                                                   |                  |                         |
| Recommended books and references (scientific journals, reports...)                                                                                                                                                                                          |          |                                                     | Products of fermentation<br>Amino acids fermentation<br>Fermentation culture medium<br>Antibiotic production<br>Single cell protein and vitamine production |                  |                         |
| Electronic References, Websites                                                                                                                                                                                                                             |          |                                                     | No found                                                                                                                                                    |                  |                         |

|                                                                                          |  |
|------------------------------------------------------------------------------------------|--|
| Course Name: Endocrinology                                                               |  |
| Course Code:First                                                                        |  |
| Semester / Year: 2023- 2024                                                              |  |
| Description Preparation Date: 1/ 9 / 2023                                                |  |
| Available Attendance Forms:apscence paper                                                |  |
| Number of Credit Hours (Total) / Number of Units (Total): 5(2 theoretical +3 practical ) |  |

|                                                                                                                                                                                                                                  |              |                                                                                                                                         |                                                                                 |                                                                                                                                                         |                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
|                                                                                                                                                                                                                                  |              |                                                                                                                                         |                                                                                 |                                                                                                                                                         |                          |
| Course administrator's name (mention all, if more than one name)                                                                                                                                                                 |              |                                                                                                                                         |                                                                                 |                                                                                                                                                         |                          |
| Name: : dr luma Qasim ali ass. prof                                                                                                                                                                                              |              |                                                                                                                                         |                                                                                 |                                                                                                                                                         |                          |
| Email: :luma 7878@ uomustansiriyah.edu.iq                                                                                                                                                                                        |              |                                                                                                                                         |                                                                                 |                                                                                                                                                         |                          |
| Course Objectives                                                                                                                                                                                                                |              |                                                                                                                                         |                                                                                 |                                                                                                                                                         |                          |
| <b>Course Objectives</b>                                                                                                                                                                                                         |              |                                                                                                                                         |                                                                                 | At the end of the Course, students are expected to learn what is the endocrine gland and there hormones, the role of hormone in the all body function . |                          |
| Teaching and Learning Strategies                                                                                                                                                                                                 |              |                                                                                                                                         |                                                                                 |                                                                                                                                                         |                          |
| <b>Strategy</b>                                                                                                                                                                                                                  |              | 1:Discission and dialogue with student<br>2:Daily exams<br>3: Class and extraclass duties<br>4:Activities outside of class              |                                                                                 |                                                                                                                                                         |                          |
| Course Structure                                                                                                                                                                                                                 |              |                                                                                                                                         |                                                                                 |                                                                                                                                                         |                          |
| <b>Week</b>                                                                                                                                                                                                                      | <b>Hours</b> | <b>Required Learning Outcomes</b>                                                                                                       | <b>Unit or subject name</b>                                                     | <b>Learning method</b>                                                                                                                                  | <b>Evaluation method</b> |
| Once                                                                                                                                                                                                                             | 5<br><br>2+3 | This subject presents the summary about the endocrine system, what main the hormone, type of hormone, type of gland in endocrine system | endocrinology                                                                   | Show and Discuss                                                                                                                                        | Daily and Monthly exams  |
| Course Evaluation                                                                                                                                                                                                                |              |                                                                                                                                         |                                                                                 |                                                                                                                                                         |                          |
| Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, dailyoral, monthly, or written exams, reports .... etc<br>(2 absence + 2 daily exam + 4 activity +20 monthly exams ) |              |                                                                                                                                         |                                                                                 |                                                                                                                                                         |                          |
| Learning and Teaching Resources                                                                                                                                                                                                  |              |                                                                                                                                         |                                                                                 |                                                                                                                                                         |                          |
| Required textbooks (curricular books, if any)                                                                                                                                                                                    |              |                                                                                                                                         | Endocrinology                                                                   |                                                                                                                                                         |                          |
| Main references (sources)                                                                                                                                                                                                        |              |                                                                                                                                         | Guyton and hall textbook of medical physiology                                  |                                                                                                                                                         |                          |
| Recommended books and references (scientific journals, reports...)                                                                                                                                                               |              |                                                                                                                                         | Textbook of medical physiology<br>Guyton and hall textbook of medical physiolog |                                                                                                                                                         |                          |
| Electronic References, Websites                                                                                                                                                                                                  |              |                                                                                                                                         | No found                                                                        |                                                                                                                                                         |                          |
| Course Name:                                                                                                                                                                                                                     |              |                                                                                                                                         |                                                                                 |                                                                                                                                                         |                          |
| Diagnosis of pathogenic bacteria                                                                                                                                                                                                 |              |                                                                                                                                         |                                                                                 |                                                                                                                                                         |                          |
| Course Code:                                                                                                                                                                                                                     |              |                                                                                                                                         |                                                                                 |                                                                                                                                                         |                          |
|                                                                                                                                                                                                                                  |              |                                                                                                                                         |                                                                                 |                                                                                                                                                         |                          |
| Semester / Year:                                                                                                                                                                                                                 |              |                                                                                                                                         |                                                                                 |                                                                                                                                                         |                          |
| Second semester / 2023-2024                                                                                                                                                                                                      |              |                                                                                                                                         |                                                                                 |                                                                                                                                                         |                          |

| Description Preparation Date:                                                                                                                                                                                                                                                                                                                                                   |       |                            |                                                           |                 |                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------|-----------------------------------------------------------|-----------------|----------------------------------------|
| 17/4/2024                                                                                                                                                                                                                                                                                                                                                                       |       |                            |                                                           |                 |                                        |
| Available Attendance Forms:                                                                                                                                                                                                                                                                                                                                                     |       |                            |                                                           |                 |                                        |
| Number of Credit Hours (Total) / Number of Units (Total)                                                                                                                                                                                                                                                                                                                        |       |                            |                                                           |                 |                                        |
| 2 theoretical hours and 3 practical hours per week.                                                                                                                                                                                                                                                                                                                             |       |                            |                                                           |                 |                                        |
| Course administrator's name (mention all, if more than one name)                                                                                                                                                                                                                                                                                                                |       |                            |                                                           |                 |                                        |
| Name: Prof. Dr. Ali Hayder Abdulhadi<br>Prof. Dr. Sadeq Abdulridha Gatea<br>Email: sadeqkaabi@uomustansiriyah.edu.iq                                                                                                                                                                                                                                                            |       |                            |                                                           |                 |                                        |
| Course Objectives                                                                                                                                                                                                                                                                                                                                                               |       |                            |                                                           |                 |                                        |
| <ul style="list-style-type: none"> <li>- Learning method of taking specimens for diagnosis of human bacterial infections.</li> <li>- Learning method for processing the clinical specimens for diagnosis of bacterial infections</li> <li>- Learning diagnosis of pathogenic bacteria morphologically by cultural, morphological, biochemical and molecular methods.</li> </ul> |       |                            |                                                           |                 |                                        |
| Teaching and Learning Strategies                                                                                                                                                                                                                                                                                                                                                |       |                            |                                                           |                 |                                        |
| <ul style="list-style-type: none"> <li>- Theoretical and practical lectures.</li> <li>- Short examination (quizzes) in each lecture.</li> <li>- Mid-term and final examinations.</li> <li>- Open discussion in the topics of each lecture.</li> </ul>                                                                                                                           |       |                            |                                                           |                 |                                        |
| Course Structure                                                                                                                                                                                                                                                                                                                                                                |       |                            |                                                           |                 |                                        |
| Week                                                                                                                                                                                                                                                                                                                                                                            | Hours | Required Learning Outcomes | Unit or subject name                                      | Learning method | Evaluation method                      |
| 1                                                                                                                                                                                                                                                                                                                                                                               | 2     | Learning theoretical bases | Diagnosis of respiratory tract pathogenic bacteria-1      | Theoretical     | Daily, mid-term and final examinations |
| 2                                                                                                                                                                                                                                                                                                                                                                               | 2     | Learning theoretical bases | Diagnosis of respiratory tract pathogenic bacteria-2      | Theoretical     | Daily, mid-term and final examinations |
| 3                                                                                                                                                                                                                                                                                                                                                                               | 2     | Learning theoretical bases | Diagnosis of urinary tract pathogenic bacteria-1          | Theoretical     | Daily, mid-term and final examinations |
| 4                                                                                                                                                                                                                                                                                                                                                                               | 2     | Learning theoretical bases | Diagnosis of urinary tract pathogenic bacteria-2          | Theoretical     | Daily, mid-term and final examinations |
| 5                                                                                                                                                                                                                                                                                                                                                                               | 2     | Learning theoretical bases | Diagnosis of gastrointestinal tract pathogenic bacteria-1 | Theoretical     | Daily, mid-term and final examinations |
| 6                                                                                                                                                                                                                                                                                                                                                                               | 2     | Learning theoretical bases | Diagnosis of gastrointestinal tract pathogenic bacteria-2 | Theoretical     | Daily, mid-term and final examinations |
| 7                                                                                                                                                                                                                                                                                                                                                                               | 2     | Learning theoretical bases | Diagnosis of bacterial pathogens in CSF-1                 | Theoretical     | Daily, mid-term and final examinations |
| 8                                                                                                                                                                                                                                                                                                                                                                               | 2     | Learning theoretical bases | Diagnosis of bacterial pathogens in CSF-2                 | Theoretical     | Daily, mid-term and final examinations |
| 9                                                                                                                                                                                                                                                                                                                                                                               | 2     | Learning                   | Diagnosis of bacterial                                    | Theoretical     | Daily, mid-term                        |

|    |   |                            |                                                                       |             |                                        |
|----|---|----------------------------|-----------------------------------------------------------------------|-------------|----------------------------------------|
|    |   | theoretical bases          | pathogens in sputum-1                                                 |             | and final examinations                 |
| 10 | 2 | Learning theoretical bases | Diagnosis of bacterial pathogens in sputum-2                          | Theoretical | Daily, mid-term and final examinations |
| 11 | 2 | Learning theoretical bases | Diagnosis of bacterial pathogens in upper respiratory tract-1         | Theoretical | Daily, mid-term and final examinations |
| 12 | 2 | Learning theoretical bases | Diagnosis of bacterial pathogens in upper respiratory tract-2         | Theoretical | Daily, mid-term and final examinations |
| 1  | 3 | Learning practical bases   | Pathogenic bacteria and biosafety.                                    | Practical   | Daily, mid-term and final examinations |
| 2  | 3 | Learning practical Bases   | Cultural media and biochemical tests used for Gram-positive bacteria. | Practical   | Daily, mid-term and final examinations |
| 3  | 3 | Learning practical Bases   | Cultural media and biochemical tests used for Gram-negative bacteria. | Practical   | Daily, mid-term and final examinations |
| 4  | 3 | Learning practical Bases   | Urinary tract infections and their causative agents.                  | Practical   | Daily, mid-term and final examinations |
| 5  | 3 | Learning practical Bases   | Gastrointestinal tract infections and their causative agents.         | Practical   | Daily, mid-term and final examinations |
| 6  | 3 | Learning practical Bases   | Respiratory tract infections and their causative agents.              | Practical   | Daily, mid-term and final examinations |
| 7  | 3 | Learning practical bases   | Blood Culture and related infections.                                 | Practical   | Daily, mid-term and final examinations |

#### Course Evaluation

Daily , mid-term and final examinations.

#### Learning and Teaching Resources

Required textbooks (curricular books, if any)

**Jawetz, Melnick, & Adelberg's Medical Microbiology, 28e**

Main references (sources)

Recommended books and references (scientific journals, reports...)

Electronic References, Websites

Course Name: medical Virology

Course Code:

Semester / Year: 2<sup>nd</sup> semester\ 2023-2024

| Description Preparation Date: 22\4\2024                                                                                                                                                              |       |                            |                                                 |                 |                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------|-------------------------------------------------|-----------------|-------------------|
| Available Attendance Forms: 3 <sup>rd</sup> stage students\ biotechnology                                                                                                                            |       |                            |                                                 |                 |                   |
| Number of Credit Hours (Total) / Number of Units (Total): tow units\week                                                                                                                             |       |                            |                                                 |                 |                   |
| Course administrator's name (mention all, if more than one name)                                                                                                                                     |       |                            |                                                 |                 |                   |
| Name: Dr. Abbas Arrak                                                                                                                                                                                |       |                            |                                                 |                 |                   |
| Email:dr.abbas65@uomustansiriyah.edu.iq                                                                                                                                                              |       |                            |                                                 |                 |                   |
| Course Objectives                                                                                                                                                                                    |       |                            |                                                 |                 |                   |
| <b>.....learning the important human pathogenic viruses</b><br><b>.....learning the routes of their transmission and epidemiology</b><br><b>.....learning their diagnosis, treatment and control</b> |       |                            |                                                 |                 |                   |
| Teaching and Learning Strategies                                                                                                                                                                     |       |                            |                                                 |                 |                   |
| Course Structure                                                                                                                                                                                     |       |                            |                                                 |                 |                   |
| Week                                                                                                                                                                                                 | Hours | Required Learning Outcomes | Unit or subject name                            | Learning method | Evaluation method |
| 1                                                                                                                                                                                                    | 2     |                            | Introduction to pathogenic viruses              | Theoretical     |                   |
| 2                                                                                                                                                                                                    | 2     |                            | Pathogenesis                                    | Theoretical     |                   |
| 3                                                                                                                                                                                                    | 2     |                            | Immunology to viruses                           | =               |                   |
| 4                                                                                                                                                                                                    | 2     |                            | Nonenveloped DNA                                | =               |                   |
| 5                                                                                                                                                                                                    | 2     |                            | viruses                                         | =               |                   |
| 6                                                                                                                                                                                                    | 2     |                            | Enveloped DNA                                   | =               |                   |
| 7                                                                                                                                                                                                    | 2     |                            | viruses                                         | =               |                   |
| 8                                                                                                                                                                                                    | 2     |                            | 1 <sup>st</sup> exam                            | =               |                   |
| 9                                                                                                                                                                                                    | 2     |                            | Segmented RNA                                   | =               |                   |
| 10                                                                                                                                                                                                   | 2     |                            | viruses                                         | =               |                   |
| 11                                                                                                                                                                                                   |       |                            | Nonsegmented RNA                                |                 |                   |
|                                                                                                                                                                                                      |       |                            | Hepatitis viruses                               |                 |                   |
|                                                                                                                                                                                                      |       |                            | Human immunodeficeincy viruses                  |                 |                   |
|                                                                                                                                                                                                      |       |                            | Corona viruses                                  |                 |                   |
|                                                                                                                                                                                                      |       |                            | 2 <sup>nd</sup> exam                            |                 |                   |
| Course Evaluation                                                                                                                                                                                    |       |                            |                                                 |                 |                   |
| Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc                                  |       |                            |                                                 |                 |                   |
| Learning and Teaching Resources                                                                                                                                                                      |       |                            |                                                 |                 |                   |
| Required textbooks (curricular books, if any)                                                                                                                                                        |       |                            | Desc encyclopedia of human and medical virology |                 |                   |
| Main references (sources)                                                                                                                                                                            |       |                            | Fields virology 6 <sup>th</sup> ed              |                 |                   |
| Recommended books and references (scientific journals, reports...)                                                                                                                                   |       |                            |                                                 |                 |                   |
| Electronic References, Websites                                                                                                                                                                      |       |                            |                                                 |                 |                   |

| Course Name: medical mycology                                                                          |       |                                                                         |                      |                 |                   |
|--------------------------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------|----------------------|-----------------|-------------------|
| Course Code:                                                                                           |       |                                                                         |                      |                 |                   |
| Semester / Year: 2023-2024                                                                             |       |                                                                         |                      |                 |                   |
| Description Preparation Date:1\9\2023                                                                  |       |                                                                         |                      |                 |                   |
| Available Attendance Forms:                                                                            |       |                                                                         |                      |                 |                   |
| Number of Credit Hours (Total) / Number of Units (Total)                                               |       |                                                                         |                      |                 |                   |
| 5 hours ( 2 theory and 3 hours practical)                                                              |       |                                                                         |                      |                 |                   |
| 5 hours (2 theory 3 h practical ) 5                                                                    |       |                                                                         |                      |                 |                   |
| Course administrator's name (mention all, if more than one name)                                       |       |                                                                         |                      |                 |                   |
| <a href="mailto:hamzia@uomustansiriyah.edu.iq">hamzia@uomustansiriyah.edu.iq</a> Dr. Hamzia Ali Ajah   |       |                                                                         |                      |                 |                   |
| Course Objectives                                                                                      |       |                                                                         |                      |                 |                   |
| 1- study the medical mycology that causes human infection .                                            |       |                                                                         |                      |                 |                   |
| 2- 2Clinical Manifestations, etiological agent                                                         |       |                                                                         |                      |                 |                   |
| 3- how to diagnose these infection and antibiotic sensitivity of these microbes.                       |       |                                                                         |                      |                 |                   |
| Teaching and Learning Strategies                                                                       |       |                                                                         |                      |                 |                   |
| Theoretical education                                                                                  |       |                                                                         |                      |                 |                   |
| Practical education: Using visual teaching materials ,such as shapes, educational slides, and diagrams |       |                                                                         |                      |                 |                   |
| Course Structure                                                                                       |       |                                                                         |                      |                 |                   |
| Week                                                                                                   | Hours | Required Learning Outcomes                                              | Unit or subject name | Learning method | Evaluation method |
| 1                                                                                                      |       | Introduction to medical mycology and Antifungal drugs                   |                      |                 |                   |
| 2                                                                                                      |       | Method of diagnoses of fungi ,Classification of diseases cause by fungi |                      |                 |                   |
| 3                                                                                                      |       | Superficial mycoses, part one                                           |                      |                 |                   |
| 4                                                                                                      |       | Superficial mycoses, part two                                           |                      |                 |                   |
| 5                                                                                                      |       | Cutaneous mycoses, part one                                             |                      |                 |                   |
| 6                                                                                                      |       | Cutaneous mycoses, part two                                             |                      |                 |                   |
| 7                                                                                                      |       | Subcutaneous mycoses. Chromoblastomycosis, Lobomycosis, Mycetoma        |                      |                 |                   |
| 8                                                                                                      |       | Subcutaneous mycoses .Phaeohyphomycosis, Sporotrichosis, Zygomycosis    |                      |                 |                   |
| 9                                                                                                      |       | Dimorphic Systemic Mycoses , Histoplasmosis , Blastomycosis             |                      |                 |                   |
| 10                                                                                                     |       | Dimorphic Systemic Mycoses , Coccidioidomycosis, Paracoccidioidomycosis |                      |                 |                   |
| 11                                                                                                     |       | Systemic mycoses due to                                                 |                      |                 |                   |

|           |  |                                                                                      |  |  |  |
|-----------|--|--------------------------------------------------------------------------------------|--|--|--|
|           |  | <b>opportunistic pathogens.Candidiasis</b>                                           |  |  |  |
| <b>12</b> |  | <b>Systemic mycoses due to opportunistic pathogens.Cryptococosis</b>                 |  |  |  |
| <b>13</b> |  | <b>Systemic mycoses due to opportunistic pathogens.Aspergillosis, pneumosistosis</b> |  |  |  |
| <b>14</b> |  | <b>Mycotoxin</b>                                                                     |  |  |  |

#### Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

#### Learning and Teaching Resources

|                                                                    |                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Required textbooks<br>(curricular books, if any)                   | Fundamental medical mycology, Errol Reiss, H. Jean Shadomy, and G. Marshall Lyon, III :Wiley-Blackwell, Hoboken, NJ,USA, 2011<br>2-Fundamental medical mycology, Errol Reiss, H. Jean Shadomy, and G. Marshall Lyon, III :Wiley-Blackwell, Hoboken, NJ,USA, 2011<br>3-Textbook of medical mycology ,By: Dr.hamzia Ali Ajah ,2018 |
| Main references (sources)                                          |                                                                                                                                                                                                                                                                                                                                  |
| Recommended books and references (scientific journals, reports...) |                                                                                                                                                                                                                                                                                                                                  |
| Electronic References, Websites                                    |                                                                                                                                                                                                                                                                                                                                  |

Course Name : **Water and sewage Microbiology**

Course Code:

Semester / Year: 1<sup>st</sup> semester 2023/2024

Description Preparation Date: 1/9 /2023

Available Attendance Forms: paper form

Number of Credit Hours (Total) / Number of Units (Total)

Number of Credit Hours (5) / 2hr Theoretical and 3hr Practical

Course administrator's name (mention all, if more than one name)

Name: Dr. Amel Hussaein Mussa ,Email: [dr.amel.h.m@uomustansiriyah.edu.iq](mailto:dr.amel.h.m@uomustansiriyah.edu.iq)

Dr. Dr, Hala Abed AL Hafez E.mail [hahlrose70@uomustansiriyah.edu.iq](mailto:hahlrose70@uomustansiriyah.edu.iq)

Dr. Aqeel Mohamed Majeed Email [aqeelbio1976@uomustansiriyah.edu.iq](mailto:aqeelbio1976@uomustansiriyah.edu.iq)

Course Objectives

Distinguish major groups of microbial organisms. Gain a basic understanding of the current methodologies used for surveying water and sewage microbial diversity.

3) Understand the environmental factors influencing microbial distribution and abundance.

4) Describe intra-specific interactions of microbes as well as inter-specific relationships with other organismal groups. 5) important microbial roles in elemental cycling and transformation, with a particular focus on carbon, nitrogen, and phosphorus cycling.

6) Obtain, read, understand, and critically evaluate primary literature on diverse topics related to water Microbiology. 7) Develop and practice advanced skills in oral and written communication.....

#### Teaching and Learning Strategies

1- Delivering and listening style.

2. Educational videos

3-Discussion and dialogue style

4-Student class contributions .

#### Course Structure

| Week | Hours | Required Learning Outcomes                                                                                        | Unit or subject name                                       | Learning method                                                                                                               | Evaluation method                           |
|------|-------|-------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| 1    | 5     | A good mix of practical and theoretical information about soil microorganisms and their, role in soil processes . | Enf fundamentals: the water habitat                        | 1-Delivering and listening style<br>2- Educational videos<br>3-Discussion and dialogue style<br>4-Student class contributions | Class-discussions<br>Homework<br>Attendance |
| 2    |       |                                                                                                                   | Fundamental factors effecting on microorganisms in aquatec |                                                                                                                               |                                             |
| 3    |       |                                                                                                                   | Water organisms :Bacteria and archaea                      |                                                                                                                               |                                             |
| 4    |       |                                                                                                                   | Fungi<br>Cyanobacteria                                     |                                                                                                                               |                                             |
| 5    |       |                                                                                                                   | Algae<br>,Nematodes                                        |                                                                                                                               |                                             |
| 6    |       |                                                                                                                   | Describe– water borne disease                              |                                                                                                                               |                                             |
| 7    |       |                                                                                                                   | Midterm exam                                               |                                                                                                                               |                                             |
| 8    |       |                                                                                                                   | Water purification                                         |                                                                                                                               |                                             |
| 9    |       |                                                                                                                   | Sewage treatment                                           |                                                                                                                               |                                             |
| 10   |       |                                                                                                                   | Dissolved removing                                         |                                                                                                                               |                                             |

|           |  |  |                                   |  |  |
|-----------|--|--|-----------------------------------|--|--|
| <b>11</b> |  |  | disinfection                      |  |  |
| <b>12</b> |  |  | M.O in sewage                     |  |  |
| <b>13</b> |  |  | Biological methods in treatments  |  |  |
| <b>14</b> |  |  | Review and class discussion       |  |  |
| <b>15</b> |  |  | Exam                              |  |  |
| <b>16</b> |  |  | Fundamentals: the aquatic habitat |  |  |

#### Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

First monthly theoretical exam =12%

The second theoretical exam =12%

Attendance =2%

Activities (homework + discussion) =2%

First practical exam =5%

Second practical exam =5%

Activities =2%

Final theoretical =42%

Final practical =18%

Total = 100%

#### Learning and Teaching Resources

|                                                                    |                                                                                                                                                                              |
|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Required textbooks (curricular books, if any)                      | Environmental microbiology 2nd .ed. (2016)<br>Raina M. Maier, Ian L. Pepper and Charles P. Gerba (2000). Academic Press.                                                     |
| Main references (sources)                                          | 1. Water microbiology 8ed. ed by Derhum p. wall. 2022.<br>www.books .Elsevier .com<br>.2 Foundation in microbiology .9th .ed. Kathleen Talaro and Barrey Chess. Mc Graw Hill |
| Recommended books and references (scientific journals, reports...) | .Principles and Applications of Aquatic Microbiology . Book • Third Edition • 2019. Edited by:<br>Deworken , y. meshel, rechar J. welleam and rase A. dawed                  |
| Electronic References, Websites                                    | <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5610682/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5610682/</a>                                                    |

Course Name: Industrial Microbiology

Course Code:

Semester / Year:2023-2024

Description Preparation Date:1/3/2024

Available Attendance Forms: Paper Forms

Number of Credit Hours (Total) / Number of Units (Total)

| Number of Credit Hours (5) / 2hr Theoretical and 3hr Practical                                                                                                                                                                                                                                                      |       |                                                                                                                       |                                                                                            |                                                                           |                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------|
| Course administrator's name (mention all, if more than one name)<br>Dr.Jehan Abdul Sattar Salman.<br>dr.jehan@uomustansiriyah.edu.iq<br>Dr. Sawsan Hassan.<br>dr.sawsanh@uomustansiriyah.edu.iq<br>Dr. Nihad Abid Taher.<br>stnu@uomustansiriyah.edu.iq<br>Dr.Aqeel Mohammed<br>aqeelbio1976@uomustansiriyah.edu.iq |       |                                                                                                                       |                                                                                            |                                                                           |                   |
| Name:                                                                                                                                                                                                                                                                                                               |       |                                                                                                                       |                                                                                            |                                                                           |                   |
| Email:                                                                                                                                                                                                                                                                                                              |       |                                                                                                                       |                                                                                            |                                                                           |                   |
| Course Objectives                                                                                                                                                                                                                                                                                                   |       |                                                                                                                       |                                                                                            |                                                                           |                   |
| <b>Detection of important industrial microorganisms in food,pharmaceutical and industrial application</b><br><b>Understand the working of a fermentation system .</b><br><b>Detection of high yield producers</b>                                                                                                   |       |                                                                                                                       |                                                                                            |                                                                           |                   |
| Teaching and Learning Strategies                                                                                                                                                                                                                                                                                    |       |                                                                                                                       |                                                                                            |                                                                           |                   |
| 1. Delivering and listening style<br>2. Educational videos<br>3.Discussion and dialogue style<br>4.Student class contribution                                                                                                                                                                                       |       |                                                                                                                       |                                                                                            |                                                                           |                   |
| Course Structure                                                                                                                                                                                                                                                                                                    |       |                                                                                                                       |                                                                                            |                                                                           |                   |
| Week                                                                                                                                                                                                                                                                                                                | Hours | Required Learning Outcomes                                                                                            | Unit or subject name                                                                       | Learning method                                                           | Evaluation method |
| 1                                                                                                                                                                                                                                                                                                                   | 1.5 h | Students are provided with understanding and knowledge on the value of microbes in life rather than as disease gents. | Introduction, historical background, choosing microorganisms for industrial microbiology,m | Theoretical<br>Paper Exam<br>Class- discussions<br>Homework<br>Attendance |                   |
| 2                                                                                                                                                                                                                                                                                                                   |       | 2                                                                                                                     | ajor microbial products                                                                    |                                                                           |                   |
| 3                                                                                                                                                                                                                                                                                                                   |       | Appreciate the use of microorganisms for the production of value added commodities                                    | &processes of interest in industrial microbiology                                          |                                                                           |                   |
| 4                                                                                                                                                                                                                                                                                                                   |       | 3                                                                                                                     | Screening of industrial M.O. ,                                                             |                                                                           |                   |
| 5                                                                                                                                                                                                                                                                                                                   |       | Understand the working of a fermentation system.                                                                      | general techniques of M.O.selection,P                                                      |                                                                           |                   |
| 6                                                                                                                                                                                                                                                                                                                   |       |                                                                                                                       | resevation of industrial M.O.                                                              |                                                                           |                   |
| 7                                                                                                                                                                                                                                                                                                                   |       | Practical<br>-Paper exam<br>-Conducting                                                                               | The basic nutrient requirement of                                                          |                                                                           |                   |

|    |     |                       |                                                                                |  |  |
|----|-----|-----------------------|--------------------------------------------------------------------------------|--|--|
| 8  |     | practical experiments | industrial media,primary and secondary metabolites                             |  |  |
| 9  |     | -Finding the unknown  |                                                                                |  |  |
| 10 |     | -Writing the report   | Anaerobic fermentation ,Ethanol productio                                      |  |  |
| 11 |     |                       |                                                                                |  |  |
| 12 |     |                       |                                                                                |  |  |
| 13 |     |                       |                                                                                |  |  |
| 14 |     |                       | Lactic acid fermentation , lactic acid production ,probiotic ,dairy production |  |  |
| 15 |     |                       |                                                                                |  |  |
| 1  | 3h. |                       |                                                                                |  |  |
| 2  |     |                       |                                                                                |  |  |
| 3  |     |                       | Arobic fermentation ,cirtic acid production                                    |  |  |
| 4  |     |                       |                                                                                |  |  |
| 5  |     |                       |                                                                                |  |  |
| 6  |     |                       | Exam                                                                           |  |  |
| 7  |     |                       |                                                                                |  |  |
| 8  |     |                       | Acetic acid production                                                         |  |  |
| 9  |     |                       |                                                                                |  |  |
| 10 |     |                       | Bread fermentation & Baker's yeast production , Biomass product                |  |  |
| 11 |     |                       |                                                                                |  |  |
| 12 |     |                       |                                                                                |  |  |
| 13 |     |                       | Single cell protein ,single cell lipids                                        |  |  |
| 14 |     |                       | Antibiotics production                                                         |  |  |
| 15 |     |                       | Vitamins production Aminoacids production                                      |  |  |
|    |     |                       | Exam                                                                           |  |  |

|  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |  |
|--|--|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
|  |  |  | <b>Laboratory rules &amp; introduction</b><br>Isolation of industrial microorganisms<br><br>Identification of industrial microorganisms<br><br>Ethanol production<br>Ethanol production<br>Ethanol production ,saurkraut production<br>Exam<br><br>Finishing ethsanol production , acetic acid production<br><br>Acetic acid production<br>Acetic acid production , preparation of plain and probiotics yogurt<br><br>Activities &viability of baker's yeast,detection of amylase<br>Antibiotics production<br>Enzymes production<br>Exam |  |  |
|--|--|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|

#### Course Evaluation

First monthly theoretical exam =12%,

The second theoretical exam =12%

The second theoretical exam =12% The second theoretical exam =12%

Attendance =2%,

Activities (homework + discussion) =2%,

First practical exam =5%,

Second practical exam =5%,Activities =2%,

Final theoretical =42%

Final practical =18%,

Total = 100%

First monthly theoretical exam =12% Activities (homework + discussion) =2%

The second theoretical exam =12%

Attendance =2%

Activities (homework + discussion) =2%

First practical exam =5%

Second practical exam =5%

Activities =2%

Final theoretical =42%

Final practical =18%

First monthly theoretical exam =12%

The second theoretical exam =12%

Attendance =2%

Activities (homework + discussion) =2%

First practical exam =5%

Second practical exam =5%

Activities =2%

Final theoretical =42%

Final prac

First monthly theoretical exam =12%

The second theoretical exam =12% First monthly theoretical exam =12%

The second theoretical exam =12%

Attendance =2%

Activities (homework + discussion) =2%

First practical exam =5%

Second practical exam =5%

Activities =2%

Final theoretical =42%

Final practical =18%

Total = 100%

Attendance =2% First monthly theoretical exam =12%

The second theoretical exam =12%

Attendance =2%

Activities (homework + discussion) =2%

First practical exam =5%

Second practical exam =5%

Activities =2%

Final theoretical =42%

Final practical =18%

Total = 100%

|                                                                                                                                                                                     |                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Activities (homework + discussion) =2%<br>First practical exam =5%<br>Second practical exam =5%<br>Activities =2%<br>Final theoretical =42%<br>Final practical =18%<br>Total = 100% |                                                                                                                                                                                                                                       |
| <b>Learning and Teaching Resources</b>                                                                                                                                              |                                                                                                                                                                                                                                       |
| Required textbooks (curricular books, if any)                                                                                                                                       | Waites, M.J.; Morgan, N.L. and Highton, G.(2013). Industrial microbiology: An introduction. 1 <sup>st</sup> .ed. Blackwell Science Ltd<br>Farnworth,E.R.(2008). Handbook Fermented functional foods. Taylor & Francis Group, LLC      |
| Main references (sources)                                                                                                                                                           | PRACTICAL MANUAL CUM WORKBOOK on INDUSTRIAL MICROBIOLOGY                                                                                                                                                                              |
| Recommended books and references (scientific journals, reports...)                                                                                                                  | BIOTECHNOLOGY PROCEDURES<br>AEXPERIMENTS HANDBOOK                                                                                                                                                                                     |
| Electronic References, Websites                                                                                                                                                     | <a href="https://www.researchgate.net/publication/344465390_PRACTICAL_MANUAL_CUM_WORKBOOK_on_INDUSTRIAL_MICROBIOLOGY">https://www.researchgate.net/publication/344465390_PRACTICAL_MANUAL_CUM_WORKBOOK_on_INDUSTRIAL_MICROBIOLOGY</a> |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Course Name: Immunology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Course Code:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Semester / Year: 2023-2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Description Preparation Date:1/9/ 2023                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Available Attendance Forms:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Number of Credit Hours (Total) / Number of Units 5 hours ( 2 theory and 3 hours practical)<br>5 hours (2 theory 3 h practical ) 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Course administrator's name (mention all, if more than one name)<br>Name: Prof. Dr. Ekhlass Noori Ali,assistant prof.Dr.Haidar J Muhammed, Assistant prof. Dr.Rawaa AbdulameerAbduljabbar andMohanad A.k.<br>Emile: <a href="mailto:ekhlassnoori@yahoo.com">ekhlassnoori@yahoo.com</a><br><a href="mailto:stkn@uomustansiriyah.edu.iq">stkn@uomustansiriyah.edu.iq</a> , <a href="mailto:rawaattar@uomustansiriyah.edu.iq">rawaattar@uomustansiriyah.edu.iq</a> , <a href="mailto:sthg@uomustansiriyah.edu.iq">sthg@uomustansiriyah.edu.iq</a><br><a href="mailto:mohanadbio77@uomustansiriyah.edu">mohanadbio77@uomustansiriyah.edu</a> |
| Course Objectives<br>1- Knowing the human body barriers against pathogens<br>Knowing the importance of receptors in immune response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Teaching and Learning Strategies<br>. Knowing the human body barriers against pathogens<br>Knowing the importance of receptors in immune response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

| Knowing some immunological test used for diagnosis from infectious disease                                                                                          |       |                            |                                                                                                                                               |                 |                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------|
| Course Structure                                                                                                                                                    |       |                            |                                                                                                                                               |                 |                   |
| Week                                                                                                                                                                | Hours | Required Learning Outcomes | Unit or subject name                                                                                                                          | Learning method | Evaluation method |
| 1                                                                                                                                                                   |       |                            | <b>ntroduction of immunotechnology and immunoelectrophoresis</b>                                                                              |                 | <b>1</b>          |
| 2                                                                                                                                                                   |       |                            | Organs and cells of the immune system                                                                                                         |                 | <b>2</b>          |
| 3                                                                                                                                                                   |       |                            | Inflammation Response. Phagocytosis                                                                                                           |                 | <b>3</b>          |
| 4                                                                                                                                                                   |       |                            | Antibody(structure and theory of production                                                                                                   |                 | <b>4</b>          |
| 5                                                                                                                                                                   |       |                            | <b>Exam</b>                                                                                                                                   |                 | <b>5</b>          |
| 6                                                                                                                                                                   |       |                            | Major Histocompatibility complex (MHC                                                                                                         |                 | <b>6</b>          |
| 7                                                                                                                                                                   |       |                            | Antigen presenting cells (APCs                                                                                                                |                 | <b>7</b>          |
| 8                                                                                                                                                                   |       |                            | Regulation of the humeral immune response., Cell Mediated Immunity( Type of the T-cell, Type of the B cells). Macrophage Activation           |                 | <b>8</b>          |
| 9                                                                                                                                                                   |       |                            | Type of Cell mediated immunity                                                                                                                |                 | <b>9</b>          |
| 10                                                                                                                                                                  |       |                            | <b>Exam</b>                                                                                                                                   |                 | <b>10</b>         |
| 11                                                                                                                                                                  |       |                            | Antigens ( Origin of antigen, type of antigen, Antigenic determinant ). Epitope, Hatpin,                                                      |                 | <b>11</b>         |
| 12                                                                                                                                                                  |       |                            | Hypersensitivity.                                                                                                                             |                 | <b>12</b>         |
| 13                                                                                                                                                                  |       |                            | <b>Complement component</b>                                                                                                                   |                 | <b>13</b>         |
| 14                                                                                                                                                                  |       |                            | Immune tolerance                                                                                                                              |                 | <b>14</b>         |
| 15                                                                                                                                                                  |       |                            | <b>Immunological test</b>                                                                                                                     |                 | <b>15</b>         |
| Course Evaluation                                                                                                                                                   |       |                            |                                                                                                                                               |                 |                   |
| Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc |       |                            |                                                                                                                                               |                 |                   |
| Learning and Teaching Resources                                                                                                                                     |       |                            |                                                                                                                                               |                 |                   |
| <b>Miller,L.E and Stevens,C.D (2021) Clinical Immunology and Serology Alaboratory prespective.5<sup>th</sup> ed. F.A. DAVIS Philadelphia.</b>                       |       |                            | <b>Miller,L.E and Stevens,C.D (2021) Clinical Immunology and Serology Alaboratory prespective.5<sup>th</sup> ed. F.A. DAVIS Philadelphia.</b> |                 |                   |

|                                                                    |                                                                                                                                                                                   |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Recommended books and references (scientific journals, reports...) |                                                                                                                                                                                   |
| Electronic References, Websites                                    | <a href="https://www.immunology.org/public-information/what-immunology/ns/immunotechnology">https://www.immunology.org/public-information/what-immunology/ns/immunotechnology</a> |

| Course Name: Nanotechnology                                                                                                                                                                                                                                                          |       |                            |                                                     |                 |                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------|-----------------------------------------------------|-----------------|-------------------|
| Course Code:                                                                                                                                                                                                                                                                         |       |                            |                                                     |                 |                   |
| Semester / Year: Second semester/ 2023-2024                                                                                                                                                                                                                                          |       |                            |                                                     |                 |                   |
| Description Preparation Date: 14-4-2024                                                                                                                                                                                                                                              |       |                            |                                                     |                 |                   |
| Available Attendance Forms:                                                                                                                                                                                                                                                          |       |                            |                                                     |                 |                   |
| Number of Credit Hours (Total) / Number of Units (Total): 8 hours weakly                                                                                                                                                                                                             |       |                            |                                                     |                 |                   |
| 2 theoretical- 6 practical in a weak                                                                                                                                                                                                                                                 |       |                            |                                                     |                 |                   |
| Course administrator's name (mention all, if more than one name)                                                                                                                                                                                                                     |       |                            |                                                     |                 |                   |
| Name: Prof. Dr. Neihaya Heikmat Zaki                                                                                                                                                                                                                                                 |       |                            |                                                     |                 |                   |
| Email: <a href="mailto:dr.neihayahz@uomustansiriyah.edu.iq">dr.neihayahz@uomustansiriyah.edu.iq</a>                                                                                                                                                                                  |       |                            |                                                     |                 |                   |
| Dr. Afraa Ali, Dr. Shimaa Nagaimish, Dr. Thann Noor.                                                                                                                                                                                                                                 |       |                            |                                                     |                 |                   |
| Course Objectives                                                                                                                                                                                                                                                                    |       |                            |                                                     |                 |                   |
| <b>Knowing the types of nanomaterials and their unique physical and chemical properties.</b><br><b>Learn about methods for manufacturing and characterizing nanomaterials in laboratories.</b><br><b>Identify the applications of using nanomaterials in various fields of life.</b> |       |                            |                                                     |                 |                   |
| Teaching and Learning Strategies                                                                                                                                                                                                                                                     |       |                            |                                                     |                 |                   |
| Power point for each lecture and videos if necessary, and some times writing on the board for more details.                                                                                                                                                                          |       |                            |                                                     |                 |                   |
| Quiz after each lecture and Questions along the lecture.                                                                                                                                                                                                                             |       |                            |                                                     |                 |                   |
| Course Structure                                                                                                                                                                                                                                                                     |       |                            |                                                     |                 |                   |
| Week                                                                                                                                                                                                                                                                                 | Hours | Required Learning Outcomes | Unit or subject name                                | Learning method | Evaluation method |
| 1                                                                                                                                                                                                                                                                                    | 2     |                            | Introduction to nanotechnology                      | Power point     |                   |
| 2                                                                                                                                                                                                                                                                                    | 2     |                            | Types of nanomaterials                              |                 |                   |
| 3                                                                                                                                                                                                                                                                                    | 2     |                            | Physical and chemical properties                    |                 |                   |
| 4                                                                                                                                                                                                                                                                                    | 2     |                            | Manufacture of nanomaterials .from bacteria         |                 |                   |
| 5                                                                                                                                                                                                                                                                                    | 2     |                            | Fabrication of nanomaterials .from fungi            |                 |                   |
| 6                                                                                                                                                                                                                                                                                    | 2     |                            | Manufacture of nanomaterials .from plants and algae |                 |                   |
| 7                                                                                                                                                                                                                                                                                    | 2     |                            | Characterization of .snanomaterial                  |                 |                   |
| 8                                                                                                                                                                                                                                                                                    | 2     |                            |                                                     |                 |                   |
| 9                                                                                                                                                                                                                                                                                    | 2     |                            |                                                     |                 |                   |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |   |                                                                                                                                                                                                                                                                    |                                                                                                                                                                    |  |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2 |                                                                                                                                                                                                                                                                    | Applications of nanomaterials<br>.in the medical field                                                                                                             |  |  |
| 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2 |                                                                                                                                                                                                                                                                    | Applications of nanomaterials<br>.in the environmental field<br>Applications of nanomaterials<br>.in the agricultural field<br>Toxicity tests of nano<br>materials |  |  |
| <b>Course Evaluation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |                                                                                                                                                                                                                                                                    |                                                                                                                                                                    |  |  |
| Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc<br>For the theoretical semester exam 28 and practical 12 = 40<br>The monthly theoretical exam: 10 per exam (two exams) = 20<br>Oral exam 4 (point for each exam) = 4<br>Daily preparation and reports 4 (score for each preparation) = 4<br>The final exam is 42 theoretical and 18 practical = 60 |   |                                                                                                                                                                                                                                                                    |                                                                                                                                                                    |  |  |
| <b>Learning and Teaching Resources</b>                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |                                                                                                                                                                                                                                                                    |                                                                                                                                                                    |  |  |
| Required textbooks (curricular books, if any)                                                                                                                                                                                                                                                                                                                                                                                                                          |   | NANOTECHNOLOGIES: Principles, Applications, Implications and Hands-on Activities. 2013. Edited by the European Commission Directorate-General for Research and Innovation Industrial technologies (NMP), programme Authors: Luisa Filipponi and Duncan Sutherland. |                                                                                                                                                                    |  |  |
| Main references (sources)                                                                                                                                                                                                                                                                                                                                                                                                                                              |   | Nanomaterials and nanoparticles: Sources and toxicity. 2007. Cristina Buzea, Ivan. I. Pacheco Blandino, and Kevin Robbie. Biointerphases, vol. 2, issue 4, pages MR17 - MR172                                                                                      |                                                                                                                                                                    |  |  |
| Recommended books and references (scientific journals, reports...)                                                                                                                                                                                                                                                                                                                                                                                                     |   | Sourav Bhattacharjee, 2019. Principles of Nanomedicine. Jenny Stanford Publishing Pte. Ltd.                                                                                                                                                                        |                                                                                                                                                                    |  |  |
| Electronic References, Websites                                                                                                                                                                                                                                                                                                                                                                                                                                        |   | A. Deepa Parvathi, K. Rajagopal, 2017. Practical Manual on Synthesis of Nanoparticles and its Applications in Biology. DigitalAge Publishers                                                                                                                       |                                                                                                                                                                    |  |  |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Course Name:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Bioremediation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Course Code:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Semester / Year:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Second semester 2023 \ 2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Description Preparation Date:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Available Attendance Forms:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Number of Credit Hours (Total) / Number of Units (Total)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Five hours a week (two theoretical and three practical)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Course administrator's name (mention all, if more than one name)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Instructor's Name: Prof.Dr. Reyam Naji Ajmi , Prof. Dr. Huda Farooq Zeki , Dr. Thana Majid Noor, Dr. Afrah Fahad abdukkareem, Nadia basher, Estabraq Mohammed Ati , Entesar Ali Mezal <a href="mailto:aalfahad17@uomustansiriyah.edu.iq">aalfahad17@uomustansiriyah.edu.iq</a> , <a href="mailto:Zekihuda@yahoo.com">Zekihuda@yahoo.com</a> , <a href="mailto:reyam80a@yahoo.com">reyam80a@yahoo.com</a> , <a href="mailto:thanaanoor76@gmail.com">thanaanoor76@gmail.com</a> , <a href="mailto:istabraqmohammed@gmail.com">istabraqmohammed@gmail.com</a> |

Course objectives: A new and emerging technology for removing toxic pollutants from the environment, microorganisms and metal pollutants while treating organic and metal pollutants.

#### Course Objectives

##### **Introduction to Microbial Bioremediation**

##### **Applications of Bacteria for Bioremediation**

##### **Microbial Indicators for Monitoring Pollution and Bioremediation**

##### **Biosurfactant-Based Bioremediation of Toxic Metals**

##### **Microbial Environments: Extreme Environments**

##### **Adaptation of microorganisms in Extreme Environmental Conditions**

##### **Bioremediation Using Extremophiles**

##### **Nanoremediation: A New and Emerging Technology for the Removal of Toxic Contaminant from Environment**

##### **Microorganisms and Metal Pollutants**

##### **Remediation of Organic and Metal Pollutants**

##### **Mercury Pollution and Bioremediation**

##### **Role of Actinobacteria in Bioremediation**

##### **Bioremediation of Heavy Metals by Actinobacteria.....**

#### Teaching and Learning Strategies

- Lectures and Presentations:
- Deliver well-structured lectures that provide a clear overview of the key concepts, principles, and technologies related to Bioremediation
- Use visual aids such as slides, diagrams, and illustrations to enhance understanding and retention of the material.
- Incorporate real-world examples and case studies to illustrate the practical applications of the technology.
- Interactive Discussions:
- Case Studies and Problem-Solving Exercises:

#### Course Structure

##### Week Topics Covered

- 1 Introduction to Microbial Bioremediation
- 2 Applications of Bacteria for Bioremediation
- 3 Microbial Indicators for Monitoring Pollution and Bioremediation
- 4 Biosurfactant-Based Bioremediation of Toxic Metals
- 5 Microbial Environments: Extreme Environments
- 6 Adaptation of microorganisms in Extreme Environmental Conditions
- 7 Bioremediation Using Extremophiles
- 8 Exam
- 9 Nanoremediation: A New and Emerging Technology for the Removal of Toxic Contaminant from Environment
- 10 Microorganisms and Metal Pollutants
- 11 Remediation of Organic and Metal Pollutants
- 12 Mercury Pollution and Bioremediation
- 13 Role of Actinobacteria in Bioremediation
- 14 Bioremediation of Heavy Metals by Actinobacteria
- 15 Exam

#### Course Evaluation

|                        |          |                            |          |
|------------------------|----------|----------------------------|----------|
| First Exam             | 10 marks | Second Exam                | 10 marks |
| Activity               | 8 marks  | Final Exam                 | 42 marks |
| While <b>Practical</b> |          | 12 marks and final exam 18 |          |

| Learning and Teaching Resources<br>Das,S.(2014).Microbial Biodegradation and Bioremediation. 1 <sup>st</sup> . Elsevier's Science & Technology Rights Department in Oxford, UK.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                  |                                 |                 |                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------------------------------------------|---------------------------------|-----------------|---------------------------------|
| Course Name: Biological control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                  |                                 |                 |                                 |
| Course Code:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                                  |                                 |                 |                                 |
| Semester / Year: Second, 2023 / 2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                  |                                 |                 |                                 |
| Description Preparation Date:1/2/2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                  |                                 |                 |                                 |
| Available Attendance Forms: Section: (Biological control ) ; Lecture Room:[ 302] ,<br>; Office No.: (7 )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                  |                                 |                 |                                 |
| Number of Credit Hours (Total) / Number of Units (Total): 2hr Theoretical and 3hr Practical                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                                  |                                 |                 |                                 |
| Course administrator's name (mention all, if more than one name)<br>Name: 1- Dr. Sahira Nsayef Muslim Email: <a href="mailto:stsn@uomustansiriyah.edu.iq">stsn@uomustansiriyah.edu.iq</a><br>2- Dr. Wafaa Hassan Muslem wafaahassan2017@uomustansiriyah.edu.iq                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                                  |                                 |                 |                                 |
| Course Objectives<br>At the end of the Course, students are expected to learn such strategies that play essential role in control and reduce contaminates of environment and ecosystem by pests.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                  |                                 |                 |                                 |
| Teaching and Learning Strategies<br>Biological control is one type of control using natural enemy by man to reduce population of pest. It relies on predation, parasitism, herbivory, or other natural mechanisms, but typically also involves an active human management role .<br>We used these strategies because of Using a lot of pesticides such as organophosphorus<br>Pesticides, carbamate or other types of insecticides lead to contamination of environment, contamination of soil, plant, animal and all food chain, Hazard the public health, Destroy of ecosystem and Resistant of pest to insecticide because of changing in phenotype by mutation |       |                                                  |                                 |                 |                                 |
| Course Structure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                  |                                 |                 |                                 |
| Week                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Hours | Required Learning Outcomes                       | Unit or subject name            | Learning method | Evaluation method               |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       | 1Introduction Biological control                 | Introduction Biological control | 1               | Introduction Biological control |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                  |                                 |                 |                                 |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       | Types of relationship between different organism |                                 |                 |                                 |
| 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                  |                                 |                 |                                 |
| 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       | Characterization of Parasites and predators      |                                 |                 |                                 |
| 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                  |                                 |                 |                                 |
| 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                  |                                 |                 |                                 |
| 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                  |                                 |                 |                                 |
| 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       | Microbial Control ( bacteria, fungi, virus)      |                                 |                 |                                 |
| 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                  |                                 |                 |                                 |

|                   |  |                                  |  |  |  |
|-------------------|--|----------------------------------|--|--|--|
| <b>11</b>         |  | The Fungi and their pathogenesis |  |  |  |
| <b>12</b>         |  | Entomopathogenic nematodes       |  |  |  |
| <b>13</b>         |  |                                  |  |  |  |
| <b>14</b>         |  | Para biological control agent (  |  |  |  |
| <b>15</b>         |  | Growth regulator hormones)       |  |  |  |
|                   |  | The sterile Insect Technique     |  |  |  |
| Course Evaluation |  |                                  |  |  |  |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |              |                                   |                             |                        |                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------------------------|-----------------------------|------------------------|--------------------------|
| Course Name: <b>Genetic Engineering</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |              |                                   |                             |                        |                          |
| Course Code:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |              |                                   |                             |                        |                          |
| Semester / Year: Second , 2023 /2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |              |                                   |                             |                        |                          |
| Description Preparation Date: 1-9-2023                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |              |                                   |                             |                        |                          |
| Available Attendance Forms: Paper Forms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |              |                                   |                             |                        |                          |
| Number of Credit Hours (Total) / Number of Units (Total)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                                   |                             |                        |                          |
| Number of Credit Hours (5) / 2hr Theoretical and 3hr Practical                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |              |                                   |                             |                        |                          |
| Course administrator's name (mention all, if more than one name)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |              |                                   |                             |                        |                          |
| Na Name: Dr. Mohammed Faraj Shather , E-mail: marjani20012001 @yahoo.com<br>Dr. Name: Dr. Hanaa Farhan. Abbas , E-mail: hanaafathan75 @uomustansiriyah.edu.iq                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |              |                                   |                             |                        |                          |
| Course Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |                                   |                             |                        |                          |
| <p>* Enabling students to understand the science of genetic engineering in a simplified manner and benefit from its important applications, In the field of environment, agriculture, medicine, disease diagnosis and scientific research.</p> <p>* Addressing the most controversial topics regarding the issue of gene cloning and genetic modification and discussing what is good or bad about them in line with science and Islamic law, as we are an Arab Muslim country.</p> <p>* Training students to acquire skills in using genetic engineering techniques such as PCR and Sequencings, DNA blotting, genetic modification, etc. in diagnosis Infectious and genetic diseases and predicting future diseases before they occur, which makes them qualified To compete in the labor market</p> |              |                                   |                             |                        |                          |
| Teaching and Learning Strategies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |              |                                   |                             |                        |                          |
| 1. 1. Delivering and listening style<br>2. Educational videos<br>3. Discussion and dialogue style<br>4. Student class contributions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |                                   |                             |                        |                          |
| Course Structure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |              |                                   |                             |                        |                          |
| <b>Week</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Hours</b> | <b>Required Learning Outcomes</b> | <b>Unit or subject name</b> | <b>Learning method</b> | <b>Evaluation method</b> |
| <b>Theoretical</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |              |                                   |                             |                        |                          |

|       |        |                                                                                                                                        |                                                                              |                                  |                                                                                                                                   |
|-------|--------|----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| 1     | 1.5hr. | *Make the student familiar with the concept of genetic engineering and its most important useful applications in our lives             | - Introduction & Definitions in Genetic engineering                          | 1-Delivering and listening style | <b>Theoretical</b><br>Paper Exam<br>Class-discussions<br>Homework<br>Attendance                                                   |
| 2     | 1.5hr. |                                                                                                                                        | - Applications & Benefits of Genetic engineering in our life                 | 2- Educational videos            |                                                                                                                                   |
| 3     | 1.5hr. |                                                                                                                                        | -Restriction enzymes .part 1                                                 | 3-Discussion and dialogue style  |                                                                                                                                   |
| 4     | 1.5hr. |                                                                                                                                        | - Restriction enzymes.part 2                                                 | 4-Student class contributions    |                                                                                                                                   |
| 5     | 1.5hr. | *Training students on gene cloning technology and using it in the fields of environment, agriculture, medicine and scientific research | - DNA Cloning part 1 (Introduction Applications, & Principles )              |                                  |                                                                                                                                   |
| 6     | 1.5hr. |                                                                                                                                        | - DNA Cloning part 2 ( The Basic Steps of DNA Cloning)                       |                                  |                                                                                                                                   |
| 7     | 1.5hr. |                                                                                                                                        | -1 <sup>st</sup> exam                                                        |                                  |                                                                                                                                   |
| 8     | 1.5hr. |                                                                                                                                        | -Polymerase Chain Reaction (PCR)                                             |                                  |                                                                                                                                   |
| 9     | 1.5hr. |                                                                                                                                        | Gel electrophoresis                                                          |                                  |                                                                                                                                   |
| 10    | 1.5hr. |                                                                                                                                        | DNA Sequencing                                                               |                                  |                                                                                                                                   |
| 11    | 1.5hr. |                                                                                                                                        | Blotting                                                                     |                                  |                                                                                                                                   |
| 12,13 | 1.5hr. | *Using PCR to diagnose diseases such as COVID-19                                                                                       | Techniques...part 1,2                                                        |                                  |                                                                                                                                   |
| 14    | 1.5hr. | Enabling students to use diagnosing infectious and genetic diseases and predicting future diseases before they occur.                  | Genome editing                                                               |                                  |                                                                                                                                   |
| 15    | 1.5hr. |                                                                                                                                        | 2 <sup>nd</sup> Exam                                                         |                                  | <b>Practical</b><br>-Paper exam<br><br>- Conducting practical experiments<br><br>-Finding the unknown<br><br>- Writing the report |
| 1     | 3hr.   |                                                                                                                                        | Genetic engineering & Most Important Equipment used in its lab.              |                                  |                                                                                                                                   |
| 2     | 3hr.   |                                                                                                                                        | Bacterial DNA extraction                                                     |                                  |                                                                                                                                   |
| 3     | 3hr.   |                                                                                                                                        | Enzymes used in recombinant DNA technology & Problems in Restriction enzymes |                                  |                                                                                                                                   |
| 4     | 3hr.   |                                                                                                                                        | Design an experiment for DNA cloning                                         |                                  |                                                                                                                                   |
| 5     | 3hr.   |                                                                                                                                        | Bacterial transformation                                                     |                                  |                                                                                                                                   |
| 6     | 3hr.   |                                                                                                                                        | Experiment                                                                   |                                  |                                                                                                                                   |
| 7     | 3hr.   |                                                                                                                                        | 1 <sup>st</sup> exam                                                         |                                  |                                                                                                                                   |
| 8     | 3hr.   |                                                                                                                                        | Procedure of Polymerase Chain Reaction (PCR)                                 |                                  |                                                                                                                                   |
| 9     | 3hr.   |                                                                                                                                        | Gel Electrophoresis for DNA/ RNA analysis                                    |                                  |                                                                                                                                   |
| 10    | 3hr.   |                                                                                                                                        | Gene Sequencing                                                              |                                  |                                                                                                                                   |
| 11    | 3hr.   |                                                                                                                                        | Technique                                                                    |                                  |                                                                                                                                   |
| 12    | 3hr.   |                                                                                                                                        | Principles & Procedure of Blotting Technique                                 |                                  |                                                                                                                                   |
| 13    | 3hr.   |                                                                                                                                        |                                                                              |                                  |                                                                                                                                   |

|                                                                                                                                                                                                                                                                                  |  |                                                                                                                                                                                                                                                                                                                                        |                                                           |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|--|--|
|                                                                                                                                                                                                                                                                                  |  |                                                                                                                                                                                                                                                                                                                                        | Problems in Blotting<br>Technique<br>2 <sup>nd</sup> Exam |  |  |
| Course Evaluation                                                                                                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                        |                                                           |  |  |
| First monthly theoretical exam =12%<br>The second theoretical exam =12%<br>Attendance =2%<br>Activities (homework + discussion) =2%<br>First practical exam =5%<br>Second practical exam =5%<br>Activities =2%<br>Final theoretical =42%<br>Final practical =18%<br>Total = 100% |  |                                                                                                                                                                                                                                                                                                                                        |                                                           |  |  |
| Learning and Teaching Resources                                                                                                                                                                                                                                                  |  |                                                                                                                                                                                                                                                                                                                                        |                                                           |  |  |
| Required textbooks (curricular books, if any)                                                                                                                                                                                                                                    |  | E-book: 1-Introduction to Molecular Biology and Genetic Engineering 2011<br>2-Techniques in GENETIC ENGINEERING,2015                                                                                                                                                                                                                   |                                                           |  |  |
| Main references (sources)                                                                                                                                                                                                                                                        |  | E-book: 1-Introduction to Molecular Biology and Genetic Engineering 2011<br>2-Techniques in GENETIC ENGINEERING,2015                                                                                                                                                                                                                   |                                                           |  |  |
| Recommended books and references (scientific journals, reports...)                                                                                                                                                                                                               |  | E-book: Laboratory Manual<br>Bachelor of Biotechnology (Hons.)<br>Recombinant Dna Technology/ Lincoln university college/2018<br>E-book :MOLECULAR BIOLOGY AND GENE MANIPULATION<br>LABORATORY MANUAL/ DEPARTMENT OF BIOTECHNOLOGY<br>SCHOOL OF BIOENGINEERING<br>SRM INSTITUTE OF SCIENCE AND TECHNOLOGY<br>KATTANKUALTHUR -2020-2021 |                                                           |  |  |
| Electronic References, Websites                                                                                                                                                                                                                                                  |  | www.bitesize.com                                                                                                                                                                                                                                                                                                                       |                                                           |  |  |

|                                                                                                      |
|------------------------------------------------------------------------------------------------------|
| Course Name:medical mycology                                                                         |
|                                                                                                      |
| Course Code:                                                                                         |
|                                                                                                      |
| Semester / Year: 2023-2024                                                                           |
|                                                                                                      |
| Description Preparation Date:1\9\2023                                                                |
|                                                                                                      |
| Available Attendance Forms:                                                                          |
|                                                                                                      |
| Number of Credit Hours (Total) / Number of Units (Total)                                             |
| 5 hours ( 2 theory and 3 hours practical)                                                            |
| 5 hours (2 theory 3 h practical ) 5                                                                  |
| Course administrator's name (mention all, if more than one name)                                     |
| <a href="mailto:hamzia@uomustansiriyah.edu.iq">hamzia@uomustansiriyah.edu.iq</a> Dr. Hamzia Ali Ajah |

| <b>Course Objectives</b>                                                                                                                                            |              |                                                                                      |                             |                        |                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------------------------------------------------------------------------------|-----------------------------|------------------------|--------------------------|
| 1- study the medical mycology that causes human infection .                                                                                                         |              |                                                                                      |                             |                        |                          |
| 2- 2Clinical Manifestations, etiological agent                                                                                                                      |              |                                                                                      |                             |                        |                          |
| 3- how to diagnose these infection and antibiotic sensitivity of these microbes.                                                                                    |              |                                                                                      |                             |                        |                          |
| <b>Teaching and Learning Strategies</b>                                                                                                                             |              |                                                                                      |                             |                        |                          |
| Theoretical education                                                                                                                                               |              |                                                                                      |                             |                        |                          |
| Practical education: Using visual teaching materials , such as shapes, educational slides, and diagrams                                                             |              |                                                                                      |                             |                        |                          |
| <b>Course Structure</b>                                                                                                                                             |              |                                                                                      |                             |                        |                          |
| <b>Week</b>                                                                                                                                                         | <b>Hours</b> | <b>Required Learning Outcomes</b>                                                    | <b>Unit or subject name</b> | <b>Learning method</b> | <b>Evaluation method</b> |
| <b>1</b>                                                                                                                                                            |              | <b>Introduction to medical mycology and Antifungal drugs</b>                         |                             |                        |                          |
| <b>2</b>                                                                                                                                                            |              | <b>Method of diagnoses of fungi ,Classification of diseases cause by fungi</b>       |                             |                        |                          |
| <b>3</b>                                                                                                                                                            |              | <b>Superficial mycoses, part one</b>                                                 |                             |                        |                          |
| <b>4</b>                                                                                                                                                            |              | <b>Superficial mycoses, part two</b>                                                 |                             |                        |                          |
| <b>5</b>                                                                                                                                                            |              | <b>Cutaneous mycoses, part one</b>                                                   |                             |                        |                          |
| <b>6</b>                                                                                                                                                            |              | <b>Cutaneous mycoses,part two</b>                                                    |                             |                        |                          |
| <b>7</b>                                                                                                                                                            |              | <b>Subcutaneous mycoses. Chromoblastomycosis, Lobomycosis, Mycetoma</b>              |                             |                        |                          |
| <b>8</b>                                                                                                                                                            |              | <b>Subcutaneous mycoses .Phaeohyphomycosis, Sporotrichosis, Zygomycosis</b>          |                             |                        |                          |
| <b>9</b>                                                                                                                                                            |              | <b>Dimorphic Systemic Mycoses , Histoplasmosis , Blastomycosis</b>                   |                             |                        |                          |
| <b>10</b>                                                                                                                                                           |              | <b>Dimorphic Systemic Mycoses , Coccidioidomycosis, Paracoccidioidomycosis</b>       |                             |                        |                          |
| <b>11</b>                                                                                                                                                           |              | <b>Systemic mycoses due to opportunistic pathogens.Candidiasis</b>                   |                             |                        |                          |
| <b>12</b>                                                                                                                                                           |              | <b>Systemic mycoses due to opportunistic pathogens.Cryptococosis</b>                 |                             |                        |                          |
| <b>13</b>                                                                                                                                                           |              | <b>Systemic mycoses due to opportunistic pathogens.Aspergillosis, pneumosistosis</b> |                             |                        |                          |
| <b>14</b>                                                                                                                                                           |              | <b>Mycotoxin</b>                                                                     |                             |                        |                          |
| <b>Course Evaluation</b>                                                                                                                                            |              |                                                                                      |                             |                        |                          |
| Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc |              |                                                                                      |                             |                        |                          |
| <b>Learning and Teaching Resources</b>                                                                                                                              |              |                                                                                      |                             |                        |                          |
| Required textbooks (curricular                                                                                                                                      |              | Fundamental medical mycology, Errol Reiss, H. Jean                                   |                             |                        |                          |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|------------------------|--------------------|----------------------|
| books, if any)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Shadomy, and G. Marshall Lyon, III :Wiley-Blackwell, Hoboken, NJ,USA, 2011<br>2-Fundamental medical mycology, Errol Reiss, H. Jean Shadomy, and G. Marshall Lyon, III :Wiley-Blackwell, Hoboken, NJ,USA, 2011<br>3-Textbook of medical mycology ,By: Dr.hamzia Ali Ajah ,2018 |                                  |                        |                    |                      |
| Main references (sources)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
| Recommended books and references (scientific journals, reports...)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
| Electronic References, Websites                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
| Course Name: <b>Microbial Genetics</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
| Course Code:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
| Semester / Year: Second , 2023 /2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
| Description Preparation Date:1-9-2023                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
| Available Attendance Forms: Paper Forms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
| Number of Credit Hours (Total) / Number of Units (Total)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
| Number of Credit Hours (5) / 2hr Theoretical and 3hr Practical                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
| Course administrator's name (mention all, if more than one name)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
| Na Name: Dr. Mohammed Faraj Shather , E-mail: marjani20012001 @yahoo.com<br>Dr. Name: Dr. Hanaa Farhan. Abbas , E-mail: hanaafathan75 @uomustansiriyah.edu.iq                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
| Course Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
| <p>* Enhancing elementary studies students’ understanding of microbial genetics in a simple way and defining its role in the horizontal and vertical inheritance of traits among bacteria, especially antibiotic resistance, which has become a global problem that needs actual solutions.</p> <p>* Discussing the most important mechanisms of horizontal gene transfer between different bacteria, such as bacterial conjugation - genetic transfer and the role of phages in bacterial inheritance.</p> <p>* Training students to acquire the skills of searching for ways to respond Microorganisms, especially pathogenic ones, and finding solutions to the problem of the rapid spread of resistance the microbiome of antibiotics used to treat diseases makes them able to compete in the labor market</p> |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
| Teaching and Learning Strategies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
| 1. 1. Delivering and listening style<br>2. Educational videos<br>3.Discussion and dialogue style<br>4.Student class contributions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
| Course Structure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
| Week                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Hour<br>s                                                                                                                                                                                                                                                                     | Required<br>Learning<br>Outcomes | Unit or subject name   | Learning<br>method | Evaluation<br>method |
| Theoretical                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                               |                                  |                        |                    |                      |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1.5hr.                                                                                                                                                                                                                                                                        | * Enhancing                      | - Microbial genetics & | 1-Delivering       | Theoretica           |

|    |        |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
|----|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| 2  | 1.5hr. | elementary studies students' understanding of microbial genetics in a simple way and defining its role in the horizontal and vertical inheritance of traits among bacteria, especially antibiotic resistance, which has become a global problem that needs actual solutions. | <p>Nucleic acid structure</p> <ul style="list-style-type: none"> <li>- DNA replication &amp; gene expression</li> <li>- Mutation.....part 1</li> <li>- Mutation.....part 2</li> <li>- Extra chromosomal Agents : Bacterial Plasmid</li> <li>-1<sup>st</sup> exam</li> <li>-Extra chromosomal Agents :Transposable elements</li> <li>-Horizontal Gene Transfer :Conjugation</li> <li>-Conjugation :High frequency recombination cell</li> <li>-Transformation</li> <li>-Transduction</li> <li>2<sup>nd</sup> Exam</li> <li>-Genetic map &amp;</li> <li>-Discussion of students reports</li> <li>-Historical events &amp; Nucleic acid structure.</li> <li>-Bacterial DNA extraction</li> <li>-Mutation types &amp; identifying of mutants( Replica plating)</li> <li>-Physical &amp; Chemical mutagens: ( Study the effect of UV light on bacterial DNA )</li> <li>1<sup>st</sup> exam</li> <li>-Identifying chemical carcinogens ( Ames test)</li> <li>-Extraction of bacterial plasmid</li> <li>-Horizontal Gene Transfer :Conjugation</li> <li>- Watch some educational videos</li> <li>-Transformation ( chemical &amp; electroporation methods)</li> <li>2<sup>nd</sup> Exam</li> </ul> | <p>and listening style</p> <p>2- Educational videos</p> <p>3-Discussion and dialogue style</p> <p>4-Student class contributions</p> | <p><b>I</b></p> <p>Paper Exam</p> <p>Class-discussions</p> <p>Homework</p> <p>Attendance</p> <p>Quiz</p> |
| 7  | 1.5hr. |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
| 8  | 1.5hr. |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
|    | 1.5hr. |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
| 10 | 1.5hr. |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
|    |        |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
| 11 | 1.5hr. |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
|    | 1.5hr. |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
|    | 1.5hr. |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
|    | 1.5hr. |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
|    | 3hr.   | * Discussing the most important mechanisms of horizontal gene transfer between different bacteria, such as bacterial conjugation - genetic transfer and the role of phages in bacterial inheritance.                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
|    | 3hr.   |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
|    | 3hr.   |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
|    | 3hr.   |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
| 12 | 3hr.   |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
| 13 |        |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
| 14 |        |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
| 15 | 3hr.   |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
|    | 3hr.   |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
| 1  | 3hr.   |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
|    | 3hr.   |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
| 2  |        |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
| 3  | 3hr.   | * Training students to acquire the skills of searching for ways to respond Microorganisms, especially pathogenic ones, and finding                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
| 4  |        |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
|    | 3hr.   |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
| 5  | 3hr.   |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
|    | 3hr.   |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
| 6  |        |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |
| 7  |        |                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                     |                                                                                                          |

|        |  |                                                                                                                                                                |  |  |  |
|--------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
| 8      |  | solutions to the problem of the rapid spread of resistance the microbiome of antibiotics used to treat diseases makes them able to compete in the labor market |  |  |  |
| 9      |  |                                                                                                                                                                |  |  |  |
| 10     |  |                                                                                                                                                                |  |  |  |
| 11     |  |                                                                                                                                                                |  |  |  |
| 12,13, |  |                                                                                                                                                                |  |  |  |
| 14     |  |                                                                                                                                                                |  |  |  |

#### Course Evaluation

First monthly theoretical exam =12%  
The second theoretical exam =12%  
Attendance =2%  
Activities (homework + discussion) =1%  
Quiz=1%  
Monthly practical exam =12%  
Final theoretical =42%  
Final practical =18%  
Total = 100%

#### Learning and Teaching Resources

|                                                                    |                                                                                                                                                                                                                                                            |
|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Required textbooks (curricular books, if any)                      | Dale, J.W. and Park, S.F. (2004) Molecular Genetics of Bacteria, 4 <sup>th</sup> ed, Wiley and Sons Ltd                                                                                                                                                    |
| Main references (sources)                                          | E-book: 1-AL Marjani, M.F. (2015). Short Course in Bacterial Genetics. First ed.<br>2-Abbasi, H.F. (2016). In simplified manner... microbial genetics.                                                                                                     |
| Recommended books and references (scientific journals, reports...) | 1-Tortora, G.J. Microbiology An Introduction 8th, 9th, 10th ed. San Francisco: Pearson Benjamin Cummings, 2004, 2007, 2010.<br>2- Dale, J.W. and von Schantz (2002). From gene to genome, concepts and applications of DNA Technology. Wiley and Sons Ltd. |
| Electronic References, Websites                                    | www.bitesize.com                                                                                                                                                                                                                                           |

|                                        |
|----------------------------------------|
| Course Name: Bacterial taxonomy        |
| Course Code:                           |
| Semester / Year: 2024                  |
| Description Preparation Date: 1/9/2024 |

| Available Attendance Forms:                                                                                                                |       |                                                                                                                                        |                           |                     |                   |
|--------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------|-------------------|
|                                                                                                                                            |       |                                                                                                                                        |                           |                     |                   |
| Number of Credit Hours (Total) / Number of Units (Total)                                                                                   |       |                                                                                                                                        |                           |                     |                   |
| 5 hours /week : 2 theoretical ;3 practical                                                                                                 |       |                                                                                                                                        |                           |                     |                   |
| Course administrator's name (mention all, if more than one name)                                                                           |       |                                                                                                                                        |                           |                     |                   |
| Name : Intesar Nadhum Khelkal                                                                                                              |       |                                                                                                                                        |                           |                     |                   |
| Email: Intesarnkshaibani2021@uomustansiriyah.edu.iq                                                                                        |       |                                                                                                                                        |                           |                     |                   |
| Course Objectives                                                                                                                          |       |                                                                                                                                        |                           |                     |                   |
| <b>Learning how to classify bacterial isolates in order to identify correctly.....</b>                                                     |       |                                                                                                                                        |                           |                     |                   |
| <b>Discrimination between species and genera and differentiation among taxonomic groups and ranks .....</b>                                |       |                                                                                                                                        |                           |                     |                   |
| <b>Rapid and accurate diagnosis of infectious diseases when identify and classify correctly and detection antibiotic sensitivity .....</b> |       |                                                                                                                                        |                           |                     |                   |
| Teaching and Learning Strategies                                                                                                           |       |                                                                                                                                        |                           |                     |                   |
|                                                                                                                                            |       |                                                                                                                                        |                           |                     |                   |
| Course Structure                                                                                                                           |       |                                                                                                                                        |                           |                     |                   |
| Week                                                                                                                                       | Hours | Required Learning Outcomes                                                                                                             | Unit or subject name      | Learning method     | Evaluation method |
| 1                                                                                                                                          |       | Lec .1 History and fundamentals of taxonomy                                                                                            | <b>Bacterial-Taxonomy</b> | Theoretical lecture |                   |
| 2                                                                                                                                          |       | Lec.2 Classification systems and methods of classification                                                                             |                           |                     |                   |
| 3                                                                                                                                          |       | Lec.3 The Major Divisions of Life ;Domain ;Archaea and Archaea phyla                                                                   |                           |                     |                   |
| 4                                                                                                                                          |       | Lec 4.Domain ;Bacteria and Bacterial phyla :Phylum, Aquificae, :Thermotogae ,Deinococcus-Thermus, Tenericutes, Photosynthetic Bacteria |                           |                     |                   |
| 5                                                                                                                                          |       | Lec. 5 Phylum Cyanobacteria , Phylum Chlamydiae                                                                                        |                           |                     |                   |
| 6                                                                                                                                          |       | Lec.6 Phylum Spirochaetes, Phylum Bacteroidetes                                                                                        |                           |                     |                   |
| 7                                                                                                                                          |       |                                                                                                                                        |                           |                     |                   |
| 8                                                                                                                                          |       | Lec.7 <b>The Phylum <i>Proteobacteria</i></b> in 5 classes: general properties                                                         |                           |                     |                   |
| 9                                                                                                                                          |       | <b>Lec.8Phylum <i>Proteobacteria</i></b><br><i>ClassAlphaproteobacteria</i><br><b>2-ClassBetaproteobacteria</b>                        |                           |                     |                   |

|    |  |                                                           |  |  |  |
|----|--|-----------------------------------------------------------|--|--|--|
| 10 |  | <b>Lec.9 Phylum<br/>Proteobacteria</b>                    |  |  |  |
|    |  | 3-<br><i>Class Gammaproteobacteria</i>                    |  |  |  |
| 11 |  | 4- <i>Class Deltaproteobacteria</i>                       |  |  |  |
|    |  | 5-<br><i>Class Epsilonproteobacteria</i>                  |  |  |  |
| 12 |  | <b>Lec10 Phylum Firmicutes</b>                            |  |  |  |
| 13 |  | <b>Class Clostridia</b>                                   |  |  |  |
|    |  | <b>Lec11 Phylum Firmicutes</b>                            |  |  |  |
| 14 |  | <b>Class Bacilli</b>                                      |  |  |  |
|    |  | <b>Lec12 Phylum</b>                                       |  |  |  |
| 15 |  | <b>Actinobacteria :general<br/>criteria and divisions</b> |  |  |  |
|    |  | <b>Lec 13 Phylum</b>                                      |  |  |  |
|    |  | <b>Actinobacteria ;major<br/>suborders</b>                |  |  |  |
|    |  | Exam                                                      |  |  |  |

#### Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

#### Learning and Teaching Resources

|                                                                    |                                                                                                                                                                                                    |
|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Required textbooks (curricular books, if any)                      | 1- Robert W. Bauman Amarillo College (2019 ):<br>Microbiology with Diseases by Taxonomy, 6th edition<br>/Pearson<br>2-Wen-Jun et al ., (2024 ): <i>Modern Taxonomy of<br/>Bacteria and Archaea</i> |
| Main references (sources)                                          | Michael Janda (2021) : Practical Handbook of<br>Microbiology . 4th Edition                                                                                                                         |
| Recommended books and references (scientific journals, reports...) |                                                                                                                                                                                                    |
| Electronic References, Websites                                    |                                                                                                                                                                                                    |

|                                        |
|----------------------------------------|
| Course Name: Plant anatomy             |
|                                        |
| Course Code:                           |
|                                        |
| Semester / Year:2023-2024              |
|                                        |
| Description Preparation Date: 1/9/2024 |
|                                        |
| Available Attendance Forms:            |
|                                        |

| Number of Credit Hours (Total) / Number of Units (Total) 8 hrs. (2 hrs. Theoretical and 6 hrs. practical)                                                                                                                                                             |       |                                                                                                              |                                                                                                        |                                                                                        |                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------|
| 7.Course administrator's name (Dr. Raghad Dhyea, Dr. Hassan Abdul-Razak, Dr. Hadeel Radawi and Dr. Yousra Badri)                                                                                                                                                      |       |                                                                                                              |                                                                                                        |                                                                                        |                               |
| Name: Dr. Hadeel Radawi<br>Email: sphh@uomustansiriyah.edu.iq                                                                                                                                                                                                         |       |                                                                                                              |                                                                                                        |                                                                                        |                               |
| Course Objectives                                                                                                                                                                                                                                                     |       |                                                                                                              |                                                                                                        |                                                                                        |                               |
| <b>A comprehensive introduction to plant anatomy and the sciences related to it</b><br><b>Study the anatomy of the internal parts of the plant, especially the stem and leaves</b><br><b>Study the differences between monocotyledonous and dicotyledonous plants</b> |       |                                                                                                              |                                                                                                        |                                                                                        |                               |
| Teaching and Learning Strategies                                                                                                                                                                                                                                      |       |                                                                                                              |                                                                                                        |                                                                                        |                               |
| Utilizing the strategies of electronic and classroom learning in Education                                                                                                                                                                                            |       |                                                                                                              |                                                                                                        |                                                                                        |                               |
| Course Structure                                                                                                                                                                                                                                                      |       |                                                                                                              |                                                                                                        |                                                                                        |                               |
| Week                                                                                                                                                                                                                                                                  | Hours | Required Learning Outcomes                                                                                   | Unit or subject name<br>Description depends on the Timing table (Theoretical & Practical)              | Learning method                                                                        | Evaluation method             |
|                                                                                                                                                                                                                                                                       |       | At the end of the course, the student will be able to identify some of the plant families present in Baghdad | Lec.1 Introduction of plant anatomy<br>Lab.1 Introduction of microscopes used in plant anatomy         | Using detailed explanation with discussion beside, on-screen display and illustrations | Discussion and oral questions |
|                                                                                                                                                                                                                                                                       |       |                                                                                                              | Lec.2 History of plant anatomy and cell wall components<br>Lab.2 Types of plant anatomical dissections |                                                                                        |                               |
|                                                                                                                                                                                                                                                                       |       |                                                                                                              | Lec.3 Pits<br><br>Lab.3 Plant cell components                                                          |                                                                                        |                               |
|                                                                                                                                                                                                                                                                       |       |                                                                                                              | Lec.4 Plasmodesmata<br><br>Lab.4 Cell wall                                                             |                                                                                        |                               |

|  |  |  |                                                                       |  |  |
|--|--|--|-----------------------------------------------------------------------|--|--|
|  |  |  | Lec.5 Living plant components<br>Lab.5 Living plant components        |  |  |
|  |  |  | Lec.6 Ergastic plant components<br>Lab.6 Ergastic plant components    |  |  |
|  |  |  | First exam                                                            |  |  |
|  |  |  | Lec.8 Tissues<br>Lab.8 Meristematic tissues                           |  |  |
|  |  |  | Lec.9 Sclerenchyma tissue<br>Lab.9 Parenchyma and collenchyma tissues |  |  |
|  |  |  | Lec.10 Complex tissues<br>Lab.10 Sclerenchyma                         |  |  |
|  |  |  | Lec.11 Stomata<br>Lab.11 Stomata and epidermis tissue                 |  |  |
|  |  |  | Lec.12 Xylem tissue                                                   |  |  |
|  |  |  | Second exam                                                           |  |  |
|  |  |  | Lec.14 Phloem tissue<br>Lab.15 Phloem tissue                          |  |  |

#### Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports.... etc

#### Learning and Teaching Resources

|                                                                    |                                                                                                                                   |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Required textbooks (curricular books, if any)                      | Plant anatomy: A Concept-Based Approach to the Structure of Seed Plants, Richard Crang , Sheila Lyons-Sobaski , Robert Wise, 2018 |
| Main references (sources)                                          | Article Researches from net                                                                                                       |
| Recommended books and references (scientific journals, reports...) | Taxon journal                                                                                                                     |
| Electronic References, Websites                                    | Google scholar and springer                                                                                                       |

| Course Name: Gene Technique                                                                                                                                                                                                                                                                     |       |                            |                                                       |                    |                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------|-------------------------------------------------------|--------------------|-------------------|
| Course Code:                                                                                                                                                                                                                                                                                    |       |                            |                                                       |                    |                   |
| Semester / Year:2023-2024                                                                                                                                                                                                                                                                       |       |                            |                                                       |                    |                   |
| Description Preparation Date:1/3/2024                                                                                                                                                                                                                                                           |       |                            |                                                       |                    |                   |
| Available Attendance Forms: Paper Forms                                                                                                                                                                                                                                                         |       |                            |                                                       |                    |                   |
| Number of Credit Hours (Total) / Number of Units (Total)                                                                                                                                                                                                                                        |       |                            |                                                       |                    |                   |
| Number of Credit Hours (2) / 2hr Theoretical                                                                                                                                                                                                                                                    |       |                            |                                                       |                    |                   |
| Course administrator's name (mention all, if more than one name)<br>Dr.Munim R. Ali<br><i>mnum2007@uomustansiriyah.edu.iq</i>                                                                                                                                                                   |       |                            |                                                       |                    |                   |
| Course Objectives                                                                                                                                                                                                                                                                               |       |                            |                                                       |                    |                   |
| Identifying the Most Modern Techniques Used in Biotechnology<br>Gene technology is considered one of the important scientific subjects in the field of biology, as it provides students with a deep understanding of the structure and functions of genes and how to study and manipulate them. |       |                            |                                                       |                    |                   |
| Teaching and Learning Strategies                                                                                                                                                                                                                                                                |       |                            |                                                       |                    |                   |
| 1. Delivering and listening style 2. Educational videos                                                                                                                                                                                                                                         |       |                            |                                                       |                    |                   |
| Week                                                                                                                                                                                                                                                                                            | Hours | Required Learning Outcomes | Unit or subject name                                  | Learning method    | Evaluation method |
| 1                                                                                                                                                                                                                                                                                               |       |                            | 1Genetic marker                                       | Theoretical        |                   |
| 2                                                                                                                                                                                                                                                                                               |       |                            | 2Bacterial virulence gene detection                   | Theoretical        |                   |
| 3                                                                                                                                                                                                                                                                                               |       |                            | 3Molecular taxonomy                                   | -Paper exam        |                   |
| 4                                                                                                                                                                                                                                                                                               |       |                            | 4Polymerase chain reaction (PCR)                      | -Class discussions |                   |
| 5                                                                                                                                                                                                                                                                                               |       |                            | 5The design of primers for PCR                        | -homework          |                   |
| 6                                                                                                                                                                                                                                                                                               |       |                            | 6Molecular marker in Phylogenetic Studies             | -Presence          |                   |
| 7                                                                                                                                                                                                                                                                                               |       |                            | 71st exam                                             | Paper Exam         |                   |
| 8                                                                                                                                                                                                                                                                                               |       |                            | 8Main marker technologies                             | Class-discussions  |                   |
| 9                                                                                                                                                                                                                                                                                               |       |                            | 9Molecular markers Non-PCR based techniques           | Homework           |                   |
| 10                                                                                                                                                                                                                                                                                              |       |                            | 10Restriction Fragment Length Polymorphism (RFLP)     | Attendance         |                   |
| 11                                                                                                                                                                                                                                                                                              |       |                            | 11Minisatellites or Variable Number of Tandem Repeats |                    |                   |
| 12                                                                                                                                                                                                                                                                                              |       |                            | 12Cleaved Amplified Polymorphic Sequences (CAPS)      |                    |                   |
| 13                                                                                                                                                                                                                                                                                              |       |                            | 13 Random Amplified                                   |                    |                   |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |  |                        |  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------|--|--|
| 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  | Polymorphic DNA (RAPD) |  |  |
| 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  | 14 2nd exam            |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |  | 15 Final Exams         |  |  |
| <p>monthly theoretical exam =12%,<br/> The second theoretical exam =12%<br/> The second theoretical exam =12% The second theoretical exam =12%<br/> Attendance =2%,<br/> Activities (homework + discussion) =2%,<br/> First practical exam =5%,<br/> Second practical exam =5%,Activities =2%,<br/> Final theoretical =70%<br/> Total = 100%</p> <p>First monthly theoretical exam =12% Activities (homework + discussion) =2%<br/> The second theoretical exam =12%<br/> Attendance =2%<br/> Activities (homework + discussion) =2%<br/> First practical exam =5%<br/> Second practical exam =5%<br/> Activities =2%<br/> Final theoretical =42%<br/> Final practical =18%<br/> First monthly theoretical exam =12%<br/> The second theoretical exam =12%<br/> Attendance =2%<br/> Activities (homework + discussion) =2%<br/> First practical exam =5%<br/> Second practical exam =5%<br/> Activities =2%<br/> Final theoretical =42%<br/> Final prac</p> |  |  |                        |  |  |
| <p>First monthly theoretical exam =12%<br/> The second theoretical exam =12% First monthly theoretical exam =12%<br/> The second theoretical exam =12%<br/> Attendance =2%<br/> Activities (homework + discussion) =2%<br/> First practical exam =5%<br/> Second practical exam =5%<br/> Activities =2%<br/> Final theoretical =42%<br/> Final practical =18%<br/> Total = 100%<br/> Attendance =2% First monthly theoretical exam =12%<br/> The second theoretical exam =12%<br/> Attendance =2%<br/> Activities (homework + discussion) =2%<br/> First practical exam =5%<br/> Second practical exam =5%<br/> Activities =2%</p>                                                                                                                                                                                                                                                                                                                          |  |  |                        |  |  |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Final theoretical =42%<br>Final practical =18%<br>Total = 100%<br>Activities (homework + discussion) =2%<br>First practical exam =5%<br>Second practical exam =5%<br>Activities =2%<br>Final theoretical =42%<br>Final practical =18%<br>Total = 100%                                                                                                                                                                                                                           |                                                                                                                                                                                                   |
| Required textbooks (curricular books, if any)                                                                                                                                                                                                                                                                                                                                                                                                                                   | Principles of Gene Manipulation and Genomics                                                                                                                                                      |
| Main references (sources)                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Molecular Cloning: A Laboratory Manualby Joseph Sambrook and Elizabeth F. Fritsch                                                                                                                 |
| Recommended books and references (scientific journals, reports...)                                                                                                                                                                                                                                                                                                                                                                                                              | Molecular Cloning: A Laboratory Manualby Joseph Sambrook and Elizabeth F. Fritsch                                                                                                                 |
| Electronic References, Websites                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <a href="https://www.amazon.in/Principles-Manipulation-Genomics-Sandy-Primrose-ebook/dp/B00D88OH7S">https://www.amazon.in/Principles-Manipulation-Genomics-Sandy-Primrose-ebook/dp/B00D88OH7S</a> |
| Course Name: Sera and Vaccines                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                   |
| Course Code:                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                   |
| Semester / Year: 2023-2024                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                   |
| Description Preparation Date:1\2\2023                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                   |
| Available Attendance Forms:                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                   |
| Number of Credit Hours (Total) / Number of Units (Total)                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                   |
| 5 hours ( 2 theory and 3 hours practical)                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                   |
| 5 hours (2 theory 1.5 h practical )                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                   |
| Course administrator's name (mention all, if more than one name)                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                   |
| Name: Prof. Dr. Alia Essam Mahmood Alubadi<br><a href="mailto:aliaalubadi65@gmail.com">aliaalubadi65@gmail.com</a><br><a href="mailto:stlh@uomustansiriyah.edu.iq">stlh@uomustansiriyah.edu.iq</a>                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                   |
| Course Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                   |
| <b>Understanding Serums:</b><br><b>Understanding Vaccines:</b><br><b>Technology and Techniques:</b> This may include lectures on cell culture techniques for propagating viruses or producing recombinant proteins, genetic engineering methods for creating attenuated or subunit vaccines, formulation and stabilization of vaccines, and quality control measures in vaccine manufacturing.<br><b>Immunology and Immune Responses:</b> Vaccine Development and Public Health |                                                                                                                                                                                                   |
| Teaching and Learning Strategies                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                   |
| <b>Lectures and Presentations:</b><br><b>Deliver well-structured lectures that provide a clear overview of the key concepts,</b>                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                   |

principles, and technologies related to sera and vaccination.

Use visual aids such as slides, diagrams, and illustrations to enhance understanding and retention of the material.

Incorporate real-world examples and case studies to illustrate the practical applications of the technology.

**Interactive Discussions: Case Studies and Problem-Solving Exercises.**

- Identify the types of antigens and the types of immune response to them, and thus identify the types of vaccines and the type of immune response specific to each type.
- Learn how to manufacture serum, polyclonal and monoclonal antibodies, in addition to how vaccines are manufactured and the importance of vaccines and their role in protecting society from diseases.
- Learn about serology, serological tests, and modern immunotherapy used to treat cancerous tumors and autoimmune diseases.

#### Course Structure

| Week | Hou<br>rs | Required<br>Learning<br>Outcomes                                                                                  | Unit or subject<br>name | Learning method | Evaluation<br>method |
|------|-----------|-------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------|----------------------|
| 1    |           | Introduction<br>of Immunity<br>Types of<br>Immunity,<br>response ,                                                |                         |                 |                      |
| 2    |           | Concept of<br>immunization<br>&its types<br>& Types of<br>immunothera<br>py                                       |                         |                 |                      |
| 3    |           | History of<br>Serology &<br>immunization                                                                          |                         |                 |                      |
| 4    |           | Concept of<br>types of<br>antigens ,<br>Adjuvant<br>&antibodies ,<br>serum ,<br>plasma and<br>related<br>subjects |                         |                 |                      |
| 5    |           | Classification<br>of vaccines<br>and the<br>concept of<br>Cross-<br>protective<br>immunity                        |                         |                 |                      |
| 6    |           | exam                                                                                                              |                         |                 |                      |
| 7    |           | Production of<br>mono and<br>poly clonal                                                                          |                         |                 |                      |

|           |  |                                                                                                                 |  |  |  |
|-----------|--|-----------------------------------------------------------------------------------------------------------------|--|--|--|
|           |  | <b>antibody and vaccines</b>                                                                                    |  |  |  |
| <b>8</b>  |  | <b>Methods of monoclonal Abs production : hybridoma, ascites fluid of mice , Recombinant DNA Technology</b>     |  |  |  |
| <b>9</b>  |  | <b>Antibody Purification Methods and Factors affecting or associated with immunization</b>                      |  |  |  |
| <b>10</b> |  | <b>Routine, Required, recommended Vaccines standard immunization schedule and Iraq Recommended Vaccinations</b> |  |  |  |
| <b>11</b> |  | <b>Types of Vaccine and its ingredients</b>                                                                     |  |  |  |
| <b>12</b> |  | <b>Types of Vaccine and its ingredients</b>                                                                     |  |  |  |
| <b>13</b> |  | <b>Concept of herd immunity &amp; its related terms</b>                                                         |  |  |  |
| <b>14</b> |  | <b>Cross-matching and other terms related to immunizations</b>                                                  |  |  |  |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                                                                                                                                                                                            |          |  |  |
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| 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |          | exam                                                                                                                                                                                       |          |  |  |
| Course Evaluation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                                                                                                                                                                                            |          |  |  |
| First Exam                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 10 marks | Second Exam                                                                                                                                                                                | 10 marks |  |  |
| Activity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 8 marks  | Final Exam                                                                                                                                                                                 | 42 marks |  |  |
| While <b>Practical</b> 12 marks and final exam 18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                                                                                                                                                                                            |          |  |  |
| Learning and Teaching Resources                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                                                                                                                                                                                            |          |  |  |
| Required textbooks (curricular books, if any)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |          | <b>Immunology &amp; Serology in Laboratory Medicine 7th Edition ISBN-13: 978-0323711937</b><br><b>Copyright © 2021, by Mosby, an imprint of Elsevier Inc.</b>                              |          |  |  |
| Main references (sources)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          | <b>THE VACCINATION BOOKLET FOR EVERYONE by Jens Spahn</b><br><b>Federal Centre for Health Education (BZgA) Maarweg 149–161, 50825 Cologne www.bzga.de</b><br><b>1st Edition, June 2021</b> |          |  |  |
| Recommended books and references (scientific journals, reports...)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |          |                                                                                                                                                                                            |          |  |  |
| Electronic References, Websites                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          | <a href="https://www.amazon.com/Vaccines-clinical-military-civilian-practice/dp/B014L8EOEE">https://www.amazon.com/Vaccines-clinical-military-civilian-practice/dp/B014L8EOEE</a>          |          |  |  |
| Course Name: Evolution and Biodiversity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          |                                                                                                                                                                                            |          |  |  |
| Bioremediation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |                                                                                                                                                                                            |          |  |  |
| Course Code:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |                                                                                                                                                                                            |          |  |  |
| Semester / Year:2023-2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |                                                                                                                                                                                            |          |  |  |
| First semester 2023 \ 2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |                                                                                                                                                                                            |          |  |  |
| Description Preparation Date:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |          |                                                                                                                                                                                            |          |  |  |
| Available Attendance Forms:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |                                                                                                                                                                                            |          |  |  |
| Number of Credit Hours (Total) / Number of Units (Total)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |                                                                                                                                                                                            |          |  |  |
| Five hours a week (two theoretical and three practical)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          |                                                                                                                                                                                            |          |  |  |
| Course administrator's name (mention all, if more than one name)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |                                                                                                                                                                                            |          |  |  |
| Instructor's Name: Prof. Dr. Reyam Naji Ajmi , Prof. Dr. Huda Zeki , MS.C Eetabraq Mohammed Ati , , MS.C Nadiya Kamil<br>E-Mail: E-Mail: <a href="mailto:aalfahad17@uomustansiryah.edu.iq">mailto:aalfahad17@uomustansiryah.edu.iq</a> <a href="mailto:Zekihuda@yahoo.com">Zekihuda@yahoo.com</a> ,<br><a href="mailto:reyam80a@yahoo.com">reyam80a@yahoo.com</a> , <a href="mailto:istabraqmohammed@gmail.com">istabraqmohammed@gmail.com</a><br>Define evolution and adaptation to environmental change and why we maintain and adapt to the ecosystem impacts of biodiversity                                                                               |          |                                                                                                                                                                                            |          |  |  |
| Course Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                                                                                                                                                                                            |          |  |  |
| <b>Introduction to Evolution, Evolution of Life      Introduction to Evolution, Mutation</b><br><b>Evolution of the Earth      What is the Role Mutation in Plant and Evolution? What are the different types of mutations in plants?</b><br><b>Evolution of Biodiversity      The history of life: looking at the patterns &gt; Trees, not ladders</b><br><b>Mutation in Plant      Microevolution , Defining, Mechanisms</b><br><b>Mechanisms: the processes of evolution/ How does evolution work?      Introduction to Biodiversity , Speciation</b><br><b>Microevolution , Defining, Mechanisms, Detection      Macroevolution , Defining, Mechanisms</b> |          |                                                                                                                                                                                            |          |  |  |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |          |                                                             |          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------------------------------------------------------|----------|
| <b>Macroevolution , Defining, Mechanisms, Detection</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          | <b>Phenotype Of Evolution and Biodiversity ( Example )</b>  |          |
| <b>Looking for Plant Biodiversity</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |                                                             |          |
| <b>Mid-Term Exam</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          | <b>Mid-Term Exam</b>                                        |          |
| <b>Evolution and Environmental Change</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          | <b>Adaptation defining</b>                                  |          |
| <b>Why Preserve Biodiversity</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          | <b>Ecosystems Impacts &amp; Adaptation</b>                  |          |
| <b>Bioavailability of pollutants</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |                                                             |          |
| <b>Biology of phytoremediation (accumulation, tolerance and resistance, Adaptation )</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                                                             |          |
| <b>Sunflower Plants as Bioindicators of Environmental Pollution with Lead *( Experiment )</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |                                                             |          |
| <b>Bioindicator in Plants</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          | <b>How to Calculate Biodiversity ( Shannon and Simpson)</b> |          |
| <b>Plants Extinction</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          | <b>Type Plants Extinction , Invasive ( In Iraq only )</b>   |          |
| <b>Invasive Plants Species</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |          | <b>Report Evolution and Biodiversity types of Plants</b>    |          |
| <b>FINAL EXAM</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          | <b>FINAL EXAM</b>                                           |          |
| Teaching and Learning Strategies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          |                                                             |          |
| <div><ul style="list-style-type: none"><li>• Lectures and Presentations:</li><li>• Deliver well-structured lectures that provide a clear overview of the key concepts, principles, and technologies related to Biodiversity and Evolution</li><li>• Use visual aids such as slides, diagrams, and illustrations to enhance understanding and retention of the material.</li><li>• Incorporate real-world examples and case studies to illustrate the practical applications of the technology.</li><li>• Interactive Discussions:</li><li>• Case Studies and Problem-Solving Exercises:</li></ul></div> |          |                                                             |          |
| Course Structure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          |                                                             |          |
| Week Topics Covered                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |                                                             |          |
| Introduction to Evolution, Evolution of Life Introduction to Evolution, Mutation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          |                                                             |          |
| Evolution of the Earth What is the Role Mutation in Plant and Evolution? What are the different types of mutations in plants?                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |                                                             |          |
| Evolution of Biodiversity The history of life: looking at the patterns > Trees, not ladders                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |          |                                                             |          |
| Mutation in Plant Microevolution , Defining, Mechanisms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |                                                             |          |
| Mechanisms: the processes of evolution/ How does evolution work? Introduction to Biodiversity , Speciation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                                                             |          |
| Microevolution , Defining, Mechanisms, Detection Macroevolution , Defining, Mechanisms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |          |                                                             |          |
| Macroevolution , Defining, Mechanisms, Detection Phenotype Of Evolution and Biodiversity ( Example )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |                                                             |          |
| <b>Looking for Plant Biodiversity</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |                                                             |          |
| <b>Mid-Term Exam</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          | <b>Mid-Term Exam</b>                                        |          |
| <b>Evolution and Environmental Change</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          | <b>Adaptation defining</b>                                  |          |
| <b>Why Preserve Biodiversity</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          | <b>Ecosystems Impacts &amp; Adaptation</b>                  |          |
| <b>Bioavailability of pollutants</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |                                                             |          |
| <b>Biology of phytoremediation (accumulation, tolerance and resistance, Adaptation )</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                                                             |          |
| <b>Sunflower Plants as Bioindicators of Environmental Pollution with Lead *( Experiment )</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |                                                             |          |
| <b>Bioindicator in Plants</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          | <b>How to Calculate Biodiversity ( Shannon and Simpson)</b> |          |
| <b>Plants Extinction</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          | <b>Type Plants Extinction , Invasive ( In Iraq only )</b>   |          |
| <b>Invasive Plants Species</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |          | <b>Report Evolution and Biodiversity types of Plants</b>    |          |
| <b>FINAL EXAM</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          | <b>FINAL EXAM</b>                                           |          |
| Course Evaluation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |                                                             |          |
| First Exam                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 10 marks | Second Exam                                                 | 10 marks |
| Activity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 8 marks  | Final Exam                                                  | 42 marks |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| While <b>Practical</b> 12 marks and final exam 18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Learning and Teaching Resources                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 1. Plant Mutation and Biotechnology, ( 2022) . Q.Y. Shu, B.P.Forster, H.Nakagawa. ISBN 978-92-5-105000-0. Electronic Publishing Policy and Support Branch, Communication Division .<br>FAO , Viale delle Terme di Caracalla, 00153 Rome, Italy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 2.Methodology for Biodiversity,<br><a href="http://www.juliantrubin.com/encyclopedia/ecology/biodiversity.html">http://www.juliantrubin.com/encyclopedia/ecology/biodiversity.html</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Course Name: Evolution and Biodiversity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Bioremediation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Course Code:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Semester / Year:2023-2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| First semester 2023 \ 2024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Description Preparation Date:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Available Attendance Forms:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Number of Credit Hours (Total) / Number of Units (Total)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Five hours a week (two theoretical and three practical)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Course administrator's name (mention all, if more than one name)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Instructor's Name: Prof. Dr. Reyam Naji Ajmi , Prof. Dr. Huda Zeki , MS.C Eetabraq<br>Mohammed Ati , , MS.C Nadiya Kamil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| E-Mail: E-Mail: <a href="mailto:aalfahad17@uomustansiriyah.edu.iq">mailto:aalfahad17@uomustansiriyah.edu.iq</a> <a href="mailto:Zekihuda@yahoo.com">Zekihuda@yahoo.com</a><br>,reyam80a@yahoo.com , <a href="mailto:istabraqmohammed@gmail.com">istabraqmohammed@gmail.com</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Define evolution and adaptation to environmental change and why we maintain and adapt to the<br>ecosystem impacts of biodiversity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Course Objectives                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Introduction to Evolution, Evolution of Life      Introduction to Evolution, Mutation</b><br><b>Evolution of the Earth      What is the Role Mutation in Plant and Evolution? What are</b><br><b>the different types of mutations in plants?</b><br><b>Evolution of Biodiversity      The history of life: looking at the patterns &gt; Trees, not ladders</b><br><b>Mutation in Plant      Microevolution , Defining, Mechanisms</b><br><b>Mechanisms: the processes of evolution/ How does evolution work?      Introduction to</b><br><b>Biodiversity , Speciation</b><br><b>Microevolution , Defining, Mechanisms, Detection      Macroevolution , Defining,</b><br><b>Mechanisms</b><br><b>Macroevolution , Defining, Mechanisms, Detection      Phenotype Of Evolution and</b><br><b>Biodiversity ( Example )</b><br><b>Looking for Plant Biodiversity</b><br><b>Mid-Term Exam      Mid-Term Exam</b><br><b>Evolution and Environmental Change      Adaptation defining</b><br><b>Why Preserve Biodiversity Ecosystems Impacts &amp; Adaptation</b><br><b>Bioavailability of pollutants</b><br><b>Biology of phytoremediation (accumulation, tolerance and resistance, Adaptation )</b><br><b>Sunflower Plants as Bioindicators of Environmental Pollution with Lead *(</b><br><b>Experiment )</b> |

**Bioindicator in Plants      How to Calculate Biodiversity ( Shannon and Simpson)**  
**Plants Extinction      Type Plants Extinction , Invasive ( In Iraq only )**  
**Invasive Plants Species      Report Evolution and Biodiversity types of Plants**  
**FINAL EXAM      FINAL EXAM**

#### Teaching and Learning Strategies

- Lectures and Presentations:
- Deliver well-structured lectures that provide a clear overview of the key concepts, principles, and technologies related to Biodiversity and Evolution
- Use visual aids such as slides, diagrams, and illustrations to enhance understanding and retention of the material.
- Incorporate real-world examples and case studies to illustrate the practical applications of the technology.
- Interactive Discussions:
- Case Studies and Problem-Solving Exercises:

#### Course Structure

Week Topics Covered

Introduction to Evolution, Evolution of Life Introduction to Evolution, Mutation

Evolution of the Earth What is the Role Mutation in Plant and Evolution? What are the different types of mutations in plants?

Evolution of Biodiversity The history of life: looking at the patterns > Trees, not ladders

Mutation in Plant Microevolution , Defining, Mechanisms

Mechanisms: the processes of evolution/ How does evolution work? Introduction to Biodiversity , Speciation

Microevolution , Defining, Mechanisms, Detection Macroevolution , Defining, Mechanisms

Macroevolution , Defining, Mechanisms, Detection Phenotype Of Evolution and Biodiversity ( Example )

Looking for Plant Biodiversity

Mid-Term Exam Mid-Term Exam

Evolution and Environmental Change Adaptation defining

Why Preserve Biodiversity Ecosystems Impacts & Adaptation

Bioavailability of pollutants

Biology of phytoremediation (accumulation, tolerance and resistance, Adaptation )

Sunflower Plants as Bioindicators of Environmental Pollution with Lead \*( Experiment )

Bioindicator in Plants How to Calculate Biodiversity ( Shannon and Simpson)

Plants Extinction Type Plants Extinction , Invasive ( In Iraq only )

Invasive Plants Species Report Evolution and Biodiversity types of Plants

FINAL EXAM FINAL EXAM

#### Course Evaluation

First Exam 10 marks Second Exam 10 marks

Activity 8 marks Final Exam 42 marks

While **Practical** 12 marks and final exam 18

#### Learning and Teaching Resources

1. Plant Mutation and Biotechnology, ( 2022) . Q.Y. Shu, B.P.Forster, H.Nakagawa. ISBN 978-92-5-105000-0. Electronic Publishing Policy and Support Branch, Communication Division . FAO , Viale delle Terme di Caracalla, 00153 Rome, Italy

2. Methodology for Biodiversity,

| Course Name: Fermentation technology                                                                                                                                                                                                           |              |                                                                                                                                                                                                                                                |                      |                  |                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------|-------------------------|
| Course Code: second                                                                                                                                                                                                                            |              |                                                                                                                                                                                                                                                |                      |                  |                         |
| Semester / Year: 2023- 2024                                                                                                                                                                                                                    |              |                                                                                                                                                                                                                                                |                      |                  |                         |
| Description Preparation Date: 1/ 9 / 2023                                                                                                                                                                                                      |              |                                                                                                                                                                                                                                                |                      |                  |                         |
| Available Attendance Forms:apscence paper                                                                                                                                                                                                      |              |                                                                                                                                                                                                                                                |                      |                  |                         |
| Number of Credit Hours (Total) / Number of Units (Total): 5(2 theoretical +3 practical )                                                                                                                                                       |              |                                                                                                                                                                                                                                                |                      |                  |                         |
| Course administrator's name (mention all, if more than one name)                                                                                                                                                                               |              |                                                                                                                                                                                                                                                |                      |                  |                         |
| Name: :ass prof dr luma Qasim ali                                                                                                                                                                                                              |              |                                                                                                                                                                                                                                                |                      |                  |                         |
| Email: :luma -7878@yahoo.com                                                                                                                                                                                                                   |              |                                                                                                                                                                                                                                                |                      |                  |                         |
| Course Objectives                                                                                                                                                                                                                              |              |                                                                                                                                                                                                                                                |                      |                  |                         |
| Introducing the student to the functions of the most important organs and systems found in the human body and how they work and why, which he can benefit from in his practical life after graduating in his work with radiology, lasers, ect. |              |                                                                                                                                                                                                                                                |                      |                  |                         |
| Teaching and Learning Strategies                                                                                                                                                                                                               |              |                                                                                                                                                                                                                                                |                      |                  |                         |
| 1:Discssion and dialogue with student<br>2:Daily exams<br>3: Class and extraclass duties<br>4:Activities outside of class                                                                                                                      |              |                                                                                                                                                                                                                                                |                      |                  |                         |
| Course Structure                                                                                                                                                                                                                               |              |                                                                                                                                                                                                                                                |                      |                  |                         |
| Week                                                                                                                                                                                                                                           | Hours        | Required Learning Outcomes                                                                                                                                                                                                                     | Unit or subject name | Learning method  | Evaluation method       |
| Once                                                                                                                                                                                                                                           | 5<br>2<br>+3 | Introducing the student to the functions of the most important organs and systems found in the human body and how they work and why, which he can benefit from in his practical life after graduating in his work with radiology, lasers, ect. | Physiology           | Show and Discuss | Daily and Monthly exams |
| Course Evaluation                                                                                                                                                                                                                              |              |                                                                                                                                                                                                                                                |                      |                  |                         |
| Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, dailyoral, monthly, or written exams, reports .... etc<br>(2 absence + 2 daily exam + 4 activity +20 monthly exams )               |              |                                                                                                                                                                                                                                                |                      |                  |                         |
| Learning and Teaching Resources                                                                                                                                                                                                                |              |                                                                                                                                                                                                                                                |                      |                  |                         |

|                                                                    |                                                      |
|--------------------------------------------------------------------|------------------------------------------------------|
| Required textbooks (curricular books, if any)                      | Physiology book                                      |
| Main references (sources)                                          | Guyton and hall textbook of medical physiology       |
| Recommended books and references (scientific journals, reports...) | General physiology<br>Textbook of medical physiology |
| Electronic References, Websites                                    | No found                                             |

| Course Name:                                                                                                                                                                                                                                                                                                                            |       |                                                                                |                       |                                        |                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------------------------------------------------------------------------|-----------------------|----------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Molecular Biology                                                                                                                                                                                                                                                                                                                       |       |                                                                                |                       |                                        |                                                                                                           |
| Course Code:                                                                                                                                                                                                                                                                                                                            |       |                                                                                |                       |                                        |                                                                                                           |
| Semester / Year:                                                                                                                                                                                                                                                                                                                        |       |                                                                                |                       |                                        |                                                                                                           |
| 1 st /2023-2024                                                                                                                                                                                                                                                                                                                         |       |                                                                                |                       |                                        |                                                                                                           |
| Description Preparation Date:                                                                                                                                                                                                                                                                                                           |       |                                                                                |                       |                                        |                                                                                                           |
| 2023/9/1                                                                                                                                                                                                                                                                                                                                |       |                                                                                |                       |                                        |                                                                                                           |
| Available Attendance Forms:                                                                                                                                                                                                                                                                                                             |       |                                                                                |                       |                                        |                                                                                                           |
| Number of Credit Hours (Total) / Number of Units (Total)                                                                                                                                                                                                                                                                                |       |                                                                                |                       |                                        |                                                                                                           |
| 125hr/sem / 5                                                                                                                                                                                                                                                                                                                           |       |                                                                                |                       |                                        |                                                                                                           |
| Course administrator's name (mention all, if more than one name)                                                                                                                                                                                                                                                                        |       |                                                                                |                       |                                        |                                                                                                           |
| Name : Prof.Dr Sawsan Sajid<br>E mail:sawsan_sajid@uomustansiriyah.edu.ig<br>Name: Dr Nadal Abdulameer<br>E mail: dr.nadalali@uomustansiriyah.edu.iq<br>Name: Dr Susan AbdulRhaman<br>E mail; dr.susan.ibrahim@uomustansiriyah.edu.iq                                                                                                   |       |                                                                                |                       |                                        |                                                                                                           |
| Course Objectives                                                                                                                                                                                                                                                                                                                       |       |                                                                                |                       |                                        |                                                                                                           |
| The main objective of the course is to learn:<br>1-Structure of nucleotide and DNA molecules<br>2-DNA replication<br>3-transcription.<br>4-Protein synthesis, translation processes<br>5-Extra chromosomal elements<br>6-Gene regulation in prokaryotic and eukaryotic cell.                                                            |       |                                                                                |                       |                                        |                                                                                                           |
| Teaching and Learning Strategies                                                                                                                                                                                                                                                                                                        |       |                                                                                |                       |                                        |                                                                                                           |
| Students learn about molecular Biology through this course and textbook. In addition, discussion, activities, and on exams, students will be asked to apply knowledge that learned in a critical-thinking questions.<br>Students will be engaged in discussion and Group activities, which help students to lead each other to success. |       |                                                                                |                       |                                        |                                                                                                           |
| Course Structure                                                                                                                                                                                                                                                                                                                        |       |                                                                                |                       |                                        |                                                                                                           |
| Week                                                                                                                                                                                                                                                                                                                                    | Hours | Required Learning Outcomes                                                     | Unit or subject name  | Learning method                        | Evaluation method                                                                                         |
| 15                                                                                                                                                                                                                                                                                                                                      | 125   | This course designs to study the basic characteristics of cell and emphasis on | 5 / molecular biology | Lectures / lab experiments<br>Students | <b>1-Exam includes:</b><br>A-Multiple choices<br>B-Thinking based questions<br>C-Defination of many terms |

|  |  |                                                                                                                                                                            |  |                                                           |                                                                                                   |
|--|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------|
|  |  | molecular, genetics and biochemistry side of molecules inside the cell. In addition, this course covers central dogma of molecular biology and gene regulation in the cell |  | have to be prepared for quizzes and discussions in class. | D- short written questions<br>E-T/F<br><b>2-quizzes</b><br><b>3-reports</b><br><b>4-home work</b> |
|--|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------|

#### Course Evaluation

|  | Assessment                      | Score |
|--|---------------------------------|-------|
|  | First term Exam                 | 15%   |
|  | Second term Exam                | 15%   |
|  | Assignment, reports and quizzes | 10%   |
|  | Final Exam                      | 60%   |
|  | Grade                           | 100%  |

#### Learning and Teaching Resources

|                                                                    |                                                                                                                                                                            |
|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Required textbooks (curricular books, if any)                      | Basic Cell and Molecular Biology 4e: What We Know and How Found Out. Gerald Bergtrom, University of Wisconsin – Milwaukee ISBN; 978-0-9961502-5-5 Publication Date, 1-2020 |
| Main references (sources)                                          | Molecular Cell Biology, By Harvey Lodish, Arnold Berk, Chris A. Kaiser, Monty Krieger, Anthony Bretscher, Hidde Ploegh, Angelika Amon and Kelsey C. Martin.2016            |
| Recommended books and references (scientific journals, reports...) |                                                                                                                                                                            |
| Electronic References, Websites                                    | /https://www.vet-ebooks.com/molecular-cell-biology-8th-edition-pdf                                                                                                         |

Course Name:Sera and Vaccines

Course Code:

Semester / Year: 2023-2024

Description Preparation Date:1\9\2023

Available Attendance Forms:

Number of Credit Hours (Total) / Number of Units (Total)

5 hours ( 2 theory and 3 hours practical)

5 hours (2 theory 3 h practical ) 5

Course administrator's name (mention all, if more than one name)

Name: Prof. Dr. Ekhlass Noori Ali,assistant prof.Dr.Haidar J Muhammed, Assistant prof. Dr.Rawaa AbdulameerAbduljabbar andMohanad A.k.

Emile: [ekhlassnoori@yahoo.com](mailto:ekhlassnoori@yahoo.com)

[stkn@uomustansiriyah.edu.iq](mailto:stkn@uomustansiriyah.edu.iq),[rawaattar@uomustansiriyah.edu.iq](mailto:rawaattar@uomustansiriyah.edu.iq),[sthg@uomustansiriyah.edu.iq](mailto:sthg@uomustansiriyah.edu.iq)

[mohanadbio77@uomustansiriyah.edu.iq](mailto:mohanadbio77@uomustansiriyah.edu.iq)

| Course Objectives                                                                                                                                                                                                                                                |       |                                            |                                                                                                                                                                                             |                 |                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------|
| Learn about vaccines and their types<br>Learn about the importance of vaccines and their role in protecting society from diseases<br>Learn about the science of the generator and the serological tests and modern immunotherapy used to treat cancerous tumors. |       |                                            |                                                                                                                                                                                             |                 |                   |
| Teaching and Learning Strategies                                                                                                                                                                                                                                 |       |                                            |                                                                                                                                                                                             |                 |                   |
| Theoretical education<br><br>Practical education:Conduction some of serological test like Blood group examination, latex test, widal and rose Bengal test.                                                                                                       |       |                                            |                                                                                                                                                                                             |                 |                   |
| Course Structure                                                                                                                                                                                                                                                 |       |                                            |                                                                                                                                                                                             |                 |                   |
| Week                                                                                                                                                                                                                                                             | Hours | Required Learning Outcomes                 | Unit or subject name                                                                                                                                                                        | Learning method | Evaluation method |
| 1                                                                                                                                                                                                                                                                |       | Introduction of vaccines                   |                                                                                                                                                                                             |                 |                   |
| 2                                                                                                                                                                                                                                                                |       | TYPES OF IMMUNITY                          |                                                                                                                                                                                             |                 |                   |
| 3                                                                                                                                                                                                                                                                |       | Herd immunity                              |                                                                                                                                                                                             |                 |                   |
| 4                                                                                                                                                                                                                                                                |       | Type of vaccines                           |                                                                                                                                                                                             |                 |                   |
| 5                                                                                                                                                                                                                                                                |       | Production of vaccines and Adjuvant        |                                                                                                                                                                                             |                 |                   |
| 6                                                                                                                                                                                                                                                                |       | Time of Vaccination                        |                                                                                                                                                                                             |                 |                   |
| 7                                                                                                                                                                                                                                                                |       | Exam                                       |                                                                                                                                                                                             |                 |                   |
| 8                                                                                                                                                                                                                                                                |       | DNA vaccination                            |                                                                                                                                                                                             |                 |                   |
| 9                                                                                                                                                                                                                                                                |       | Introduction of Serology and Immunotherapy |                                                                                                                                                                                             |                 |                   |
| 10                                                                                                                                                                                                                                                               |       | Application of immunotherapy               |                                                                                                                                                                                             |                 |                   |
| 11                                                                                                                                                                                                                                                               |       | Active immunethers s                       |                                                                                                                                                                                             |                 |                   |
| 12                                                                                                                                                                                                                                                               |       | Exam                                       |                                                                                                                                                                                             |                 |                   |
| 13                                                                                                                                                                                                                                                               |       | Passive Immunethers                        |                                                                                                                                                                                             |                 |                   |
| 14                                                                                                                                                                                                                                                               |       | Hypo sensitization and Hyper sensitization |                                                                                                                                                                                             |                 |                   |
| 15                                                                                                                                                                                                                                                               |       | Serum sickness                             |                                                                                                                                                                                             |                 |                   |
| Course Evaluation                                                                                                                                                                                                                                                |       |                                            |                                                                                                                                                                                             |                 |                   |
| Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc                                                                                              |       |                                            |                                                                                                                                                                                             |                 |                   |
| Learning and Teaching Resources                                                                                                                                                                                                                                  |       |                                            |                                                                                                                                                                                             |                 |                   |
| Required textbooks (curricular books, if any)                                                                                                                                                                                                                    |       |                                            | <b>-Orenstein,W.A. <i>et al.</i>, 2024.Plotkins vaccines 8<sup>th</sup> ed,Elseveir.</b><br><b>2-Owen,Punt and Stranford 2009,Kuby immunology7th ed .W.H. freeman and company.New york.</b> |                 |                   |

|                                                                    |                                                                                                                                                                                   |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Main references (sources)                                          |                                                                                                                                                                                   |
| Recommended books and references (scientific journals, reports...) |                                                                                                                                                                                   |
| Electronic References, Websites                                    | <a href="https://www.amazon.com/Vaccines-clinical-military-civilian-practice/dp/B014L8EOEE">https://www.amazon.com/Vaccines-clinical-military-civilian-practice/dp/B014L8EOEE</a> |

|                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Course Name: Plant taxonomy                                                                                                                                                                                                               |
| Course Code:                                                                                                                                                                                                                              |
| Semester / Year: 2024                                                                                                                                                                                                                     |
| Description Preparation Date:                                                                                                                                                                                                             |
| Available Attendance Forms:                                                                                                                                                                                                               |
| Number of Credit Hours (Total) / Number of Units (Total) Eight hours a week (two theoretical and six practical)                                                                                                                           |
| Course administrator's name (mention all, if more than one name)                                                                                                                                                                          |
| Name: Dr.ghaidaa husain abd ali                                                                                                                                                                                                           |
| Email: spgh@uomustansiriyah.edu.iq                                                                                                                                                                                                        |
| Course Objectives                                                                                                                                                                                                                         |
| <b>This course provides an introduction to basic principles of plant function, primarily covering physical processes in plants, metabolism, secondary products, cell physiology, and introducing principles of growth and development</b> |
| Teaching and Learning Strategies                                                                                                                                                                                                          |

| Course Structure |       |                                                                                                                                                                                                                                                                                                                                                       |                                           |                                                          |                                 |
|------------------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------------|---------------------------------|
| Week             | Hours | Required Learning Outcomes                                                                                                                                                                                                                                                                                                                            | Unit or subject name                      | Learning method                                          | Evaluation method               |
|                  |       | explain the water solute and sugar transport processes in plants.<br>explain Plant Nutrient<br>explain the importance of photosynthesis for plants. They explain the light and dark reactions of photosynthesis.<br>They compare the dark reactions in C3, C4 and CAM plants. T<br>.explain respiration in plant .<br>explain Plant growth regulators | Lab .1<br>preparation of solution         | شرح مفصل مع المناقشة والعرض على الشاشة والرسوم التوضيحية | مناقشة شفوية وأسئلة حول الموضوع |
|                  |       |                                                                                                                                                                                                                                                                                                                                                       | Lab 2<br>Acidity and al kalin and Buffers |                                                          |                                 |
|                  |       |                                                                                                                                                                                                                                                                                                                                                       | Lab 3<br>Diffiusion                       |                                                          |                                 |
|                  |       |                                                                                                                                                                                                                                                                                                                                                       | Lab 4<br>plasmolysis                      |                                                          |                                 |
|                  |       |                                                                                                                                                                                                                                                                                                                                                       | Lab 5<br>permability                      |                                                          |                                 |
|                  |       |                                                                                                                                                                                                                                                                                                                                                       | First exam                                |                                                          |                                 |
|                  |       |                                                                                                                                                                                                                                                                                                                                                       | Lab .6<br>Plant nutrient 1                |                                                          |                                 |
|                  |       |                                                                                                                                                                                                                                                                                                                                                       | Lab .7<br>Plant nutrient 2                |                                                          |                                 |

|  |  |  |                                        |  |  |
|--|--|--|----------------------------------------|--|--|
|  |  |  | Lab 8<br>Photosynthesis<br>pigments 1  |  |  |
|  |  |  | Lab 9<br>Photosynthesis<br>pigments 2  |  |  |
|  |  |  | Lab 10<br>respiration in plant         |  |  |
|  |  |  | Lab 11<br>Plant growth<br>regulators 1 |  |  |
|  |  |  | Lab 12<br>Plant growth<br>regulators 2 |  |  |
|  |  |  | Second exam                            |  |  |
|  |  |  | Lab 13 plant<br>tropism                |  |  |
|  |  |  |                                        |  |  |

#### Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

#### Learning and Teaching Resources

|                                                                    |                                                 |
|--------------------------------------------------------------------|-------------------------------------------------|
| Required textbooks (curricular books, if any)                      | Fundamentals of plant physiology                |
| Main references (sources)                                          | Libraries ,research and books from the internet |
| Recommended books and references (scientific journals, reports...) | Plant Physiology                                |
| Electronic References, Websites                                    | Google scholar and springer                     |

Course Name: Biological control

Course Code:

Semester / Year: Second, 2023 / 2024

Description Preparation Date:1/2/2024

Available Attendance Forms: Section: (Biological control ) ; Lecture Room:[ 302] , ; Office No.: (7 )

Number of Credit Hours (Total) / Number of Units (Total): 2hr Theoretical and 3hr Practical

Course administrator's name (mention all, if more than one name)

Name: 1- Dr. Sahira Nsayef Muslim Email: [stsn@uomustansiriyah.edu.iq](mailto:stsn@uomustansiriyah.edu.iq)

2- Dr. Wafaa Hassan Muslem wafaahassan2017@uomustansiriyah.edu.iq

#### Course Objectives

At the end of the Course, students are expected to learn such strategies that play essential role in control and reduce contaminates of environment and ecosystem by pests.

### Teaching and Learning Strategies

Biological control is one type of control using natural enemy by man to reduce population of pest. It relies on predation, parasitism, herbivory, or other natural mechanisms, but typically also involves an active human management role .

We used these strategies because of Using a lot of pesticides such as organophosphorus Pesticides, carbamate or other types of insecticides lead to contamination of environment, contamination of soil, plant, animal and all food chain, Hazard the public health, Destroy of ecosystem and Resistant of pest to insecticide because of changing in phenotype by mutation

### Course Structure

| Week | Hours                                                      | Required Learning Outcomes | Unit or subject name               | Learning method | Evaluation method                  |
|------|------------------------------------------------------------|----------------------------|------------------------------------|-----------------|------------------------------------|
| 1    | Introduction                                               | 1                          | Introduction<br>Biological control | 1               | Introduction<br>Biological control |
| 2    | Biological control                                         |                            |                                    |                 |                                    |
| 3    | Types of relationship                                      |                            |                                    |                 |                                    |
| 4    | between different organism                                 |                            |                                    |                 |                                    |
| 5    | Characterization of                                        |                            |                                    |                 |                                    |
| 6    | Parasites and                                              |                            |                                    |                 |                                    |
| 7    | predators                                                  |                            |                                    |                 |                                    |
| 8    | Microbial Control (                                        |                            |                                    |                 |                                    |
| 9    | bacteria, fungi,                                           |                            |                                    |                 |                                    |
| 10   | virus)                                                     |                            |                                    |                 |                                    |
| 11   |                                                            |                            |                                    |                 |                                    |
| 12   | The Fungi and their                                        |                            |                                    |                 |                                    |
| 13   | pathogenesis                                               |                            |                                    |                 |                                    |
| 14   | Entomopathogenic                                           |                            |                                    |                 |                                    |
| 15   | nematodes                                                  |                            |                                    |                 |                                    |
|      | Para biological control agent ( Growth regulator hormones) |                            |                                    |                 |                                    |
|      | The sterile Insect Technique                               |                            |                                    |                 |                                    |

### Course Evaluation

| Course Name: Plant physiology                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                                                                                                                                                                                                                                                                                         |                      |                           |                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------------|--------------------------------------------|
| Course Code: /                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                                                                                                                                                                                                                                                                                         |                      |                           |                                            |
| Semester / Year: <b>First /2023 -2024</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                                                                                                                                                                                                                                                                         |                      |                           |                                            |
| Description Preparation Date: 1 /9/2023                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                                                                                                                                                                                                                                                                         |                      |                           |                                            |
| Available Attendance Forms: attendance forma                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                                                                                                                                                                                                                                                                                         |                      |                           |                                            |
| Number of Credit Hours (Total) / Number of Units (Total)<br>1unit /(theoretical lectures) 2 hours (practical lectures) 6 hours.                                                                                                                                                                                                                                                                                                                                                                         |       |                                                                                                                                                                                                                                                                                                         |                      |                           |                                            |
| Course administrator's name (mention all, if more than one name)                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                                                                                                                                                                                                                                                                                         |                      |                           |                                            |
| <b>Instructor's Name: Professor Dr. Alaa Jabbar Taha</b><br><b>Email: Dr.alaa@uomustansiriyah.edu.iq</b>                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                                                                                                                                                                                                                                                                         |                      |                           |                                            |
| <b>Course Objectives</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                                                                                                                                                                                                                                                                                         |                      |                           |                                            |
| The study of plant physiology, which addresses issues like ideal planting and harvesting periods, post-harvest storage of plant products for human consumption, and the creation of secondary goods like pharmaceuticals and cosmetics, is essential for the production of food crops.                                                                                                                                                                                                                  |       |                                                                                                                                                                                                                                                                                                         |                      |                           |                                            |
| <b>Teaching and Learning Strategies</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                                                                                                                                                                                                                                                                         |                      |                           |                                            |
| HoHow plant organs work and function.<br>•PlaPlant physiology is a very broad science that is closely related to other sciences such as biophysics, environmental physiology, agricultural engineering, and cell science.<br>• Knowing some of the factors that affect the growth, organization, and functioning of plant organs such as stems, roots, and leaves through a group of interacting factors such as light, nutrition, temperature, hormones, metabolism, water, and environmental factors. |       |                                                                                                                                                                                                                                                                                                         |                      |                           |                                            |
| Course Structure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                                                                                                                                                                                                                                                                                         |                      |                           |                                            |
| Week                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Hours | Required Learning Outcomes                                                                                                                                                                                                                                                                              | Unit or subject name | Learning method           | Evaluation method                          |
| 1-15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2     | How plants work in their everyday life<br>The scope of plant physiology is very broad science ranging from biophysics to environmental physiology and agronomy<br>,Growth of stems, roots and leaves are regulated by a host of interacting factors such as light, nutrition, temperature, hormones and | Plant physiology     | Theoretical and practical | Questions, quizzes and writing examination |

|                                                                    |                 |                 |                                                                                                                             |                 |                   |
|--------------------------------------------------------------------|-----------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------|
|                                                                    |                 | metabolism      |                                                                                                                             |                 |                   |
| Course Evaluation                                                  |                 |                 |                                                                                                                             |                 |                   |
|                                                                    | <b>1st exam</b> | <b>2nd exam</b> | <b>Practical</b>                                                                                                            | <b>Activity</b> | <b>Final Exam</b> |
|                                                                    | <b>12</b>       | <b>12</b>       | <b>12</b>                                                                                                                   | <b>4</b>        | <b>60</b>         |
| Learning and Teaching Resources                                    |                 |                 |                                                                                                                             |                 |                   |
| Required textbooks (curricular books, if any)                      |                 |                 | Plant physiology, by: Frank , B. and Cleon, W. 2012<br>Principles of botany, by: Gordon, U., Richard, S. and Randy, M. 2001 |                 |                   |
| Main references (sources)                                          |                 |                 | Introduction to plant physiology. By: William, G., Norman, P., 2009, fourth ed.                                             |                 |                   |
| Recommended books and references (scientific journals, reports...) |                 |                 | /                                                                                                                           |                 |                   |
| Electronic References, Websites                                    |                 |                 | /                                                                                                                           |                 |                   |

Course Name: Bacteria physiology

Course Code:

Semester / Year : second course / 2023-2024

Description Preparation Date: 2024 /4/15

Available Attendance Forms:

Number of Credit Hours (Total) / Number of Units (Total)  
/: 11 hours per week (2 theoretical, 6 practical, and 3 research projects)

Course administrator's name (mention all, if more than one name)

Name: Maysoon Khaleefa Abbas

Email: maysoon.bio2005@uomustansiriyah.edu.iq

Course Objectives

**Course Intended Outcomes:**

**At the end of the course the student has been studied**

**the relation between cell structure & function, cell metabolism; Catabolism & Anabolism in addition to energy release.**

Teaching and Learning Strategies

This subject presents the functions of the cell ; how bacterial cell grow ,divide ,reproduce, move , feed ; how uptake nutrients ,synthesize sugar, proteins, lipids, nucleic acids, also studying the effect of different conditions on the cell.

Course Structure

| Week             | Hours | Required Learning Outcomes | Unit or subject name<br>Description depends on the Timing table<br>(Theoretical & Practical) | Learning method | Evaluation method |
|------------------|-------|----------------------------|----------------------------------------------------------------------------------------------|-----------------|-------------------|
| Discussion, Oral |       |                            | Lec 1; Introduction for bacterial physiology                                                 |                 |                   |

|                                                                                                         |  |  |                                                                                                                                                                                |  |  |  |
|---------------------------------------------------------------------------------------------------------|--|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
| <p>questions and practical evaluation of laboratory work and technique</p> <p>And practical reports</p> |  |  | <p>مختبر 1: نبذة مختصرة عن أهمية دراسة فسلجة البكتريا وبعض الأجهزة والمواد والعزلات البكتيرية المستخدمة في المختبر</p>                                                         |  |  |  |
|                                                                                                         |  |  | <p><b>Lec 2; Bacterial cell structure</b><br/>مختبر 2: قياس الزيادة الحاصلة في نمو البكتريا من خلال الزيادة الحاصلة في أعداد الخلايا ( التقدير المباشر)</p>                    |  |  |  |
|                                                                                                         |  |  | <p><b>Lec 3 ; Cell function</b><br/>مختبر 3: قياس الزيادة الحاصلة في نمو البكتريا من خلال قياس الزيادة الحاصلة في أعداد الخلايا (التقدير غير المباشر)</p>                      |  |  |  |
|                                                                                                         |  |  | <p><b>Lec 4; Microbial nutrition</b><br/>مختبر 4 : قياس الزيادة الحاصلة في نمو الخلايا من خلال قياس الزيادة الحاصلة في كتلة الخلايا</p>                                        |  |  |  |
|                                                                                                         |  |  | <p><b>Lec 5; Microbial growth</b><br/>مختبر 5 : تأثير درجة الحرارة على نمو البكتريا</p>                                                                                        |  |  |  |
|                                                                                                         |  |  | <p><b>Lec6 ; Influence of environmental factors on growth ; Solutes &amp; Water activity ,pH ,Temperature .</b><br/>مختبر 6 : تأثير الأس الهيدروجيني على نمو البكتيريا</p>     |  |  |  |
|                                                                                                         |  |  | <p><b>Lec.7: Oxygen concentration , Radiation</b><br/>مختبر 7: تأثير الضغط الأزموزي على نمو البكتريا</p>                                                                       |  |  |  |
|                                                                                                         |  |  | <p><b>Exam</b><br/>أمتحان شهري</p>                                                                                                                                             |  |  |  |
|                                                                                                         |  |  | <p><b>Lec.8: Metabolism ; Energy , Oxidation- Reduction Reactions , Electron carriers</b><br/>مختبر 8: تأثير المصدر الكربوني على النمو</p>                                     |  |  |  |
|                                                                                                         |  |  | <p><b>Lec.9: Energy Release and Conservation</b><br/>مختبر 9: متطلبات النمو للأحياء المجهرية : تأثير المصدر النتروجيني على نمو البكتيريا</p>                                   |  |  |  |
|                                                                                                         |  |  | <p><b>Lec.10: Catabolism of Carbohydrates, Proteins and Lipids</b><br/>مختبر 10: تأثير الفسفور والكبريت والأملاح المعدنية والعوامل المساعدة والفيتامينات على نمو البكتيريا</p> |  |  |  |
|                                                                                                         |  |  | <p><b>Lec.11: Anabolism; Synthesis of Sugars ,Polysaccharides ,Amino Acids</b><br/>مختبر 11: تأثير الأشعة</p>                                                                  |  |  |  |

|  |  |  |                                                         |  |  |  |
|--|--|--|---------------------------------------------------------|--|--|--|
|  |  |  | فوق البنفسجية على النمو البكتيري                        |  |  |  |
|  |  |  | Lec.12: Synthesis of purines & pyrimidines ,Nucleotides |  |  |  |
|  |  |  | مختبر 12: التأثير الانتقائي لصبغة الكرسنال              |  |  |  |
|  |  |  | فايوليت في تثبيط النمو البكتيري                         |  |  |  |
|  |  |  | Lec.13: Synthesis of Lipids                             |  |  |  |
|  |  |  | مختبر 13: مراجعة للمختبرات                              |  |  |  |
|  |  |  | mExam                                                   |  |  |  |
|  |  |  | أمتحان شهري                                             |  |  |  |

#### Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral l ,Quas, monthly, or written exams, reports .... etc

#### Learning and Teaching Resources

|                                                                    |                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Required textbooks (curricular books, if any)                      | 1. Microbial Physiology. Albert G Moat, John W Foster, Michael P. Spector. 2002. Fourth Edition. A John Wiley and sons, INC., publication.                                                                                                                                                                                                                            |
| Main references (sources)                                          | Libraries and online book and information sites                                                                                                                                                                                                                                                                                                                       |
| Recommended books and references (scientific journals, reports...) | 1. Microbial Physiology. Albert G Moat, John W Foster, Michael P. Spector. 2002. Fourth Edition. A John Wiley and sons, INC., publication.<br>2. Microbiology. Lansing M Prescott, John P. Harley, Donald A. Klein.2005. Sixth Edition. Higher Education.<br>3. Microbial an introduction. 2004. Gerard J Tortora, Berdell R Funke, Christine L Case. Eighth Edition. |
| Electronic References, Websites                                    | Googol Scholar and 4- shred                                                                                                                                                                                                                                                                                                                                           |

Course Name: Plant anatomy

Course Code:

Semester / Year:2023-2024

Description Preparation Date: 1/9/2024

Available Attendance Forms:

Number of Credit Hours (Total) / Number of Units (Total) 8 hrs. (2 hrs. Theoretical and 6 hrs. practical)

7.Course administrator's name (Dr. Raghad Dhyea, Dr. Hassan Abdul-Razak, Dr. Hadeel Radawi and Dr. Yousra Badri)

Name: Dr. Hadeel Radawi

Email: sphh@uomustansiriyah.edu.iq

#### Course Objectives

**A comprehensive introduction to plant anatomy and the sciences related to it**  
**Study the anatomy of the internal parts of the plant, especially the stem and leaves**  
**Study the differences between monocotyledonous and dicotyledonous plants**

#### Teaching and Learning Strategies

Utilizing the strategies of electronic and classroom learning in Education

| Course Structure |       |                                                                                                              |                                                                                                        |                                                                                        |                               |
|------------------|-------|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------|
| Week             | Hours | Required Learning Outcomes                                                                                   | Unit or subject name<br>Description depends on the Timing table (Theoretical & Practical)              | Learning method                                                                        | Evaluation method             |
|                  |       | At the end of the course, the student will be able to identify some of the plant families present in Baghdad | Lec.1 Introduction of plant anatomy<br>Lab.1 Introduction of microscopes used in plant anatomy         | Using detailed explanation with discussion beside, on-screen display and illustrations | Discussion and oral questions |
|                  |       |                                                                                                              | Lec.2 History of plant anatomy and cell wall components<br>Lab.2 Types of plant anatomical dissections |                                                                                        |                               |
|                  |       |                                                                                                              | Lec.3 Pits<br>Lab.3 Plant cell components                                                              |                                                                                        |                               |
|                  |       |                                                                                                              | Lec.4 Plasmodesmata<br>Lab.4 Cell wall                                                                 |                                                                                        |                               |
|                  |       |                                                                                                              | Lec.5 Living plant components<br>Lab.5 Living plant components                                         |                                                                                        |                               |
|                  |       |                                                                                                              | Lec.6 Ergastic plant components<br>Lab.6 Ergastic plant components                                     |                                                                                        |                               |
|                  |       |                                                                                                              | First exam                                                                                             |                                                                                        |                               |
|                  |       |                                                                                                              | Lec.8 Tissues<br>Lab.8                                                                                 |                                                                                        |                               |

|  |  |  |                                                                              |  |  |
|--|--|--|------------------------------------------------------------------------------|--|--|
|  |  |  | Meristematic tissues                                                         |  |  |
|  |  |  | Lec.9<br>Sclerenchyma tissue<br><br>Lab.9 Parenchyma and collenchyma tissues |  |  |
|  |  |  | Lec.10 Complex tissues<br><br>Lab.10 Sclerenchyma                            |  |  |
|  |  |  | Lec.11 Stomata<br>Lab.11 Stomata and epidermis tissue                        |  |  |
|  |  |  | Lec.12 Xylem tissue                                                          |  |  |
|  |  |  | Second exam                                                                  |  |  |
|  |  |  | Lec.14 Phloem tissue<br>Lab.15 Phloem tissue                                 |  |  |

#### Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports.... etc

#### Learning and Teaching Resources

|                                                                    |                                                                                                                                   |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Required textbooks (curricular books, if any)                      | Plant anatomy: A Concept-Based Approach to the Structure of Seed Plants, Richard Crang , Sheila Lyons-Sobaski , Robert Wise, 2018 |
| Main references (sources)                                          | Article Researches from net                                                                                                       |
| Recommended books and references (scientific journals, reports...) | Taxon journal                                                                                                                     |
| Electronic References, Websites                                    | Google scholar and springer                                                                                                       |

|                                        |
|----------------------------------------|
| Course Name: Plant groups              |
|                                        |
| Course Code:                           |
|                                        |
| Semester / Year:2023                   |
|                                        |
| Description Preparation Date: 1/9/2023 |
|                                        |
| Available Attendance Forms:            |

| Number of Credit Hours (Total) / Number of Units (Total) 8 hrs. (2 hrs. Theoretical and 6 hrs. practical)                                                                                                                                                                                                                                                                                                                                             |       |                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                              |                                                                                        |                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------|
| 7.Course administrator's name () ;                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                              |                                                                                        |                               |
| Name: Dr. ghaidaa husain abd ali ,dr. dina Yousef ,dr. Rana hadi ,dr. saba hadi<br>Email: spgh@uomustansiriyah.edu.iq                                                                                                                                                                                                                                                                                                                                 |       |                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                              |                                                                                        |                               |
| <b>Course Objectives</b>                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                              |                                                                                        |                               |
| <b>Students should have a comprehensive understanding and knowledge of the plant kingdom, which includes all plants. They are eukaryotic, multicellular, and autotrophic organisms. A plant cell has a rigid cell wall. Plants contain chloroplasts and chlorophyll pigments needed for photosynthesis. The plant kingdom is classified into five subgroups according to the above criteria: mosses, mosses, ferns, gymnosperms, and angiosperms.</b> |       |                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                              |                                                                                        |                               |
| <b>Teaching and Learning Strategies</b>                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                              |                                                                                        |                               |
| Utilizing the strategies of electronic and classroom learning in Education                                                                                                                                                                                                                                                                                                                                                                            |       |                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                              |                                                                                        |                               |
| <b>Course Structure</b>                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                              |                                                                                        |                               |
| Week                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Hours | Required Learning Outcomes                                                                                                                                                                                                                                                                                                                                                         | Unit or subject name<br>Description depends on the Timing table<br>(Theoretical & Practical) | Learning method                                                                        | Evaluation method             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       | At the end of the course, the student will be able to know the plant kingdom, which includes the plant kingdom. The plant kingdom can be divided into the algae phylum, and the vascular and mossy phyla. The phylum Vascular is can be divided into ferns, gymnosperms, and angiosperms. Angiosperms contain flowering plants, and can be divided into monocots and dicotyledons. | Lab 1: Learn about the algae phylum and methods for collecting algae samples                 | Using detailed explanation with discussion beside, on-screen display and illustrations | Discussion and oral questions |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                                                                                                                                                                                                                                                                                                                                                                    | lab2 ; Types of algae cultivation media                                                      |                                                                                        |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                                                                                                                                                                                                                                                                                                                                                                                    | lab.3 : Learn about some cyanobacteria and green algae                                       |                                                                                        |                               |

|  |  |  |                                                                              |  |  |
|--|--|--|------------------------------------------------------------------------------|--|--|
|  |  |  | lab.4 : Identifying the characteristics of some red and brown algae          |  |  |
|  |  |  | Lab 5 : Identifying the characteristics of some economically important algae |  |  |
|  |  |  | Lab 6 :Exam 1                                                                |  |  |
|  |  |  | Lab 7: Characteristics of bryophyte with some example                        |  |  |
|  |  |  | Lec.8 : Hepaticopsida (Liverworts)                                           |  |  |
|  |  |  | lab.9 : Bryopsida (Mosses)                                                   |  |  |
|  |  |  | Lab 10 : Anthocerotopsida (Hornworts)                                        |  |  |
|  |  |  | Lab.11 : important Characteristics of Ferns                                  |  |  |
|  |  |  | Lab.12: General Characteristics of Lycopodium                                |  |  |
|  |  |  | Second exam                                                                  |  |  |
|  |  |  | Lab.15 : General characteristics of gymnosperms                              |  |  |

#### Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports.... etc

#### Learning and Teaching Resources

|                                                                                                                   |                                                                                           |
|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Required textbooks (Archegoniate Plants (2022) by Anand Sharma , algae (Fourth Edition)—by Linda E. Graham (2024) | Plant taxonomy, Simpson,2019                                                              |
| Main references (sources)                                                                                         |                                                                                           |
| Recommended books and references (scientific journals, reports...)                                                |                                                                                           |
| Electronic References, Websites                                                                                   | <a href="https://link.springer.com/journal/606">https://link.springer.com/journal/606</a> |

Course Name: General Entomology

Course Code: 5084123

Semester / Year: First, 2023 / 2024

| Description Preparation Date: 1/ 10/ 2023                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                                                                                                                                                                                                                                                                             |                                 |                 |                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----------------|-------------------|
| Available Attendance Forms:                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                                                                                                                                                                                                                                                                                             |                                 |                 |                   |
| Number of Credit Hours (Total) / Number of Units (Total): 1.30 hr. Theoretical and 1.30 hr. Practical                                                                                                                                                                                                                                                                                                                                                                       |       |                                                                                                                                                                                                                                                                                                             |                                 |                 |                   |
| Course administrator's name (mention all, if more than one name)                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                                                                                                                                                                                                                                                                                             |                                 |                 |                   |
| Name: Prof. Dr. Maan Abdul Azeez Shafeeq                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                                                                                                                                                                                                                                                                             |                                 |                 |                   |
| Email: <a href="mailto:maanalsalihi@gmail.com">maanalsalihi@gmail.com</a>                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                                                                                                                                                                                                                                                                                             |                                 |                 |                   |
| <b>Course Objectives</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                                                                                                                                                                                                                                                                             |                                 |                 |                   |
| The student will be familiar with the existing types of insects, their environments, their feeding methods, their living methods, how each of the insect's body systems works,                                                                                                                                                                                                                                                                                              |       |                                                                                                                                                                                                                                                                                                             |                                 |                 |                   |
| <b>Teaching and Learning Strategies</b>                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                                                                                                                                                                                                                                                                                             |                                 |                 |                   |
| This subject presents the Knowledge of all information related to insects in terms of morphology and physiology, as well as information and classification of the phylum of arthropods according to the classes they contain, as well as the mouth parts of insects, wings, and legs.                                                                                                                                                                                       |       |                                                                                                                                                                                                                                                                                                             |                                 |                 |                   |
| <b>Course Structure</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                                                                                                                                                                                                                                                                                             |                                 |                 |                   |
| Week                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Hours | Required Learning Outcomes                                                                                                                                                                                                                                                                                  | Unit or subject name            | Learning method | Evaluation method |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.30  | This subject presents the This subject presents Knowledge of all information related to insects in terms of morphology and physiology, as well as information and classification of the phylum of arthropods according to the classes they contain, as well as the mouth parts of insects, wings, and legs. | Phylum: Arthropoda              | Data Show       |                   |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.30  |                                                                                                                                                                                                                                                                                                             | Structure of the body           |                 |                   |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.30  |                                                                                                                                                                                                                                                                                                             | wall                            |                 |                   |
| 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.30  |                                                                                                                                                                                                                                                                                                             | Body region                     |                 |                   |
| 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.30  |                                                                                                                                                                                                                                                                                                             |                                 |                 |                   |
| 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.30  |                                                                                                                                                                                                                                                                                                             | Mouh parts                      |                 |                   |
| 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.30  |                                                                                                                                                                                                                                                                                                             | Thorax                          |                 |                   |
| 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.30  |                                                                                                                                                                                                                                                                                                             | Abdomen                         |                 |                   |
| 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.30  |                                                                                                                                                                                                                                                                                                             |                                 |                 |                   |
| 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1.30  |                                                                                                                                                                                                                                                                                                             | First Examination               |                 |                   |
| 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1.30  |                                                                                                                                                                                                                                                                                                             | Digestive system                |                 |                   |
| 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1.30  |                                                                                                                                                                                                                                                                                                             | Excretory system                |                 |                   |
| 13                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1.30  |                                                                                                                                                                                                                                                                                                             | Respiration system              |                 |                   |
| 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1.30  |                                                                                                                                                                                                                                                                                                             | Circulatory system              |                 |                   |
| 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1.30  |                                                                                                                                                                                                                                                                                                             | Reproductive system             |                 |                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                                                                                                                                                                                                                                                                             | Nervous system                  |                 |                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                                                                                                                                                                                                                                                                             | Sensory organs                  |                 |                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                                                                                                                                                                                                                                                                                             | Second Examination              |                 |                   |
| <b>Course Evaluation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                                                                                                                                                                                                                                                                             |                                 |                 |                   |
| Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc<br>24 marks (2 Theory exams) 2 marks (attendance) 2 marks (quizzes) = 28 marks (A theoretical quest)<br>8 marks (2 monthly practical exams) 2 marks (attendance) 2 marks (quizzes) = 12 marks (practical quest)<br>42 marks (theoretical final exam) 18 marks (final practical exam) = 60 marks (final) |       |                                                                                                                                                                                                                                                                                                             |                                 |                 |                   |
| <b>Learning and Teaching Resources</b>                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                                                                                                                                                                                                                                                                                                             |                                 |                 |                   |
| Required textbooks (curricular books, if any)                                                                                                                                                                                                                                                                                                                                                                                                                               |       |                                                                                                                                                                                                                                                                                                             | Principle of General Entomology |                 |                   |

|                                                                    |                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Main references (sources)                                          | Chapman, R.F. (2012). The Insects: Structure and Function: Stephen,                                                                                                                                                                                                                                                                 |
| Recommended books and references (scientific journals, reports...) | Introduction to Insect Biology and Diversity                                                                                                                                                                                                                                                                                        |
| Electronic References, Websites                                    | <a href="https://www.cambridge.org/iq/universitypress/subjects/life-sciences/entomology/insects-structure-and-function-5th-edition?format=PB&amp;isbn=9780521113892">https://www.cambridge.org/iq/universitypress/subjects/life-sciences/entomology/insects-structure-and-function-5th-edition?format=PB&amp;isbn=9780521113892</a> |

| Course Name: Plant taxonomy                                                                                                    |       |                                                                                                              |                                                                                              |                                                                                        |                               |
|--------------------------------------------------------------------------------------------------------------------------------|-------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------|
| Course Code:                                                                                                                   |       |                                                                                                              |                                                                                              |                                                                                        |                               |
| Semester / Year:2023-2024                                                                                                      |       |                                                                                                              |                                                                                              |                                                                                        |                               |
| Description Preparation Date: 1/3/2024                                                                                         |       |                                                                                                              |                                                                                              |                                                                                        |                               |
| Available Attendance Forms:                                                                                                    |       |                                                                                                              |                                                                                              |                                                                                        |                               |
| Number of Credit Hours (Total) / Number of Units (Total) 8 hrs. (2 hrs. Theoretical and 6 hrs. practical)                      |       |                                                                                                              |                                                                                              |                                                                                        |                               |
| 7.Course administrator's name (Dr. Adel Alwan, Dr. Hassan Abdul-Razak, Dr. Hadeel Radawi, Dr. Aseel Munther and Dr. Saba Hadi) |       |                                                                                                              |                                                                                              |                                                                                        |                               |
| Name: Dr. Hadeel Radawi                                                                                                        |       |                                                                                                              |                                                                                              |                                                                                        |                               |
| Email: sphh@uomustansiriyah.edu.iq                                                                                             |       |                                                                                                              |                                                                                              |                                                                                        |                               |
| <b>Course Objectives</b>                                                                                                       |       |                                                                                                              |                                                                                              |                                                                                        |                               |
| A comprehensive introduction to plant classification and related sciences and knowledge of morphological description.          |       |                                                                                                              |                                                                                              |                                                                                        |                               |
| Identification of plants specially the wild one.                                                                               |       |                                                                                                              |                                                                                              |                                                                                        |                               |
| Emphasis on morphological characters of plants as they are fundamental for plant identification                                |       |                                                                                                              |                                                                                              |                                                                                        |                               |
| <b>Teaching and Learning Strategies</b>                                                                                        |       |                                                                                                              |                                                                                              |                                                                                        |                               |
| Utilizing the strategies of electronic and classroom learning in Education                                                     |       |                                                                                                              |                                                                                              |                                                                                        |                               |
| <b>Course Structure</b>                                                                                                        |       |                                                                                                              |                                                                                              |                                                                                        |                               |
| Week                                                                                                                           | Hours | Required Learning Outcomes                                                                                   | Unit or subject name<br>Description depends on the Timing table<br>(Theoretical & Practical) | Learning method                                                                        | Evaluation method             |
|                                                                                                                                |       | At the end of the course, the student will be able to identify some of the plant families present in Baghdad | Lec.1 Plant taxonomy<br>Lab.1 Introduction of plant taxonomy                                 | Using detailed explanation with discussion beside, on-screen display and illustrations | Discussion and oral questions |
|                                                                                                                                |       |                                                                                                              | Lec.2 Plant Description<br>Lab.2 Plant description terminology                               |                                                                                        |                               |

|  |  |  |                                                                                                    |  |  |
|--|--|--|----------------------------------------------------------------------------------------------------|--|--|
|  |  |  | Lec.3 Classification systems and identification<br>Lab.3 Classification systems and identification |  |  |
|  |  |  | Lec.4 Life span and habitats<br>Lab.4 Life span and habitats by field work                         |  |  |
|  |  |  | Lec.5 Vegetative organs<br>Lab.5 Vegetative organs                                                 |  |  |
|  |  |  | Lec.6 Roots<br>Lab.6 Roots                                                                         |  |  |
|  |  |  | First exam                                                                                         |  |  |
|  |  |  | Lec.8 Stems and modification<br>Lab.8 Stems and modification                                       |  |  |
|  |  |  | Lec.9 Leaves and modifications<br>Lab.9 Leaves and modifications                                   |  |  |
|  |  |  | Lec.10 Flora parts<br>Lab.10 Flora parts                                                           |  |  |
|  |  |  | Lec.11 Inflorescences<br>Lab.11 Inflorescences                                                     |  |  |
|  |  |  | Lec.12 Pollination and fertilization<br>Lab.12 Field work to collect plants                        |  |  |
|  |  |  | Second exam                                                                                        |  |  |
|  |  |  | Lec.14 Description of Local Iraqi flora<br>Lab.14 Description of some Local Iraqi flora families   |  |  |

|                                                                                                                                                                                |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------|-------------------|
| <b>Course Evaluation</b>                                                                                                                                                       |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
| Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports.... etc             |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
| <b>Learning and Teaching Resources</b>                                                                                                                                         |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
| Required textbooks (curricular books, if any)                                                                                                                                  |       |                                                                                                                                                                                                                                                                                                             | Plant taxonomy, Simpson,2019          |                 |                   |
| Main references (sources)                                                                                                                                                      |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
| Recommended books and references (scientific journals, reports...)                                                                                                             |       |                                                                                                                                                                                                                                                                                                             | Taxon journal                         |                 |                   |
| Electronic References, Websites                                                                                                                                                |       |                                                                                                                                                                                                                                                                                                             | https://link.springer.com/journal/606 |                 |                   |
| Course Name: Insects Taxonomy                                                                                                                                                  |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
|                                                                                                                                                                                |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
| Course Code: 5084123                                                                                                                                                           |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
|                                                                                                                                                                                |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
| Semester / Year: Second, 2023 / 2024                                                                                                                                           |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
|                                                                                                                                                                                |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
| Description Preparation Date: 14 / 4 / 2024                                                                                                                                    |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
|                                                                                                                                                                                |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
| Available Attendance Forms:                                                                                                                                                    |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
|                                                                                                                                                                                |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
| Number of Credit Hours (Total) / Number of Units (Total): 1.30 hr. Theoretical and 1.30 hr. Practical                                                                          |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
|                                                                                                                                                                                |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
| Course administrator's name (mention all, if more than one name)                                                                                                               |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
| Name: Prof. Dr. Maan Abdul Azeez Shafeeq                                                                                                                                       |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
| Email: <a href="mailto:maanalsalihi@gmail.com">maanalsalihi@gmail.com</a>                                                                                                      |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
| <b>Course Objectives</b>                                                                                                                                                       |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
| The student will be familiar with the existing types of insects, their environments, their feeding methods, their living methods, how each of the insect’s body systems works, |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
| Teaching and Learning Strategies                                                                                                                                               |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
|                                                                                                                                                                                |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
| <b>Course Structure</b>                                                                                                                                                        |       |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |
| Week                                                                                                                                                                           | Hours | Required Learning Outcomes                                                                                                                                                                                                                                                                                  | Unit or subject name                  | Learning method | Evaluation method |
| 1                                                                                                                                                                              | 1.30  | This subject presents the This subject presents Knowledge of all information related to insects in terms of morphology and physiology, as well as information and classification of the phylum of arthropods according to the classes they contain, as well as the mouth parts of insects, wings, and legs. | Tax classification system             | Data Show       |                   |
| 2                                                                                                                                                                              | 1.30  |                                                                                                                                                                                                                                                                                                             | Class: Insecta,                       |                 |                   |
| 3                                                                                                                                                                              | 1.30  |                                                                                                                                                                                                                                                                                                             | <b>Subclass:</b>                      |                 |                   |
| 4                                                                                                                                                                              | 1.30  |                                                                                                                                                                                                                                                                                                             | Apterygota                            |                 |                   |
| 5                                                                                                                                                                              | 1.30  |                                                                                                                                                                                                                                                                                                             | Division:                             |                 |                   |
| 6                                                                                                                                                                              | 1.30  |                                                                                                                                                                                                                                                                                                             | Exopterygota                          |                 |                   |
| 7                                                                                                                                                                              | 1.30  |                                                                                                                                                                                                                                                                                                             | Order: Odonata                        |                 |                   |
| 8                                                                                                                                                                              | 1.30  |                                                                                                                                                                                                                                                                                                             | Order: Plecoptera.                    |                 |                   |
| 9                                                                                                                                                                              | 1.30  |                                                                                                                                                                                                                                                                                                             | Order: Orthoptera.                    |                 |                   |
| 10                                                                                                                                                                             | 1.30  |                                                                                                                                                                                                                                                                                                             | First Examination                     |                 |                   |
| 11                                                                                                                                                                             | 1.30  |                                                                                                                                                                                                                                                                                                             | Order: Blattodea.                     |                 |                   |
| 12                                                                                                                                                                             | 1.30  |                                                                                                                                                                                                                                                                                                             | Order: Mantodea.                      |                 |                   |
| 13                                                                                                                                                                             | 1.30  |                                                                                                                                                                                                                                                                                                             | Order:                                |                 |                   |
| 14                                                                                                                                                                             | 1.30  |                                                                                                                                                                                                                                                                                                             | Phasmatodea:                          |                 |                   |
| 15                                                                                                                                                                             | 1.30  |                                                                                                                                                                                                                                                                                                             |                                       |                 |                   |

|  |  |  |                                                                     |  |  |
|--|--|--|---------------------------------------------------------------------|--|--|
|  |  |  | Order:<br>Dermaptera.                                               |  |  |
|  |  |  | Order: Isoptera:<br>(TERMITES;                                      |  |  |
|  |  |  | Order:<br>Mallophaga.                                               |  |  |
|  |  |  | Order: Hemiptera.<br>(True Bugs,<br>Aphids, Scales,<br>and Allies). |  |  |
|  |  |  | Second<br>Examination                                               |  |  |

#### Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

24 marks (2 Theory exams) 2 marks (attendance) 2 marks (quizzes) = 28 marks (A theoretical quest)

8 marks (2 monthly practical exams) 2 marks (attendance) 2 marks (quizzes) = 12 marks (practical quest)

42 marks (theoretical final exam) 18 marks (final practical exam) = 60 marks (final)

#### Learning and Teaching Resources

|                                                                    |                                            |
|--------------------------------------------------------------------|--------------------------------------------|
| Required textbooks (curricular books, if any)                      | Principle of General Entomology            |
| Main references (sources)                                          | PRACTICAL MANUAL Insect Taxonomy           |
| Recommended books and references (scientific journals, reports...) | PRACTICAL MANUAL CLASSIFICATION OF INSECTS |
| Electronic References, Websites                                    | Handbook of Agricultural Entomology        |

Course Name: Invertebrate

Course Code:

Semester / Year:2023 - 2024

Description Preparation Date:1-9-2023

Available Attendance Forms:

Number of Credit Hours (Total) / Number of Units (Total)

5 ours ( 2 theory and 3 hours practical )

Course administrator's name (mention all, if more than one name)

Name: Prof.Dr.Nebrass Faleh Chachain and Prof.Dr.Sabaa tahr

Email:gmoon4444@uomustansiriyah.edu.iq.

Dr.saba@ uomustansiriyah.edu.iq.

#### Course Objectives

Identify invertebrate and their type .

Identify its characteristics and their life .....

Learn about their scientific , medical and environmental important .....

#### Teaching and Learning Strategies

Theoretical education

Practical education using visual teaching material such as shapes , slides and diagrams .

| Course Structure |       |                                                                                             |                      |                 |                   |
|------------------|-------|---------------------------------------------------------------------------------------------|----------------------|-----------------|-------------------|
| Week             | Hours | Required Learning Outcomes                                                                  | Unit or subject name | Learning method | Evaluation method |
| 1                |       | Brief invertebrates and types of cavities (coeloms).                                        |                      |                 |                   |
| 2                |       | Phylum: Protozoa classification and characteristic                                          |                      |                 |                   |
| 3                |       | Spp of protozoa <i>Amoeba</i> , <i>Paramecium</i> , <i>Euglena</i>                          |                      |                 |                   |
| 4                |       | Phylum: Porifera classification and characteristic and examples                             |                      |                 |                   |
| 5                |       | Phylum : Cnidaria classification and characteristic and examples.                           |                      |                 |                   |
| 6                |       | Exam                                                                                        |                      |                 |                   |
| 7                |       | Phylum : Mollusca classification and characteristic and examples                            |                      |                 |                   |
| 8                |       | Bivalvia classification and characteristic .                                                |                      |                 |                   |
| 9                |       | Phylum : Annelida classification and characteristics .                                      |                      |                 |                   |
| 10               |       | Phylum : Echinodermata                                                                      |                      |                 |                   |
| 11               |       | classification and characteristic and examples.                                             |                      |                 |                   |
| 12               |       | Phylum : Platyhelminthes classification and characteristic and examples .                   |                      |                 |                   |
| 13               |       | Exam.                                                                                       |                      |                 |                   |
| 14               |       | Phylum : Aschehelminthes classification and characteristic and examples.                    |                      |                 |                   |
| 15               |       | Phylum: Arthropoda Crustacea, classification and characteristic and examples <i>Julus</i> . |                      |                 |                   |

|                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                                                                                          |                                        |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------|----------------------------------------|--|--|
|                                                                                                                                                                                                                                                                                                                                                                                                                            |  | Phylum : Arthropoda Insecta and others <i>Argiop</i> classification and characteristic . |                                        |  |  |
| <b>Course Evaluation</b>                                                                                                                                                                                                                                                                                                                                                                                                   |  |                                                                                          |                                        |  |  |
| Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc                                                                                                                                                                                                                                                        |  |                                                                                          |                                        |  |  |
| <b>Learning and Teaching Resources</b>                                                                                                                                                                                                                                                                                                                                                                                     |  |                                                                                          |                                        |  |  |
| Required textbooks (curricular books, if any)                                                                                                                                                                                                                                                                                                                                                                              |  |                                                                                          |                                        |  |  |
| Main references (sources)                                                                                                                                                                                                                                                                                                                                                                                                  |  |                                                                                          |                                        |  |  |
| Recommended books and references (scientific journals, reports...)                                                                                                                                                                                                                                                                                                                                                         |  |                                                                                          | Invertebrata - Invertebrata Medicine . |  |  |
| Electronic References, Websites                                                                                                                                                                                                                                                                                                                                                                                            |  |                                                                                          |                                        |  |  |
| Course Name: Microbiology II                                                                                                                                                                                                                                                                                                                                                                                               |  |                                                                                          |                                        |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                                                                                          |                                        |  |  |
| Course Code:                                                                                                                                                                                                                                                                                                                                                                                                               |  |                                                                                          |                                        |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                                                                                          |                                        |  |  |
| Semester / Year: 2 <sup>nd</sup> semester 2023-2024                                                                                                                                                                                                                                                                                                                                                                        |  |                                                                                          |                                        |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                                                                                          |                                        |  |  |
| Description Preparation Date: 14/02/2024                                                                                                                                                                                                                                                                                                                                                                                   |  |                                                                                          |                                        |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                                                                                          |                                        |  |  |
| Available Attendance Forms: Attendance sheets                                                                                                                                                                                                                                                                                                                                                                              |  |                                                                                          |                                        |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                                                                                          |                                        |  |  |
| Number of Credit Hours (Total) / Number of Units (Total)                                                                                                                                                                                                                                                                                                                                                                   |  |                                                                                          |                                        |  |  |
| 5 hours ( 2 theory and 3 hours practical)                                                                                                                                                                                                                                                                                                                                                                                  |  |                                                                                          |                                        |  |  |
| 5 hours (2 theory 3 h practical ) 5                                                                                                                                                                                                                                                                                                                                                                                        |  |                                                                                          |                                        |  |  |
| Course administrator's name (mention all, if more than one name)                                                                                                                                                                                                                                                                                                                                                           |  |                                                                                          |                                        |  |  |
| Name: Prof. Dr Hamzeah Ali , <a href="mailto:Hamzia@uomustansiriyah.edu.iq">Hamzia@uomustansiriyah.edu.iq</a>                                                                                                                                                                                                                                                                                                              |  |                                                                                          |                                        |  |  |
| Email: <a href="mailto:Dr.amnaalhashimi@uomustansiriyah.edu.iq">Dr.amnaalhashimi@uomustansiriyah.edu.iq</a> .                                                                                                                                                                                                                                                                                                              |  |                                                                                          |                                        |  |  |
| Dr Amna Mohammed Dr Zaid shaker Dr Saba Talib Dr Tahreer hadi                                                                                                                                                                                                                                                                                                                                                              |  |                                                                                          |                                        |  |  |
| <b>Course Objectives</b>                                                                                                                                                                                                                                                                                                                                                                                                   |  |                                                                                          |                                        |  |  |
| The purpose of this semester of Microbiology is to familiarize the student with those concepts that are basic to prokaryotic and eukaryotic cells. Lecture is the foundation of the course, as the laboratories are designed to give the student the basic laboratory techniques necessary to identify microorganisms. The student is responsible for assignments (such as specific papers from the scientific literature) |  |                                                                                          |                                        |  |  |
| <b>Teaching and Learning Strategies</b>                                                                                                                                                                                                                                                                                                                                                                                    |  |                                                                                          |                                        |  |  |
| Teaching and learning microbiology effectively requires a combination of traditional and innovative strategies to engage students and facilitate their understanding of complex concepts. Here are some brief teaching and learning strategies tailored for microbiology:                                                                                                                                                  |  |                                                                                          |                                        |  |  |
| Active Learning: Encourage active participation through discussions, case studies, and group activities. This helps students apply theoretical knowledge to real-life scenarios, enhancing comprehension and retention.                                                                                                                                                                                                    |  |                                                                                          |                                        |  |  |
| Visual Aids: Utilize visual aids such as diagrams, models, and animations to illustrate microbial structures, processes, and interactions. Visual representation enhances understanding and makes abstract concepts more tangible.                                                                                                                                                                                         |  |                                                                                          |                                        |  |  |
| Laboratory Sessions: Provide hands-on laboratory sessions to allow students to observe, manipulate, and analyze microorganisms directly. Practical experience reinforces theoretical concepts and fosters critical thinking skills.                                                                                                                                                                                        |  |                                                                                          |                                        |  |  |

**Technology Integration:** Integrate technology tools such as virtual labs, simulation software, and interactive online modules. These resources offer opportunities for self-paced learning and enable students to explore microbiological concepts in an immersive environment.

**Peer Teaching:** Encourage peer teaching and collaboration by assigning group projects or peer-led discussions. This approach promotes active engagement, reinforces learning through teaching, and fosters a supportive learning community among students.

**Assessment for Learning:** Implement varied assessment methods such as quizzes, assignments, presentations, and concept maps to assess student understanding at different levels. Provide timely feedback to guide student progress and address misconceptions.

#### Course Structure

| Week | Hours | Required Learning Outcomes                                                                                                                                                                                                                                                                                                                                                                                                                               | Unit or subject name                                                                                                                                                                                                                                                                                                                                                                                                                                       | Learning method | Evaluation method |
|------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------|
|      |       | At the end of the course, students are expected to learn:<br>A1-The microorganisms and their types.<br>A2-The methods used for their study.<br>A3-To cover the organization of prokaryotic and eukaryotic cells.<br>A4-To new the microbial physiology & cell biology<br>A 5-Demonstrate practical skills in fundamental microbiological techniques. and To learn the basis of microbial control.<br>6-Solve problems in the context of this understandi | Environmental microbiology: 1-<br>Air microbiology<br><br>Water -2<br>microbiology<br><br>Soil -3<br>microbiology<br><br>Microbe Human interactions<br>(Infections ,Disease and Epidemiology -part1<br><br>First Exam<br><br>Microbe Human interactions<br>(Infections ,Disease and Epidemiology part2<br><br>Procedures for identifying & diagnosis infections<br><br>The Gram Positive bacteria<br><br>The Gram negative bacteria<br>----<br>Second Exam |                 |                   |

|                                                                                                                                                                                                                                  |  |  |                                                                                                                                                                                                               |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
|                                                                                                                                                                                                                                  |  |  | <p>Diagnosis of medical important parasites</p> <p>Diagnosis of medical important fungi</p> <p>Viral - diagnosis</p> <p>Normal flora of human body &amp; its significance</p> <p>Review before final exam</p> |  |  |
| <b>Course Evaluation</b>                                                                                                                                                                                                         |  |  |                                                                                                                                                                                                               |  |  |
| Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc 28 marks ( theory +12 marks practical ) 40 final exam 60 mar |  |  |                                                                                                                                                                                                               |  |  |
| <b>Learning and Teaching Resources</b>                                                                                                                                                                                           |  |  |                                                                                                                                                                                                               |  |  |
| Required textbooks (curricular books, if any) N/A                                                                                                                                                                                |  |  |                                                                                                                                                                                                               |  |  |
| Main references (sources)                                                                                                                                                                                                        |  |  | Talaro, K.P, and Ghess, B.(2015) .Foundation in Microbiology .ninth-ed. McGraw-Hill. International edition. New York.                                                                                         |  |  |
| Recommended books and references (scientific journals, reports...                                                                                                                                                                |  |  |                                                                                                                                                                                                               |  |  |
| Electronic References, Websites                                                                                                                                                                                                  |  |  |                                                                                                                                                                                                               |  |  |