



Ministry of Higher Education and
Scientific Research

Scientific Supervision and
Evaluation Apparatus Directorate of
Quality Assurance and Academic
Accreditation



Academic Program and Course Description Guide - Department of Biology

2025-2026

2026 A.D

1448 A.H

Academic Program Description Form

- Educational Institution: Wasit University / College of Science
- Scientific Department: Department of Biology
- Academic or Professional Program Name: Bachelor of Science degree in (Biology or Biotechnology)
- Final Degree Name: Bachelor of Science in Biology and Bachelor of Science in Biotechnology
- Academic System: (Semester-based fourth level), while the first , second, and third levels are taught according to the (Bologna Process).
- Accredited Accreditation Program: None
- Date of Description Preparation: 2025/09/ 22

Signature:

Head of Department Name:

Dr. Jawad Kadhim Isa

Date: 2025/09/26

Signature:

Scientific Associate Name:

Dr. Ali Jabbar Freih

Date: 2025/09/26

The file is checked by:

Department of Quality Assurance and University Performance

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Date : 2025/09

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مسؤول شعبة ضمان الجودة والاعتماد الجامعي

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Dr. Faik Jameel Hassan Maya

Dean

Signature

Approval of the Dean

Date: 2025/09/26

Introduction

An educational program is like a package of study courses that are put together in a way. The program is designed to help students develop the skills they need to succeed in the job market. To make sure the program is good it is reviewed every year by people inside and outside the program.

Academic Program Description

This description is a summary of the points of the program and its study courses. It focuses on the skills that students want to learn to achieve the programs goals. This description is very important because it helps the program get accredited. The teachers are in charge of writing it. They do it under the supervision of the academic departments.

This guide has been updated to include information about the study courses. It includes:

-Traditional Systems: This is about the way of doing things, where we document the academic program description for the whole year and for each semester.

- Bologna Process: This is a way of doing things, where we follow the rules set by the Department of Studies, Planning and Follow-up in a letter they sent on May 3 2023. This letter is, about colleges and institutes that use the "Bologna Process" in their system.

In conclusion we think it is very important to write down and document the program and course descriptions. This is a step to make sure the educational process works well.

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1-Vision and Mission of the Academic Program

A. Program vision

The College of Science and the Department of Life Sciences want to be the best at teaching biological science especially in the areas of microbiology and biotechnology. The Academic Program wants to have graduates who're good scientists and researchers. These scientists and researchers will help with development plans. They will also meet the needs of the job market in the health, industrial and environmental areas. The Academic Program wants to be one of the schools in the area and in the region.

B- Program mission

The mission of our program aims to prepare excellent scientific competencies in life sciences. It focuses on developing skills in microbiology and biotechnology through an advanced educational environment. We are committed to promoting scientific research, adopting modern technologies and biological sciences, and applying them practically. We strive to improve medical, environmental, and industrial services, thereby contributing to community service and effectively solving its problems.

2-Accreditation, External Influences

A- There is no Accreditation Program.

B- External Influences include:

- 1 .Scientific. Laboratories.
- 2 .The World Wide Web, which is the Internet.
- 3 .Conventional. Digital libraries.
- 4 .PowerPoint. Data projectors, which are also known as Data Show.
- 5 .Summer training and field. Training courses.

3-Academic Program Goals

1 .Providing Good Education: We want to give students an education that helps them learn a lot about life sciences, especially microbiology and biotechnology. This means they will learn how to think and solve problems in a smart way.

2 .Helping Students Get Degrees: We want our students to be able to get masters and PhD degrees in microbiology and related fields either in Iraq or in other countries.

3 .Teaching Laboratory Skills: We will give students hands-on training in labs to teach them about biotechnologies, how to analyze things in labs and how to use advanced scientific tools.

4 .Helping Students Do Scientific Research: We will teach students how to do research from designing experiments to looking at and understanding the results.

5 .Using Research to Help the Community: We will focus our research on solving problems in the community and work with community partners to make this happen.

6 .Publishing Important Research: We will help our teachers publish their research, in international journals and databases.

7 .Working with Universities: We will work with local and international universities and institutions to do scientific research together.

8 .Giving Back to the Community: We will do community service projects. Encourage our students and staff to volunteer.

9 .Helping Students Learn Outside of Class: We will have activities outside of class like summer training, field trips and lab work to help students learn skills and find their talents.

4- Required Program Learning Outcomes

A- Cognitive Goals

A1-Degree and Career Opportunities

- Graduates from the Department of Life Sciences obtain a Bachelor's degree in Life Sciences, specializing in either (Microbiology) or (Biotechnology). This degree provides them with the fundamental knowledge in the field of life sciences, with an emphasis on general biology, biotechnology, and molecular biology. These fundamentals are highly essential for those wishing to study medicine or dentistry in the future.
- Upon completing all academic levels, the student becomes well-qualified to join professional health programs, work in practical laboratories, environmental centers, and scientific research centers. They can also pursue postgraduate studies if they wish to do so.

A2- Program Learning Outcomes (PLOs)

Upon graduation, students achieve several scientific and practical outcomes, including the ability to:

1. List cell components and explain the relationship between them within the living cell.
2. Effectively present biological research findings in both written and oral formats.
3. Conduct biological laboratory experiments and field studies using scientific equipment while adhering to biosafety and biosecurity protocols.
4. Explain historical theories of biological evolution, including the development of foundational theories and laws governing the nature of this science.
5. Master the accurate statistical analysis of data.

6. Logically analyze information and utilize critical thinking to solve problems and develop research projects effectively.

B- Skill-Based Goals of the Program

1. **B1-** Teaching students how to think logically is essential; this type of thinking helps them better understand their studies. Training students to analyze information and use precise terminology within their subjects enables them to comprehend concepts in greater detail.
2. **B2-** Helping students develop their capacity to critically reflect on what they study enhances their learning abilities and encourages them to pursue continuous improvement.
3. **B3-** Training students to communicate articulately and utilize modern educational tools effectively is critical; this enables them to interact more efficiently with their peers and instructors, ensuring their academic success.

5- Effective Teaching and Learning Methods

1- **Lecturing:** Lecturing is considered an essential part of academic work, where the lecturer presents information and concepts to students in an organized and structured manner.

2- **Asking Questions and Opening Dialogue:** It is important to ask questions and listen to different opinions, as this enhances student interaction and stimulates group discussion.

3- **Computer-Assisted Teaching and Screen Presentations:** Using technology in teaching can increase the quality of learning, as information is displayed in a visual and interactive format using screens and computers.

4- Assigning Research Papers to Students: Assigning students to write research papers can contribute to developing their research and analytical skills, as they learn how to collect information, analyze data, and draw conclusions.

5- Participating in Conferences and Scientific Field Trips: Participating in scientific conferences and field trips can provide students with valuable opportunities to learn about the latest developments in their field of study and exchange experiences with students and professors from different institutions.

6-Assessment Methods

1-Daily and Monthly Quizzes / Exams.

2-Scientific Research Papers.

3- Student Seminars and Panel Discussions.

7-Faculty Members and Academic Staff

Academic Rank	General Specialization	Fine Specialization	Special Requirements / Skills	Permanent Staff	Lecturer
Professor	Biological Sciences	Biotechnology		1	
Professor	Biological Sciences	Physiology		1	
Professor	Biological Sciences	Microbiology		2	
Professor	Veterinary Medicine	Microbiology		1	
Professor	Plant Protection	Mycology		1	
Professor	Veterinary Medicine	Histology & Anatomy		1	
Professor	Veterinary Medicine	Parasitology		1	
Professor	Biological Sciences	Plant Physiology		2	
Professor	Biological Sciences	Cytogenetics		1	
Professor	Biological Sciences	Ecology		2	
Professor	Biological Sciences	Parasitology		2	
Assistant Professor	Biological Sciences	Plant Physiology		1	
Assistant Professor	Biological Sciences	Molecular Biology		1	
Assistant Professor	Biological Sciences	Biotechnology		1	

Assistant Professor	Biological Sciences	Food Microbiology		1	
Assistant Professor	Biological Sciences	Immunology		1	
Assistant Professor	Biological Sciences	Zoology		4	
Assistant Professor	Biological Sciences	Botany		1	
Assistant Professor	Biological Sciences	Microbiology		1	
Lecturer	Biological Sciences	Molecular Biology		1	
Lecturer	Biological Sciences	Zoology		18	
Lecturer	Veterinary Medicine	Virology		1	
Lecturer	Biological Sciences	Immunology		1	
Assistant Lecturer	Biological Sciences	Zoology		14	
Assistant Lecturer	Physical Education	Physical Education		1	
Assistant Lecturer	Computer Science	Computer Science		1	
Assistant Lecturer	Veterinary Medicine	Parasitology		1	
Assistant Lecturer	Biological Sciences	Microbiology		5	
Assistant Lecturer	Biological Sciences	Botany		2	
Biologist	Biological Sciences	Biological Sciences		4	

8- Program Description

-In the third stage, students specialize in either the **Microbiology Branch** or the **Biotechnology Branch**.

-First Stage

No.	Academic Year / Level	Course Title	Theoretical Hours	Practical Hours	Number of Units
1	First Stage/ 1st Semester	Human Rights	2	-	1
2		Analytical Chemistry	2	2	3
3		General Mathematics	2	-	3
4		Biophysics	2	2	3
5		Zoology	2	2	3
6		Arabic Language	2	-	1
		Total (18 Hours)	12	6	14
1	First Stage /	Biostatistics	2	2	3

2	2nd Semester	Organic Chemistry	2	2	3
3		General Botany	2	2	3
4		English Language I	2	-	1
5		Computer Science II	2	2	3
6		Biosafety and Biosecurity	2	-	1
		Total (22 Hours)	12	8	14

-Second Stage

No.	Academic Year / Level	Course Title	Theoretical Hours	Practical Hours	Number of Units
1	Second Stage / 1st Semester	Biochemistry I	2	2	3
2		General Entomology	2	2	3
3		General Microbiology I	2	2	3
4		Plant Anatomy	2	2	3
5		Invertebrates	2	2	3
6		English Language II	2	-	2
7		Computer Science	-	2	1
		Total (22 Hours)	12	10	18
1	Second Stage / 2nd Semester	Biochemistry II	2	2	3
2		Insect Taxonomy	2	2	3
3		General Microbiology II	2	2	3
4		Plant Taxonomy	2	2	3
5		Parasitology	2	2	3
6		Plant Groups	2	2	3
7		Computer Science	-	2	1
		Total (26 Hours)	12	14	19

First: -Microbiology branch

Third Stage

No.	Academic Year / Level	Course Title	Theoretical Hours	Practical Hours	Number of Units
1	Third Stage / 1st Semester	Microbial Physiology	2	2	3
2		Immunology	2	2	3
3		Soil Microbiology	2	2	3
4		Mycology I	2	2	3
5		Molecular Biology I	2	2	3
6		Elective	2	2	3
7		English Language III	2	-	2
8		Total (26 Hours)	14	12	20
1	Third Stage / 2nd Semester	Microbial Pollution	2	2	3
2		Hematology	2	2	3
3		Industrial Fermentations	2	2	3
4		Protozoology	2	2	3
5		Mycology II	2	2	3
6		Molecular Biology II	2	2	3
7		Elective	2	2	3
8		Total (28 Hours)	14	14	21

-Fourth Stage

No.	Academic Year / Level	Course Title	Theoretical Hours	Practical Hours	Number of Units
1	Fourth Stage	Philosophy of Science & Logic of Scientific Research	1	-	1
2		Pathogenic Bacteria	2	2	3

3	/ 1st Semester	Genetic Engineering	2	2	3
4		Food Microbiology	2	2	3
5		Research Project I	-	-	1
6		Antibiotics	2	2	3
7		Elective	2	2	3
8		English Language IV	2	-	2
9		Total (25 Hours)	13	12	19
1	Fourth Stage / 2nd Semester	Virology	2	2	3
2		Biotechnology	2	2	3
3		Microbial Genetics	2	2	3
4		Industrial Microbiology	2	2	3
5		Research Project II	-	-	1
6		Microbial Ecology	2	2	3
7		Elective	2	2	3
8		Total (24 Hours)	12	12	19

Second-Biotechnology branch

Third Stage

No.	Academic Year / Level	Course Title	Theoretical Hours	Practical Hours	Number of Units
1	Third Stage / 1st Semester	Molecular Biology I	2	2	3
2		Immunology	2	2	3
3		Histology	2	2	3
4		Environmental Biotechnology	2	2	3
5		Plant Biotechnology	2	2	3
6		General Genetics	2	2	3
7		Elective (Mycology I)	2	2	3

8		English Language III	2	-	2
		Total (28 Hours)	16	14	23
1	Third Stage / 2nd Semester	Molecular Biology II	2	2	3
2		Hematology	2	2	3
3		Environmental Pollution	2	2	3
4		Tissue Culture	2	2	3
5		Animal Physiology	2	2	3
6		Cytogenetics	2	2	3
7		Elective	2	2	3
		Total (28 Hours)	14	14	21

-Fourth Stage

No.	Academic Year / Level	Course Title	Theoretical Hours	Practical Hours	Number of Units
1	Fourth Stage / 1st Semester	Philosophy of Science & Logic of Scientific Research 1	1	-	1
2		Genetic Engineering I	2	2	3
3		Reproductive Biotechnology	2	2	3
4		Research Project I	-	2	2
5		Microbial Physiology	2	2	3
6		Elective	2	2	3
7		English Language IV	2	-	2
8		Total (21 Hours)	11	10	17
1	Fourth Stage / 2nd Semester	Virology and Vaccines	2	2	3
2		Genetic Engineering II	2	2	3
3		Nanobiotechnology	2	2	3
4		Industrial Microbiology	2	2	3
5		Research Project II	-	-	1

6		Endocrinology	2	2	3
7		Elective	2	2	3
8		Total (24 Hours)	12	12	19

9. Faculty Professional Development Planning

The academic and professional development plan for faculty members relies on effective teaching and learning strategies. This plan aims to enhance faculty performance, develop their skills, and precisely evaluate learning outcomes. Through these strategies, academic and professional development goals can be achieved, such as improving teaching quality, reinforcing faculty capabilities, and delivering outstanding learning experiences for students. Furthermore, professional development programs are an essential component of this plan, providing university educators with opportunities to enhance their skills and acquire modern knowledge within their respective fields of specialization. Overall, this plan aims to elevate the academic and professional performance levels of faculty members, thereby improving educational quality and advancing the university as a whole.

10. College Admission Criteria

First: College Admission Requirements:

1. Adopting student admission requirements in accordance with the Central Admission regulations of the Ministry of Higher Education and Scientific Research.
2. Successfully passing any special exam or personal interview deemed necessary by the College or University Council.
3. Being medically fit for the specific specialization applied for.

Second: Department Admission Requirements:

1. Selecting the student's preferences out of multiple choices, ranked in order of priority.
2. The student's high school (General Secondary Education) GPA.
3. The grade average of the prerequisite course for the department in which the student wishes to study.
4. The enrollment capacity of the scientific department.

11. Most Important Sources of Information About the Program

1. Teaching methods and curricula approved by Wasit University.
2. Various American and British university programs, such as the University of Iowa, University of Arkansas, University of South Carolina, University of Leeds, and University of Birmingham.

12. Curriculum Skills Plan

Year / Level	Course Name	Course Code	Core or Elective	Cognitive Goals (A)	Program-Specific Skills (B)	Affective & Value Goals (C)	General & Transferable Skills (D)
First Year / First Semester	Human Rights	-	Core	✓	✓	✓	✓
	General Mathematics	-	Core	✓	✓	✓	✓
	Analytical Chemistry	-	Core	✓	✓	✓	✓
	Biophysics	-	Core	✓	✓	✓	✓
	General Zoology	-	Core	✓	✓	✓	✓
	Arabic Language	-	Core	✓	✓	✓	✓
First Year / Second Semester	Biostatistics	-	Core	✓	✓	✓	✓
	Organic Chemistry	-	Core	✓	✓	✓	✓
	General Botany	-	Core	✓	✓	✓	✓
	English Language 1	-	Core	✓	✓	✓	✓
	Computer Sciences 2	-	Core	✓	✓	✓	✓
	Biosafety & Biosecurity	-	Core	✓	✓	✓	✓

Year / Level	Course Name	Course Code	Core or Elective	Cognitive Goals (A)	Program-Specific Skills (B)	Affective & Value Goals (C)	General & Transferable Skills (D)
Second Year / First Semester	General Mathematics	-	Core	✓	✓	✓	✓
	Biochemistry 1	-	Core	✓	✓	✓	✓
	General Entomology	-	Core	✓	✓	✓	✓
	General Microbiology 1	-	Core	✓	✓	✓	✓
	Plant Anatomy	-	Core	✓	✓	✓	✓
	Invertebrates	-	Core	✓	✓	✓	✓
	English Language 2	-	Core	✓	✓	✓	✓
Second Year / Second Semester	Biochemistry 2	-	Core	✓	✓	✓	✓
	Insect Taxonomy	-	Core	✓	✓	✓	✓
	General Microbiology 2	-	Core	✓	✓	✓	✓
	Plant Taxonomy	-	Core	✓	✓	✓	✓
	Parasitology	-	Core	✓	✓	✓	✓
	Plant Groups	-	Core	✓	✓	✓	✓

Microbiology Branch

Year / Level	Course Name	Course Code	Core or Elective	Cognitive Goals (A)	Program-Specific Skills (B)	Affective & Value Goals (C)	General & Transferable Skills (D)
Third Year / First Semester	Computer Sciences	-	Core	✓	✓	✓	✓
	Microbial Physiology	-	Core	✓	✓	✓	✓
	Immunology	-	Core	✓	✓	✓	✓
	Soil Microbiology	-	Core	✓	✓	✓	✓
	Mycology 1	-	Core	✓	✓	✓	✓
	Molecular Biology 1	-	Core	✓	✓	✓	✓
Third Year / Second Semester	Computer Sciences	-	Core	✓	✓	✓	✓
	Microbial Pollution	-	Core	✓	✓	✓	✓
	Hematology	-	Core	✓	✓	✓	✓
	Industrial Fermentations	-	Core	✓	✓	✓	✓
	Protozoology	-	Core	✓	✓	✓	✓
	Mycology 2	-	Core	✓	✓	✓	✓

Fourth Year / First Semester	English Language 3	-	Core	✓	✓	✓	✓
	Philosophy of Science and Logic	-	Core	✓	✓	✓	✓
	Pathogenic Bacteria	-	Core	✓	✓	✓	✓
	Genetic Engineering	-	Core	✓	✓	✓	✓
	Food Microbiology	-	Core	✓	✓	✓	✓
	Antibiotics	-	Core	✓	✓	✓	✓
Fourth Year / Second Semester	Molecular Biology 2	-	Core	✓	✓	✓	✓
	Virology	-	Core	✓	✓	✓	✓
	Biotechnology	-	Core	✓	✓	✓	✓
	Microbial Genetics	-	Core	✓	✓	✓	✓
	Microbial Ecology	-	Core	✓	✓	✓	✓
	Graduation Project	-	Core	✓	✓	✓	✓

Biotechnology Branch

Year / Level	Course Name	Course Code	Core or Elective	Cognitive Goals (A)	Program-Specific Skills (B)	Affective & Value Goals (C)	General & Transferable Skills (D)
Third Year / First Semester	Molecular Biology 1	-	Core	✓	✓	✓	✓
	Immunology	-	Core	✓	✓	✓	✓
	Histology	-	Core	✓	✓	✓	✓
	Environmental Biotechnology	-	Core	✓	✓	✓	✓
	Plant Biotechnology	-	Core	✓	✓	✓	✓
	General Genetics	-	Core	✓	✓	✓	✓
Third Year / Second Semester	Molecular Biology 2	-	Core	✓	✓	✓	✓
	Hematology	-	Core	✓	✓	✓	✓
	Environmental Pollution	-	Core	✓	✓	✓	✓
	Tissue Culture	-	Core	✓	✓	✓	✓
	Animal Physiology	-	Core	✓	✓	✓	✓
	Cytogenetics	-	Core	✓	✓	✓	✓

Fourth Year / First Semester	Mycology 1	-	Core	✓	✓	✓	✓
	English Language 3	-	Core	✓	✓	✓	✓
	Philosophy of Science and Logic of Scientific Research 1	-	Core	✓	✓	✓	✓
	Genetic Engineering 1	-	Core	✓	✓	✓	✓
	Reproductive Biotechnology	-	Core	✓	✓	✓	✓
Fourth Year / Second Semester	Microbial Physiology	-	Core	✓	✓	✓	✓
	Viruses and Vaccines	-	Core	✓	✓	✓	✓
	Genetic Engineering 2	-	Core	✓	✓	✓	✓
	Nanobiotechnology	-	Core	✓	✓	✓	✓
	Industrial Microbiology	-	Core	✓	✓	✓	✓
	Endocrinology	-	Core	✓	✓	✓	✓
	Graduation Project	-	Core	✓	✓	✓	✓

Second Stage

Course Description Form

Course Name:	
Baathist crimes	
Course Code:	
BioSG-217	
Semester / Year:	
Second semester	
Description Preparation Date:	
2026 / 7 / 7	
Available Attendance Forms:	
In – person lectures	
Number of Credit Hours (Total) / Number of Units (Total)	
2 hours –in week	
Course administrator's name (mention all, if more than one name)	
Name: Dr. Ahmed Abdul Hamed Resen Email: ahmedabd@uowasit.edu.iq	
Course Objectives	
Course Objectives	 - Educating students about the crimes committed by the former regime against the Iraqi people. - Raising student awareness and

		equipping them to counter the lies of the former regime's cronies. - Educating students about the crimes committed by the former regime against humanity as a whole. - Educating students about the crimes committed by the former regime against the environment. - Educating students about the crimes committed by the former regime against religious scholars and progressive thinkers.
Teaching and Learning Strategies		
Strategy	-Group discussions and assignment completion - Fostering a competitive atmosphere among students and addressing individual differences through appropriate educational aids	-

		Scientific reports -			
		Incorporating modern teaching methods -			
		Encouraging students to conduct research and investigate evidence -			
– Theory Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	The program targets first-year students.	Introduction Ba'athist Crimes Against the Intellectual Class in Society	Theoretical content is presented through lectures, board illustrations, and classroom discussions.	Assessment is conducted through multiple tests and the evaluation of reports.
2	2	Military death-penalty courts			Preparing the daily log, daily

					tests, and discussion.
3	2	The Battle of Al-Anfal			Daily preparation, daily exams, and discussion.
4	2	Chemical attack on Halabja			Preparing the daily log, daily tests, and discussion
5	2	Battle of the Jasim River			Preparing the daily log, daily tests, and discussion
6	2	Assassinations of religious scholars			Preparing the daily log, daily tests, and discussion
7			First Monthly Exam	First Monthly Exam	exam

8	2	The Iran-Iraq War			Preparing the daily log, daily tests, and discussion
9	2	Battle of Mount Mawt			Preparing the daily log, daily tests, and discussion
10	2	Execution of soldiers who refuse to fight.			Preparing the daily log, daily tests, and discussion
11	2	The Kuwait War			Preparing the daily log, daily tests, and discussion
12	2	The economic blockade and its consequences for the people			Preparing the daily log, daily tests, and discussion
13	2	The Sha'ban Intifada and Its Dimensions			Preparing the daily log, daily tests, and discussion
14	2	Striking holy sites and killing innocent people within them.			Preparing the daily log, daily tests, and discussion
15			Second	Second	exam

			Monthly Exam	Monthly Exam	
– Practical Course Structure					
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
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 Second Semester

Theory

30 Activities and Quizzes Second Exam 10 First Exam 10

Final Exam 50

Learning and Teaching Resources

Required textbooks (curricular books, if any)

The Book of Ba'ath Crimes

Main references (sources)

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

Electronic References, Websites

Course Description Form

1. Course Name	
Plant Anatomy	
2. Course Code	
BioSG-215	
3. Semester / Year	
)2026-2025First Semester (	
4. Description Preparation Date:	
51/10/202	
5. Available Attendance Forms	
Actual Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
(2 Hours Theory)and (2 hours practical)	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. doctor : Wasan Hamza Mezail Email: whamza@uowasit.edu.iq Asst.Prof. Roaa Mohammed Hassan Lect. Safa Hashim Jumaa Lect. Zainab Abdul Jabbar Aboud Biologist Marwa Muheibis Thujeil	
8. Course Objectives	
Course Objectives	This study is focusing on the internal structure and function of plant cells, tissue, and organs. This includes the problem of the use of external sources of matter and energy in the processes of metabolism, as well as the growth and development processes and their internal regulation. in addition, training students in the proper use of the compound light microscope and to give them experience in interpreting images that they see through the microscope in terms of how plant structure is related to function.

9. Teaching and Learning Strategies					
Strategy	- ourse covers the anatomy and morphology of thallophyte, bryophytes and tracheophy with emphasis on the different levels of organization found in each. Comparison of ce tissues and tissue systems in these groups. Details of anatomy and morphology gymnosperms and engiosperms in relation to habit and habitat				
10. Course Structure					
Week	Hours	Required Learning Outcomes	/Unit or subject name Theoretical	/Learning method practical	Evaluation method
1	4	Referred to in the previous axis and each according to the content	Introduction to Plant Anatomy		Daily preparation and oral exam and Discussion
2	4		Plant Tissue		Daily preparation and oral exam and Discussion
3	4		Plant Tissue		Daily preparation and oral exam and Discussion
4	4		Plant Tissue		Daily preparation and oral exam and Discussion
5	4		Plant Tissue		Daily preparation and oral exam and Discussion
6	4		Plant Tissue		Daily preparation and oral exam and Discussion
7	4		Leaf Anatomy		Daily preparation and oral exam and Discussion
8	4		Midterm Exam		Exam.
9	4		Leaf Anatomy		Daily preparation and oral exam and Discussion
10	4		Stem Anatomy		Daily preparation and oral exam and Discussion
11	4		Root Anatomy		Daily preparation and oral exam and Discussion
12	4		Flower Structure		Daily preparation and

					oral exam and Discussion
13	4		Fruits structure		Daily preparation and oral exam and Discussion
14	4		Seed Structure		Daily preparation and oral exam and Discussion
16	4		Second exam.	Second exam.	Exam.

11.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

Course	THEORETICAL			PRACTICAL			Final -Exam
	First Exam.	First Exam.	Quizzes	First Exam.	First Exam.	Quizzes	
1nd	10	10	10	10	5	5	50

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Harleese B. Beck. (2010).An Introduction to Plant Structure and Development. Cambridge University. Second edition. 2.Paula J. Rudall. (2007) Anatomy of flowering plants, an introduction to flowering and development. Cambridge University. 3.Ratikanta Maiti , Pratik Satya, Dasari Rajkumar, and Allam Daswamy.(2012). Crop Plant Anatomy. CAB International.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

13.Course Name	
Plant Taxonomy	
14.Course Code	
BioSG-225	
15.Semester / Year	
)6-2022025Second Semester (	
16.Description Preparation Date:	
6/20221/	
17.Available Attendance Forms	
Actual Attendance	
18.Number of Credit Hours (Total) / Number of Units (Total)	
(2 Hours Theory)and (2 hours practical)	
19.Course administrator's name (mention all, if more than one name)	
Name: Prof. doctor : Wasan Hamza Mezail Email: whamza@uowasit.edu.iq Lect. Safa Hashim Jumaa Lect. Zainab Abdul Jabbar Aboud Biologist Marwa Muheibis Thujeil	
20.Course Objectives	
Course Objectives	1. Identify the most important different foundations on which taxonomy is based and its most important objectives 2. Explain the taxonomic evidence on which taxonomy depends 3. Explains the organizational structure of plant classification and the most important laws, rules and basics of scientific naming of plants 4. Enumerates thephenotypic characteristics of the floral plant

	5. Distinguish the relationship between sources of information related to taxonomy 6. Recognize the historical development of the classification 7. Compare the characteristics of plants in plant groups of different families
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21. Teaching and Learning Strategies

Strategy	- 1. Teaching lectures using the demo device (Data show) - 2. Assigning students to conduct reports and research on certain topics related to content of the course - 3. Hands
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22. Course Structure

Week	Hours	Required Learning Outcomes	/Unit or subject name Theoretical	/Learning method practical	Evaluation method
1	4	Referred to in the previous axis and each according to the content	A comprehensive introduction to the history of taxonomy – Objectives of taxonomy – Foundations of the division of botany	Home Work and Lab	Daily preparation and oral exam and Discussion
2	4		The taxonomic evidence on which taxonomy depends and recent trends in taxonomy.	Home Work and Lab	Daily preparation and oral exam and Discussion
3	4		Organizational Structure of the taxonomy	Home Work and Lab	Daily preparation and oral exam and Discussion
4	4		Laws, rules and basics of scientific nomenclature of plants	Home Work and Lab	Daily preparation and oral exam and Discussion
5	4		First midterm exam	Home Work and Lab	Daily preparation and oral exam and Discussion
6	4		Sources of phenotypic taxonomic traits: (vegetative total)	Home Work and Lab	Daily preparation and oral exam and Discussion
7	4		Floral and Floral Law	Home Work and Lab	Daily preparation and oral exam and Discussion

8	4		Roots system	Home Work and Lab	Exam.
9	4		Second midterm exam	Home Work and Lab	Daily preparation and oral exam and Discussion
10	4		Study of different fruit types of seeded plants	Home Work and Lab	Daily preparation and oral exam and Discussion
11	4		Sources of information related to taxonomy	Home Work and Lab	Daily preparation and oral exam and Discussion
12	4		Historical development of taxonomic systems of plant division with emphasis on modern taxonomy	Home Work and Lab	Daily preparation and oral exam and Discussion
13	4		Study examples of some plant species in terms of their characteristics, classification bases and economic importance	Home Work and Lab	Daily preparation and oral exam and Discussion
14	4		Final practical exam	Home Work and Lab	Daily preparation and oral exam and Discussion
16	4			Home Work and Lab	Exam.

23.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

Course	THEORETICAL			PRACTICAL			Final -Exam
	First Exam.	First Exam.	Quizzes	First Exam.	First Exam.	Quizzes	
1nd	10	10	10	10	5	5	50

24.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Qasim Al-Sahar, Plant Taxonomy, Academic Library. Second Edition Muhammad Miloud Khalifa, Practical Botany. Arab Book House. First Edition Al-Razzaq Al-Sharif, Fundamentals of Botany. Dar Al-Hikma Second Editio
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Third Stage Biotechnology

Course Description Form

Course Name:	
histology	
Course Code:	
BioST-313	
Semester / Year:	
Phase Three – Chapter One	
Description Preparation Date:	
1/6/2026	
Available Attendance Forms:	
In person	
Number of Credit Hours (Total) / Number of Units (Total)	
60 hours, 5 units	
Course administrator's name (mention all, if more than one name)	
Name: Esraa Abdul Khaliq Zegyer Email: azegher@uwasit.edu.iq Huda Kareem Sarboot Ikram Saad Abdul Hussain	
Course Objectives	
Course Objectives	1-Understanding the concept of histology and its importance. 2. Studying the basic types of tissues and their characteristics.

			3. Differentiating between epithelial, connective, muscular, and nervous tissues. 4. Understanding the microscopic structure of different organs and tissues. 5. Relating tissue structure to the physiological function of tissues		
Teaching and Learning Strategies					
Strategy		Teaching and learning strategies and methods adopted in the program's overall implementation: Thinking and discussion approach Practical tests used in laboratories Learning through exploratory lectures Lectures, use of the whiteboard and delivery, illustrative presentations (using diagrams, images, and educational films), interactive discussion, self-directed learning			
– Theory Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	To identify and classify epithelial tissue and its types	Epithelial tissues	lecture	Short quiz
2	2	To identify and explain connective tissue and its components	Connective Tissue (CT)	a lecture	Report

3	2	To differentiate between the types of connective tissue	Types of Connective Tissue	a lecture	Assignment
4	2	To describe and differentiate between the types of muscle tissue	Muscle tissue	a lecture	Participation
5	2	To explain the structure of nervous tissue and the functions of nerve and glial cells	Nervous tissue	a lecture	Report assignment
6	2	To explain the histological structure of the nervous system and identify its components	nervous system	a lecture	Short quiz
7	2	To describe the histological structure of lymphatic organs	Lymphoid Organs	a lecture	Report
8	2	To explain the layers of the skin and its components	Skin	a lecture	Assignment
9	2	To describe the histological structure of the digestive tract	Digestive system	a lecture	Participation
10	2	To explain the histological structure of the small intestine and its relationship to absorption	Small intestine	a lecture	Report assignment
11	2	To explain the histological structure	Male genital system	a lecture	Short quiz

		of the male reproductive system			
12	2	To explain the histological structure of the female reproductive system	Female genital system	a lecture	Report
13	2	To describe the histological structure of the urinary system	Urinary system	a lecture	Assignment
14	2	To explain the histological structure of the upper respiratory tract	Upper Respiratory system	a lecture	Short quiz
15	2	To describe the histological structure of the lower respiratory tract	Lower Respiratory system	a lecture	Report
– Practical Course Structure					
1	2	Identifying and microscopically distinguishing types of epithelial tissues	Epithelial tissues	Practical demonstration	Short Quiz
2	2	Identifying the components and characteristics of connective tissue	Connective Tissue (CT)	Practical demonstration	Assignment
3	2	Distinguishing between different types of connective tissue	Types of Connective Tissue	Practical demonstration	Practical Exam
4	2	Distinguishing between types of muscle tissue	Muscle tissue	Practical demonstration	Short Quiz
5	2	Identifying the components of nervous tissue	Nervous tissue	Practical demonstration	Assignment

6	2	Describing the histological structure of the nervous system	nervous system	Practical demonstration	Participation
7	2	Identifying the histological structure of lymphatic organs	Lymphoid Organs	Practical demonstration	Practical Exam
8	2	Distinguishing the layers of the skin	Skin	Practical demonstration	Short Quiz
9	2	Identifying the histological structure of the organs of the digestive system	Digestive system	Practical demonstration	Assignment
10	2	Distinguishing the layers of the small intestine	Small intestine	Practical demonstration	Practical Exam
11	2	Identifying the histological structure of the organs of the male reproductive system	Male genital system	Practical demonstration	Short Quiz
12	2	Identifying the histological structure of the organs of the female reproductive system	Female genital system	Practical demonstration	Assignment
13	2	Identifying the histological structure of the kidneys and urinary tract	Urinary system	Practical demonstration	Practical Exam
14	2	Identifying the histological structure of the upper respiratory tract	Upper Respiratory system	Practical demonstration	Short Quiz
15	2	Identifying the histological structure of the lower respiratory tract	Lower Respiratory system	Practical demonstration	Assignment

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)	Basic histology
Main references (sources)	Comparative histology Textbook of Histology
Recommended books and references (scientific journals, reports...)	Jonquiere's basic histology Essential Histology
Electronic References, Websites	Histology Guide Virtual Histology

Course Description Form

Course Name:
Tissue technic
Course Code:
BioST-327
Semester / Year:
Phase Three - Chapter Two
Description Preparation Date:
1/6/2026
Available Attendance Forms:
In person
Number of Credit Hours (Total) / Number of Units (Total)
60 hours, 5 units

Course administrator's name (mention all, if more than one name)	
Name: Esraa Abdul Khaliq Zegyer Email: azegher@uwasit.edu.iq Huda Kareem Sarboot Ikram Saad Abdul Hussain	
Course Objectives	
Course Objectives	General Objective: To provide students with the theoretical knowledge and practical skills necessary for handling biological samples and converting them into high-quality tissue slides suitable for microscopic examination. First Objective: To familiarize students with the sequential steps of tissue sample preparation, from fixation and clarification to staining and loading. Second Objective: To enable students to operate and calibrate tissue sectioning equipment such as the microtome and tissue processor. Third Objective: To equip students with the skill to identify common artifacts during preparation and how to avoid them to ensure accurate medical diagnoses
Teaching and Learning Strategies	
Strategy	Method of presentation, clarification, question and answer, and discussion - Teaching methods include the use of educational technology (display screen for in-person teaching - explanation using three-dimensional models - educational videos and pictures supporting the topic) -Method of distance learning by holding electronic meetings using (Google Meet or FCC and others for e-learning) -Encouraging students to self-learn

– Theory Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	The student should understand the concept of fixation and its objectives.	Fixation	lecture	Short quiz
2	2	The student should explain the steps of washing and its importance.	Washing	lecture	Report
3	2	The student should explain the principle of dehydration and its stages.	Dehydration	lecture	Assignment
4	2	The student should explain the principle of transparency.	Clearing	lecture	Participation
5	2	The student should explain the process of impregnating tissues with paraffin.	Infiltration	lecture	Report assignment
6	2	The student should correctly apply the steps of tissue embedding.	Embedding	lecture	Short quiz
7	2	The student should perform the process of trimming the paraffin mold.	Trimming	lecture	Report
8	2	The student should apply the steps of sectioning tissue sections.	Mounting & Sectioning	lecture	Assignment

9	2	The student should explain the principles of tissue staining.	Staining of tissues	lecture	Participation
10	2	The student should apply the steps of H&E staining.	Hematoxylin & Eosin	lecture	Report assignment
11	2	The student should correctly perform the method of covering glass slides.	Covering method	lecture	Short quiz
12	2	The student should compare the scanning, brushing, and freezing methods.	Smearing, Squashing and Freezing Methods	lecture	Report
13	2	The student should explain the principle of operation of the electron microscope.	Electron microscope	lecture	Assignment
14	2	The student should analyze the mechanism of operation of the transmission electron microscope.	Transmission Electron Microscope	lecture	Short quiz
15	2	The student should compare scanning electron microscopes and transmission electron microscopes..	Scanning Electron Microscope	lecture	Report
– Practical Course Structure					
1	2	The student should: Perform the fixation of tissue samples using a fixative.	Fixation	Practical demonstration	Short Quiz
2	2	Perform the washing	Washing	Practical	Assignment

		of samples after fixation.		demonstration	
3	2	Perform the dehydration process using appropriate alcohol concentrations.	Dehydration	Practical demonstration	Practical Exam
4	2	Perform the clarification process using a suitable material.	Clearing	Practical demonstration	Short Quiz
5	2	Perform the paraffin impregnation process correctly.	Infiltration	Practical demonstration	Assignment
6	2	Perform the paraffin molding process correctly.	Embedding	Practical demonstration	Participation
7	2	Perform the paraffin mold trimming process correctly.	Trimming	Practical demonstration	Practical Exam
8	2	Perform the tissue sectioning process by cutting thin tissue sections and fixing them on glass slides.	Mounting & Sectioning	Practical demonstration	Short Quiz
9	2	Perform the tissue staining steps, adhering to the correct sequence of stains.	Staining of tissues	Practical demonstration	Assignment
10	2	Perform hematoxylin and eosin staining.	Hematoxylin & Eosin	Practical demonstration	Practical Exam
11	2	Perform the correct coating on glass slides.	Covering method	Practical demonstration	Short Quiz
12	2	Perform the scanning, brushing, and freezing	Smearing, Squashing and Freezing Methods	Practical demonstration	Assignment

		techniques appropriate to the type of sample.			
13	2	Operate the electron microscope and identify its components.	Electron microscope	Practical demonstration	Practical Exam
14	2	Examine samples using the transmission electron microscope.	Transmission Electron Microscope	Practical demonstration	Short Quiz
15	2	The student should be able to practically differentiate between scanning electron microscopes and transmission electron microscopes.	Scanning Electron Microscope	Practical demonstration	Assignment
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)			Histotechnology		
Main references (sources)			Bancroft's Theory and Practice of Histological Techniques		
Recommended books and references (scientific journals, reports...)			Fundamentals of Histology		
Electronic References, Websites			Web Path (The Internet Pathology Laboratory)		

Course Description Form

25.Course Name	
Environmental biotechnology	
26.Course Code	
14BioST- 3	
27.Semester / Year	
First Semester (2025-2026)	
28.Description Preparation Date:	
1/02/2025	
29.Available Attendance Forms	
Actual Attendance	
30.Number of Credit Hours (Total) / Number of Units (Total)	
(2 Hours Theory)and (2 hours practical)	
31.Course administrator's name (mention all, if more than one name)	
Name: Prof. doctor : Melad Khalaf Mohammed Email: malalosy@uowasit.edu.iq Asst. Prof. Dr. Hussein Ali Awadh Al-Zamili Dr.Fatima Kareem Shandokh	
32.Course Objectives	
Course Objectives	1. Understanding biotechnology as a term, its definition, and ways to link it to genetic engineering and various fields. 2. Identify the stages of development of this subject and the achievements obtained through it in various fields. 3. Identify the most important techniques used to develop and improve products

	using microorganisms. 4. Providing learners with knowledge of the principles of biotechnology and environmental techniques for treating pollutants, which qualifies them to work and research in all areas of environmental techniques for treating pollutants. 5. Identify the most important techniques used to develop and improve the treatment of pollutants using living organisms. 6. Explaining environmental phenomena to the student from a chemical perspective so that the student understands the interplay of sciences with environmental problems and solutions. 7. Teaching students all the necessary information related to the subject of environmental technologies.				
33. Teaching and Learning Strategies					
Strategy	- Group discussions and assignments - Creating a competitive atmosphere among students and addressing individual differences using appropriate educational methods - Research projects - Interdisciplinary discussion circles - Incorporating teaching methods that utilize educational technology - Encouraging students for self-directed learning.				
34. Course Structure					
Week	Hours	Required Learning	/Unit or subject name	/Learning method	Evaluation method

		Outcomes	Theoretical	practical	
1	4	Referred to in the previous axis and each according to the content	Introduction to the relationship of biotechnology to the ecosystem and types of chemical pollutants	Introduction to environmental laboratories	Daily preparation and oral exam and Discussion
2	4		Historical development of the relationship of biotechnology to environmental modifications	Microbial safety in laboratories	Daily preparation and oral exam and Discussion
3	4		Biotechnology, its importance and its relationship to areas of life	Definition and measurement of total solids	Daily preparation and oral exam and Discussion
4	4		Chemical pollution of the environment, ways to detect and measure it, and how to treat it	Defining and measuring the biological oxygen demands	Daily preparation and oral exam and Discussion
5	4		Quantitative and qualitative predictions of hazardous chemical pollutants	Defining and measuring the chemical oxygen demands	Daily preparation and oral exam and Discussion
6	4		Applications of pollutant removal using living organisms via biodegradation and bioremediation	Investigating the influencing abiotic factors	Daily preparation and oral exam and Discussion
7	4		Detection of pollutants using biological indicators	Measuring the effect of alkalinity and acidity	Daily preparation and oral exam and Discussion
8	4		First Exam.	First Exam.	Exam.
9	4		Using microorganisms to treat radioactive contamination	A practical application for withdrawing heavy metal from soil	Daily preparation and oral exam and Discussion
10	4		Use biological tests and associated basic concepts to	A practical application for	Daily preparation and oral exam and

			identify and control environmental pollution.	withdrawing heavy metal from water	Discussion
11	4		Using microorganisms in bioassays to determine the extent of the effect of pollutants on living organisms.	Practical application for biodegradation of oil pollutants in water	Daily preparation and oral exam and Discussion
12	4		Biofuels and renewable energy sources	Practical application of bioremediation of oil pollutants in water	Daily preparation and oral exam and Discussion
13	4		Organisms that are used to produce biofuel or that have the potential to produce biofuel	Practical application to eliminate the effect of pesticides in water	Daily preparation and oral exam and Discussion
14	4		Bioreactors	Identify the types of laboratory reactors and fermenters	Daily preparation and oral exam and Discussion
15	4		Fermenters and biological production	Biopolymer production experience	Daily preparation and oral exam and Discussion
16	4		Second exam.	Second exam.	Exam.

35.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

36.Learning and Teaching Resources

Required textbooks (curricular books, if any)	1- Environmental chemistry - a comprehensive overview Written by Gary W. Lunn and Stephen J. Duffy Translated by Dr. Hatem Al-Najdi 2012
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	2- Environmental Chemistry Written by Ibrahim Zamil Al-Zamil and Muhammad Othman Ka 2013 3- Biotechnology 5 th. ed. (2009) John E. Smith.
Main references (sources)	1- Environmental Science and Technology - Concepts and Applications, written by Frank R. Spielman and Nancy A. Whiting, translated by Al-Siddiq Omar Al-Siddiq 2012 2- Introduction to Biotechnology and Genetic Engineering, 1st Edition(2010)
Recommended books and references (scientific journals, reports...)	Environmental Microbiology and Biotechnology. UTTARAKHAND OPEN UNIVERSITY. Teenpani Bypass Road, Transport Nagar, Haldwani - 263 139 . Phone No. : (05946) - 286002, 286022, 286001, 286000. Toll Free No. : 1800 180 4025. Fax No. : (05946) - 264232, email : info@uou.ac.in. http://www.uou.ac.in.
Electronic References, Websites	2016International Journal of Science and Environmental Technology. -https://www.wikipedia.org - https://scholar.google.com

Course Description Form

37.Course Name
Environmental Pollution
38.Course Code
BioST-323
39.Semester / Year
)2026-2025Second Semester (
40.Description Preparation Date:
202619/1/
41.Available Attendance Forms
Actual Attendance

42.Number of Credit Hours (Total) / Number of Units (Total)					
(2 Hours Theory)and (2 hours practical)					
43.Course administrator's name (mention all, if more than one name)					
Name: Asst. Prof. Dr. Hussein Ali Awadh Al-Zamili					
Email: hawad@uowasit.edu.iq					
Dr.Aseel Razak Kazim					
44.Course Objectives					
Course Objectives		1- The course aims to consolidate the basic concepts of Environmental Pollution.			
		2- Identifying the environment and the ecosystem, the importance of continuing the health of the ecosystem for humans and other living organisms, identifying the types and causes of pollution in the various environmental systems in the air, water and soil and the modern methods used in treating pollution in the air, water and soil and knowing the phenomena of global environmental imbalance such as global warming and hole Ozone and acid rain. Maintaining a healthy environment free of pollution by following various scientific methods. Involving the student as part of the community and the problem in solving environmental problems and urging students to produce new ideas to effectively contribute to protecting the environment from pollution.			
45.Teaching and Learning Strategies					
Strategy		- Group discussions and assignments			
		- Creating a competitive atmosphere among students and addressing individual differences using appropriate educational methods			
		- Research projects			
		- Interdisciplinary discussion circles			
		- Incorporating teaching methods that utilize educational technology			
		- Encouraging students for self-directed learning.			
46. Course Structure					
Week	Hours	Required Learning Outcomes	/Unit or subject name Theoretical	/Learning method practical	Evaluation method
1	4	Referred to in the previous axis and each according to the content	Introduction, Environmental pollution types and sources, classification of pollutants	Environmental pollution, types and pollutants, methods of dividing	Daily preparation and oral exam and Discussion

				pollutants	
2	4		Movement and geographic transfer of pollutants, Changes in environmental pollutants	Abiotic changes, chemical changes, and biological changes that occur in pollutants	Daily preparation and oral exam and Discussion
3	4		Expressing the concentration of pollutants Air pollution	The most important types of the main aggregates of particulates in the air, gaseous air pollutants	Daily preparation and oral exam and Discussion
4	4		The atmosphere and its components, Types of air pollutants	Division of the layers of the atmosphere and the percentages of its components	Daily preparation and oral exam and Discussion
5	4		Global air pollutants (ozone layer, Radioactive pollution)	Biological effects of radiation	Daily preparation and oral exam and Discussion
6	4		First Exam.	First Exam.	Daily preparation and oral exam and Discussion
7	4		Global warming, effects and ways to treat	Greenhouse gases causing global warming	Exam.
8	4		Acid rain, effects and methods of treatment	The most important pollutants causing acid rain pollution	Daily preparation and oral exam and Discussion
9	4		Soil pollution	Basic classifications of soil pollutants	Daily preparation and oral exam and Discussion
10	4		Water Pollution	Basic classifications of water pollutants	Daily preparation and oral exam and Discussion
11	4		Food Contamination	Basic classifications of food contaminants	Daily preparation and oral exam and Discussion
12	4		Microbial contamination of food	Methods used to control microbial contamination of food	Daily preparation and oral exam and Discussion
13	4		Desertification, its causes and types	Identify the most important natural causes of desertification	Daily preparation and oral exam and Discussion

14	4		Biodiversity	Benefits of biodiversity and examples of the most important endangered species	Daily preparation and oral exam and Discussion
15	4		Second exam.	Second exam.	Exam.

47.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

Course	THEORETICAL			PRACTICAL			Final -Exam
	First Exam.	First Exam.	Quizzes	First Exam.	First Exam.	Quizzes	
1nd	12	12	4	4	4	4	60

48.Learning and Teaching Resources

Required textbooks (curricular books, if any)	4- Lectures prepared by Dr. Adel Mashaan Rabee and Dr. Mahmood Basil / College of Science / University of Baghdad 5- Environmental science. Hussein Al-Saadi, 2002, 360 pp 6- Basics of Ecology, written by Basem Youssef Al-Khafaji 2015
Main references (sources)	3- Environmental Ecology, Maier et al, 2008, 2nd Ed
Recommended books and references (scientific journals, reports...)	1- Environmental Pollution Journal published by Elsevier
Electronic References, Websites	https://libguides.tcu.edu/environmental-science/websites

Course Description Form

1. Course Name:	
Tissue Culture	
2. Course Code:	
BioST-324	
3. Semester / Year: Semester	
Second	
4. Description Preparation Date	
23/6/2026	
5. Available Attendance Forms	
Mandatory	
6. Number of Credit Hours (Total) / Number of Units (Total) 3	
(2 Hours Theory)and (2 hours practical)	
7. Course administrator's name (mention all, if more than one name)	
Name: prof. Dr. Muthana Ibrahim Maleek Email: mmaleek@uowasit.edu.iq Zainab Dhiyaa Jabuori Alkhateeb Waleed Mahdi Muslim	
8. Course Objectives	
Course Objectives	1- The students will get to know what mean tissue culture 2 -Study the basic information for tissue

	culture 3- How you can make cell line 4 -Study the difference between transformed and normal cells 5 -Identify cancer cell The advantages and disadvantages of using culture
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9. Teaching and Learning Strategies

Strategy	–General and qualifying transferable skills (other skills related to employability and personal development). –Providing continuous learning opportunities for students and motivating them – Organized self-learning – Social Media – self management
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10. Course Structure– theory

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
		Learn about the science of tissue culture	Introduction: The use of animal cell culture	of devices Data y and monthly v and materials ninations ired	
		Explain the benefits and harms of using this technology	The advantages and disadvantages of using cell culture		
		Identify the history of this technology	The early history of cell culture		
		Knowing the extent to which cells remain alive	How long will primary cultures survive?		
		Study of the characteristics of tissue culture	Characteristics of cells in culture		
		Knowing how to make the first culture of cells taken from living tissue	primary culture		
		Monthly evaluation	First exam		

		Knowing the types of transplanted cells	How to select a particular cell type		
		Identify factors that helps to cell development	Anchorage-dependence		
		Identification of embryonic and mature cells	Embryonic and adult stem cells		
		What is the concept of transformed cells?	Transformed cells		
		Monthly evaluation	Second exam		
		Identify the conditions required for cell development	Growth and maintenance of cells in culture		
		How to grow cells by making cell lines from them	Subculture		
		Identify the stages of cell growth and the phases they go through	The phases of a culture		

– Practical Course Structure

1	2	Important of Laboratory Animals	Laboratory Animals	Use of devices Data show and materials required	Daily and monthly examinations
2	2	solutions for cell cultures	Stock solutions for cell cultures	=	=
3	2	stains	Stains for cells	=	=
4	2	Types of media	Medium of Tissue culture	=	=
5	2	Preparing of medium	Preparing of medium	=	=
6	2	Types of Tumor cell lines	Tumor cell lines	=	=
7	2	The cell line	maintenance tumor cell line	=	=
8	2	First exam	First exam	=	=
9	2	peripheral blood lymphocyte	culture of peripheral blood lymphocyte	=	=
10	2	The myoblast	Isolated of myoblast	=	=

11	2	Meaning of transformed cells	Transformed cells	=	=
12	2	Meaning of immunosuppression	Mice immunosuppression technique	=	=
13	2	Isolation of lymphocytes	Isolation of lymphocytes	=	=
14	2	Second exam	Second exam	=	=
15	2	Maintenance of in vitro cell lines	Maintenance of in vitro cell lines	=	=

11. 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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Michael Butler. Animal Cell Culture and Technology.2005 Second Edition Hill.
Main references (sources)	Wilson Aruni. Animal Tissue Culture.2021.Mjp Publishers
Recommended books and references (scientific journals, reports...)	Michael Butler. Animal Cell Culture and Technology.2005 Second Edition Hill.
Electronic References, Websites	https://www.culturecollections.org.uk/media/161749/ecacc-lab-handbook-fourth-edition.pdf

Course Description Form

1. Course Name:	
Genetics	
2. Course Code:	
BioST-316	
3. Semester / Year:	
first semester/ 2025-2026	
4. Description Preparation Date:	
/ 202564 /	
5. Available Attendance Forms:	
6. Number of Credit Hours (Total) / Number of Units (Total)	
4	
7. Course administrator's name (mention all, if more than one name)	
Name: Zainab Dhiyaa Jabuori Alkhateeb	
Email: zalkhateeb@uowasit.edu.iq	
Waleed Mahdi Muslim	
8. Course Objectives	
Course Objectives	1 - Organizing learning of the concepts and basics of cytogenetics 2 - Forming a future vision for the mechanism of studying the transmission of genetic traits from one cell to another and who controls it. 3 - Understanding practical exercises through studied genetic examples developing the skill of self-evaluation through the feed c that tests provide
9. Teaching and Learning Strategies	
Strategy	-General and qualifying transferable skills (other skills related to employability and personal development). -Providing continuous learning opportunities for students and motivating them - Organized self-learning cial Media -self management

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
		Identify the structure of nucleic acids	Nucleic acid structure	Use of devices and materials required	Quiz and monthly examinations
		Explain the mechanism of function of nucleic acids	Nucleic acid function		
		Explain the mechanism of regulating the genes work	Gene regulation		
		Explain how genetic material is replicated	DNA replication		
		Explain the concept of genetic mutation	Mutation		
		Monthly evaluation	Monthly evaluation		
		Explain about chromosome structure	Chromosomes		
		Knowledge of the study of the characteristics and aberrations of chromosomes	Chromosomes analysis		
		Identify chromosomal mutation	Human karyotype		
		Study of morphological variations of chromosomes	Chromosome morphisms		
		Identifying aberrations that may occur in chromosomes	Chromosome aberration		
		Monthly evaluation	Monthly evaluation		
		Study of the increase and decrease in the number of chromosomes in people	Euploidy and polyploidy		
		Identify structural variations in chromosomes	Structural aberrations		
		Identify the mechanism of chromosomal aberrations	Translocation, deletions and chromosomes		

11.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

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	-Liehr, T. (Ed.). (2023). <i>Cytogenetics and Molecular Cytogenetics</i>. Boca Raton, FL: CRC Press. -Pandey, P. K., Ashaq, M., Bharatkumar, C., Satish, D., Srivarsha, J., & Gupta, S. (2025). <i>Molecular Cytogenetics and Crop Improvement</i>. CRC Press. - Heng, H. H., & Ye, J. C. (Eds.). (2025). <i>Cancer Cytogenetics and Cytogenomics: Methods and Protocols</i>. Springer Nature.
Main references (sources)	Ye, J. C., & Heng, H. H. (Eds.). (2024). <i>Cancer Cytogenetics and Cytogenomics: Methods and Protocols</i>. Springer Nature. Pierce, B. A. (2024). <i>Genetics: A Conceptual Approach</i> (7th ed.). Macmillan Learning
Recommended books and references (scientific journals, reports...)	Cohn, R., Scherer, S., & Hamosh, A. (2023). <i>Thompson & Thompson Genetics and Genomics in Medicine</i> (9th ed.) . Elsevie.
Electronic References, Websites	

Course Description Form

13. Course Name:	
Cytogenetics	
14. Course Code:	
62BioST-3	
15. Semester / Year:	
Second semester/ 2025-2026	
16. Description Preparation Date:	
/ 202564 /	
17. Available Attendance Forms:	
18. Number of Credit Hours (Total) / Number of Units (Total)	
4	
19. Course administrator's name (mention all, if more than one name)	
Name: Zainab Dhiyaa Jabuori Alkhateeb	
Email: zalkhateeb@uowasit.edu.iq	
Waleed Mahdi Muslim	
20. Course Objectives	
Course Objectives	1 - Organizing learning of the concepts and basics of cytogenetics 2 - Forming a future vision for the mechanism of studying the transmission of genetic traits from one cell to another and who controls it. 3 - Understanding practical exercises through studied genetic examples Developing the skill of self-evaluation through the feedback that tests provide
21. Teaching and Learning Strategies	
Strategy	-General and qualifying transferable skills (other skills related to employability and personal development). -Providing continuous learning opportunities for students and motivating them - Organized self-learning - Social Media -self management

22. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Identify the structure of nucleic acids	Nucleic acid structure	Use of devices Data show and materials required	Weekly and monthly examinations
2	4	Explain the mechanism of action of nucleic acids	Nucleic acid function	=	=
3	4	Knowing the mechanism of regulating the genes work	Gene regulation	=	=
4	4	Learn how genetic material is replicated	DNA replication	=	=
5	4	Study the concept of genetic mutation	Mutation	=	=
6	4	Monthly evaluation	Monthly evaluation		=
7	4	Learn about chromosome structure	Chromosomes	=	=
8	4	Knowledge of the study of the characteristics and aberrations of chromosomes	Chromosomes analysis	=	=
9	4	Identify chromosomal aberration	Human karyotype	=	=
10	4	Study of morphological aberrations of chromosomes	Chromosome heteromorphisms	=	=
11	4	Identifying aberrations that may occur in chromosomes	Chromosome aberration	=	=
12	4	Monthly evaluation	Monthly evaluation		=
13	4	Study of the increase and decrease in the number of chromosomes in people	Aneuploidy and polyploidy	=	=
14	4	Identify structural aberrations in chromosomes	Structural aberrations	=	=
15	4	Identify the mechanism of chromosomal aberrations	Translocation, deletions and ring chromosomes	=	=

23.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.Learning and Teaching Resources

Required textbooks (curricular books, if any)	-Liehr, T. (Ed.). (2023). <i>Cytogenetics and Molecular Cytogenetics</i>. Boca Raton, FL: CRC Press. -Pandey, P. K., Ashaq, M., Bharatkumar, C., Satish, D., Srivarsha, J., & Gupta, S. (2025). <i>Molecular Cytogenetics and Crop Improvement</i>. CRC Press. - Heng, H. H., & Ye, J. C. (Eds.). (2025). <i>Cancer Cytogenetics and Cytogenomics: Methods and Protocols</i>. Springer Nature.
Main references (sources)	Ye, J. C., & Heng, H. H. (Eds.). (2024). <i>Cancer Cytogenetics and Cytogenomics: Methods and Protocols</i>. Springer Nature. Pierce, B. A. (2024). <i>Genetics: A Conceptual Approach</i> (7th ed.). Macmillan Learning
Recommended books and references (scientific journals, reports...)	hn, R., Scherer, S., & Hamosh, A. (2023). <i>Thompson Thompson Genetics and Genomics in Medicine</i> (9th ed.) . Elsevie.
Electronic References, Websites	

Course Description Form

Course Name:	
Molecular Biology	
Course Code:	
BioST-311	
Semester / Year:	
First Semester 2025–2026	
Description Preparation Date:	
20/06/2026	
Available Attendance Forms:	
On-site	
Number of Credit Hours (Total) / Number of Units (Total)	
Total Hours: 60 hours (30 theoretical + 30 practical)	
Course administrator's name (mention all, if more than one name)	
Name: Nuha Alaa Hamza Email: nuha.alaa.hamza@uowasit.edu.iq Mohammed Assi Samir	
Course Objectives	
Course Objectives	- Understand the molecular structure of DNA and RNA. - Explain the mechanisms of DNA replication, transcription, and translation. - Study gene expression regulation and genetic mutations.

	• Become familiar with modern molecular biology techniques such as PCR, DNA sequencing, and genetic engineering. • Develop laboratory skills and the ability to analyze experimental results.
Teaching and Learning Strategies	
Strategy	• Theoretical lectures • Scientific discussions • Practical laboratory sessions • Presentations and reports • Self-learning using electronic resources

– Theory Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Students define molecular biology and its importance.	Introduction to Molecular Biology	Lecture	Discussion
2	2	Students compare eukaryotic and prokaryotic DNA.	Eukaryotic DNA versus Prokaryotic DNA	Lecture	Discussion
3	2	Students describe DNA and RNA structure.	Structure of DNA and RNA	Lecture	Discussion
4	2	Assessment of previous concepts.	First Monthly Examination	exam	Written Exam
5	2	Students explain DNA replication.	DNA Replication	Lecture	Questions and assignments
6	2	Students explain DNA replication.	DNA Replication	Lecture	Questions and assignments
7	2	Students explain transcription.	Transcription	Lecture	Questions and assignments
8	2	Students explain transcription.	Transcription	Lecture	Questions and assignments
9	2	Students explain protein synthesis.	Translation	Lecture	Questions and assignments
10	2	Students explain protein synthesis.	Translation	Lecture	Questions and assignments
11	2	Students explain protein synthesis.	Translation	Lecture	Questions and assignments
12	2	Assessment.	Second Monthly Examination	Lecture	Written Exam
13	2	Assessment.	Midterm Examination	Lecture	Written Exam
14					
15					

– Practical Course Structure					
1	2	Introduction to Molecular Biology	Define molecular biology and its importance.	Lecture	Questions and assignments
2	2	Micropipette	Use micropipettes accurately.	Lecture	Questions and assignments
3	2	DNA Extraction from Blood	Perform DNA extraction from blood samples.	Lecture	Questions and assignments
4	2	Chromosomal DNA Extraction from Bacteria	Evaluate bacterial DNA quality.	Lecture	Questions and assignments
5	2	Gel Electrophoresis	Analyze DNA bands.	Lecture	Questions and assignments
6	2	Gel Electrophoresis	Analyze DNA bands.	Lecture	Questions and assignments
7	2	First Monthly Examination	Assess previous topics.	exam	Written Exam
8	2	Polymerase Chain Reaction (PCR)	Explain PCR principles.	Lecture	Questions and assignments
9	2	Polymerase Chain Reaction (PCR)	Interpret PCR results.	Lecture	Questions and assignments
10	2	RNA Extraction	Perform RNA extraction.	Lecture	Questions and assignments
11	2	DNA & RNA Concentration Measurement	Measure concentration and purity.	Lecture	Questions and assignments
12	2	Second Monthly	Assessment.	exam	Written Exam

		Examination			
13	2	Introduction to Molecular Biology	Define molecular biology and its importance.	Lecture	Questions and assignments
14	2	Micropipette	Use micropipettes accurately.	Lecture	Questions and assignments
15	2	DNA Extraction from Blood	Perform DNA extraction from blood samples.	Lecture	Questions and assignments
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)			Molecular Biology of the Gene – Watson et al		
Main references (sources)			2. Molecular Cell Biology – Lodish et al. 3. Lewin's Genes XII – Krebs et al.		
Recommended books and references (scientific journals, reports...)			4. Principles of Gene Manipulation and Genomics – Primrose & Twyman.		
Electronic References, Websites			☐ NCBI: https://www.ncbi.nlm.nih.gov/ ☐ PubMed: https://pubmed.ncbi.nlm.nih.gov/ ☐ Nature Reviews Molecular Cell Biology: https://www.nature.com/nr		

Course Description Form

Course Name:	
2 Molecular Biology	
Course Code:	
1BioST-32	
Semester / Year:	
Second Semester 2025–2026	
Description Preparation Date:	
20/06/2026	
Available Attendance Forms:	
Number of Credit Hours (Total) / Number of Units (Total)	
Total Hours: 60 hours (30 theoretical + 30 practical)	
Course administrator's name (mention all, if more than one name)	
Name: Nuha Alaa Hamza Asyad Abdul-Abbas Hussein Email: nuha.alaa.hamza@uowasit.edu.iq	
Course Objectives	
Course Objectives	- To understand the mechanisms of gene regulation and their role in controlling gene expression in prokaryotes and eukaryotes. - To understand the structure and biological functions of proteins and their roles in cellular processes. - To explain the types and mechanisms of genetic mutations and their effects on gene expression and protein function. - To study DNA repair mechanisms and their role in maintaining genome stability. - To recognize the relationship between mutations, defects in DNA repair, and the development of genetic diseases and cancer.

	To develop students' skills in applying molecular techniques used in the study of gene regulation, proteins, mutations, and DNA repair and in interpreting experimental results..
Teaching and Learning Strategies	
Strategy	- Theoretical lectures - Scientific discussions - Practical laboratory sessions - Presentations and reports - Self-learning using electronic resources
– Theory Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	define gene regulation and explain its importance in controlling gene expression.	Introduction to Gene Regulation	Lecture	Discussion
2	2	explain the mechanisms of gene regulation in prokaryotes and eukaryotes	Gene Regulation	Lecture	Discussion
3	2	classify different types of mutations and analyze their effects on gene and protein functions.	Mutations	Lecture	Discussion
4	2	Assessment of previous concepts.	First Monthly Examination	exam	Written Exam
5	2	Students will explain the causes and consequences of mutations in genetic disorders.	Mutations	Lecture	Questions and assignments

6	2	Students will explain DNA repair mechanisms and their role in maintaining genome stability.	DNA Repair	Lecture	Questions and assignments
7	2	=	=	Lecture	Questions and assignments
8	2	define proteins, their structures, and their biological importance.	Introduction to Proteins	Lecture	Questions and assignments
9	2	explain protein classification and their functions in biological processes.	Proteins	Lecture	Questions and assignments
10	2	describe the levels of protein structure and factors affecting protein function.	Protein Structure	Lecture	Questions and assignments
11	2	explain protein denaturation and its effects on protein activity.	Protein Denaturation	Lecture	Questions and assignments
12	2	Assessment.	Second Monthly Examination	Lecture	Written Exam
13					
14					
15					
– Practical Course Structure					

1	2	explain the principles and importance of protein extraction in biological studies.	Introduction to Protein Extraction	Lecture	Questions and assignments
2	2	perform protein extraction procedures and evaluate the quality of the extracted proteins.	Protein Extraction	Lecture	Questions and assignments
3	2	Students will perform protein extraction from animal cells and explain the purpose of each step.	Protein Extraction from Animal Cells	Lecture	Questions and assignments
4	2	Students will apply methods for extracting proteins from plant cells and assess protein yield.	Protein Extraction from Plant Cells	Lecture	Questions and assignments
5	2	Students will isolate proteins from bacterial cells and evaluate the purity of the extracted proteins.	Protein Extraction from Bacteria	Lecture	Questions and assignments
6	2	Students will explain the principles of protein	Protein Purification Techniques	Lecture	Questions and assignments

		purification techniques and their applications.			
7	2	Students will apply gel filtration chromatography for protein separation based on molecular size.	Gel Filtration Chromatography	exam	Written Exam
8	2	Students will apply ion exchange chromatography and explain its role in protein separation based on charge.	Ion Exchange Chromatography	Lecture	Questions and assignments
9	2	Students will perform electrophoresis and analyze protein band patterns.	Electrophoresis	Lecture	Questions and assignments
10	2	Students will explain the principle of Western blotting and identify specific proteins using	Protein Detection Techniques (Western Blotting)	Lecture	Questions and assignments

		immunodetection methods.			
11					
12	2	Second Monthly Examination	Assessment.	exam	Written Exam
13					
14					
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)		Molecular Biology of the Gene – Watson et al			
Main references (sources)		4. Molecular Cell Biology – Lodish et al. 5. Lewin's Genes XII – Krebs et al.			
Recommended books and references (scientific journals, reports...)		5. Principles of Gene Manipulation and Genomics – Primrose & Twyman.			
Electronic References, Websites		☐ NCBI: https://www.ncbi.nlm.nih.gov/ ☐ PubMed: https://pubmed.ncbi.nlm.nih.gov/ ☐ Nature Reviews Molecular Cell Biology: https://www.nature.com/nr			

Course Description Form

Course Name:	
Immunology	
Course Code:	
BioST-312	
Semester / Year:	
2025-2026- first	
Description Preparation Date:	
2026-07-23	
Available Attendance Forms:	
Actual Attendance	
Number of Credit Hours (Total) / Number of Units (Total)	
2 hr. theoretical + 2 hr. practical (weekly)	
Course administrator's name (mention all, if more than one name)	
Name: Asst. Prof. Dr. Alaa Ali Matrood Email: amatrood@uowasit.edu.iq Lec. Mohammed Assi Samir Dr. Asyad Abdulabbas Dr. Marwa Ali marwaa@uowasit.edu.iq Lect. Hussein Ali Mohammed Lect. Duha Hamzah Abbood	
Course Objectives	
Course Objectives	- Understand the principles and functions of the immune system. - Interpret humoral and cell-mediated immune responses. - Recognize major immunological disorders and basic diagnostic methods. - Apply immunological concepts in medical and laboratory

	settings.				
Teaching and Learning Strategies					
Strategy	-Teaching and learning strategies and methods adopted in implementing the program in general. - Style of thinking and discussion - Practical tests used in laboratories - Lecture, use of the blackboard, and delivery. - Illustrative presentations (using diagrams, pictures, and educational films) - Interactive discussion - Self-education)				
– Theory Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction to Immunology as Science		Data Show	Daily & monthly Exam
2	2	Innate Immunity		Data show	Daily & monthly Exam
3	2	Cells of the immune system		Data Show	Daily & monthly Exam
4	2	Adaptive immunity		Data show	Daily & monthly Exam
5	2	Lymphatic organs		Data Show	Daily & monthly Exam
6	2	The effectiveness of the immune system and the immune response		Data show	Daily & monthly Exams

7	2	Antigens and Immunogen		Data Show	Daily & monthly Exams
8	2	Antibodies		Data show	Daily & monthly Exams
9	2	Antigen-Antibody Reaction		Data Show	Daily & monthly Exams
10	2	Complement System		Data show	Daily & monthly Exams
11	2	Autoimmune diseases		Data Show	Daily & monthly Exams
12	2	Immunologic Tolerance		Data show	Daily & monthly Exams
13	2	Immunodeficiency		Data Show	Daily & monthly Exams
14	2	Relationship between tumor and immunity		Data show	Daily & monthly Exams
15	2	Exam			
– Practical Course Structure					
1	2	Animal Marking		Theoretical background short demonstration & practical hands-on application	Daily & monthly Exams +lab report
2	2	Injection methods and Blood Sampling		Theoretical background short demonstration & practical hands-on	Daily & monthly Exams +lab report

				application	
3	2	Immune System Structures, Components and Functions		Theoretical background short demonstration & practical hands-on application	Daily & monthly Exams +lab report
4	2	First exam			
5	2	Isolation of Serum and Plasma		Theoretical background short demonstration & practical hands-on application	Daily & monthly Exams +lab report
6	2	Serological test		Theoretical background short demonstration & practical hands-on application	Daily & monthly Exams +lab report
7	2	Agglutination test		Theoretical background short demonstration & practical hands-on application	Daily & monthly Exams +lab report
8	2	Second exam			

9	2	Complement Fixation Test (CFT)		Theoretical background short demonstration & practical hands-on application	Daily & monthly Exams +lab report
10	2	Enzyme - Linked Immunosorbent Assay (ELISA)		Theoretical background short demonstration & practical hands-on application	
11		Third Exam			
12					
13					
14					
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)			Medical Microbiology and Immunology, Warren Levinson, 2016 . - Microbiology and Immunology ,Subhash Chandra Parija, 2012 - Cellular and molecular immunology 2015 - Sara's Immunology 2014		
Main references (sources)					

Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	https://teachmephysiology.com/immune-system/?utm_source=chatgpt.com https://teachmephysiology.com/immune-system/?utm_source=chatgpt.com

Course Description Form

49.Course Name	
Animal Physiology	
50.Course Code	
BioST-325	
51.Semester / Year	
Second Semester (2025-2026)	
52.Description Preparation Date	
1/2/2026	
53.Available Attendance Forms	
Actual Attendance	
54.Number of Credit Hours (Total) / Number of Units (Total)	
(2 Hours Theory) and (2 Hours Practical)	
55.Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr. Jafar Abbas Issa Al-Maamori Email: jalmaamori@uowasit.edu.iq Rusul Abdal Redha Huda Abdal Hadi	
56.Course Objectives	
Course Objectives	Providing students with scientific concepts in the fields of fundamentals of physiology and its applications as follows: 3- Recognize the physiological effects of temperature, metabolic processes, and the

	functions of some different body systems, 4- Study the equilibrium mechanisms of various body systems. 5- The role of endocrine glands and hormones and the mutual influence between them. 6- Acquire scientific skills by studying some common examples in the field of physiological disorders.
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57. Teaching and Learning Strategies

Strategy	- Involve the student and work in the preparation of daily and weekly reports on the theoretical side. - Activating extracurricular skills and activities and developing the student's abilities to dictate and influence. - Linking sequential and interrelated theoretical information with laboratory experiments and some pictures with media that make the courses smooth and simple for the student. - Using modern educational technology as supportive teaching methods
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58. Course Structure

Week	Hours	Required Learning Outcomes	/Unit or Subject Name Theoretical	/Learning Method practical	Evaluation Method
1	4	Mentioned within previous point according to the content	Energy release, aerobic respiration, Krebs cycle	Differential count of Leukocytes (WBC)	Daily quizzes, live questioning and discussion
2	4		Physiological effect of temperature and its regulation.	Leukocytes count (WBC count)	Daily quizzes, live questioning and discussion
3	4		Basic metabolism and the relationship of body size and metabolism.	Blood/hemoglobin, coagulation time, bleeding time, packed cell volume and blood cell sedimentation rate	Daily quizzes, live questioning and discussion
4	4		Physiology of the circulatory system, mammalian heart, electrical accidents of the heartbeat, cardiac circulation, cardiac units, blood pressures and factors Nervous control of the pulse, blood components.	Capillary circulation in frog plates, measurement of blood pressure in humans	Daily quizzes, live questioning and discussion
5			Digestive system, mechanical digestion, saliva and salivary	Frog pulse - effect of some drugs	Daily quizzes, live questioning and

	4		glands, digestion in the stomach, control of gastric secretions, theories of satiety and hunger, pancreas and secretions, bile and its components and functions, absorption.		discussion
6	4		First Exam.	First Exam.	Exam.
7	4		Urinary physiology, enzymatic regulation and exchange between different body fluids.	The heartbeat of the frog separated from the body, the effects of ions, some drugs, and the thermal coefficient Q10	Daily quizzes, live questioning and discussion
8	4		The acid-base balance of the body and the control of the balance.	Osmotic relationship and permeability of erythrocyte membranes	Daily quizzes, live questioning and discussion
9	4		The kidney and its basic function, filtration rate, regulating hormones.	Muscle contraction, muscle and nerve separation and muscle abduction.	Daily quizzes, live questioning and discussion
10	4		Endocrinology and chemical coordination, types of endocrine glands.	Temporal complex and spatial complex	Daily quizzes, live questioning and discussion
11	4		The pituitary gland Hormones, their action, chemical nature, and methods of action.	Reflex actions in the spiny frog	Daily quizzes, live questioning and discussion
12	4		Hormones, their action, chemical nature, and methods of action	Study of salivary amylase, pepsin, trypsin, lipase	Daily quizzes, live questioning and discussion
13	4		Male reproductive system	Smooth muscle contraction	Daily quizzes, live questioning and discussion
14	4		Female reproductive system	Absorption/absorption of glucose and water in the intestine	Daily quizzes, live questioning and discussion
15	4		Second exam.	Second exam.	Exam.

59.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.

Course	Theoretical			Practical			Final -Exam
	First Exam.	First Exam.	Quizzes	First Exam.	First Exam.	Quizzes	
2 nd	12	12	4	4	4	4	60

60. Learning and Teaching Resources

Required Textbooks (Curricular Books, if any)	Non
Main References (Sources)	1. Physiology: Authored by Prof. Sabah Nasser Al-Aluji (2014). 2. Fundamentals of Animal Physiology. By: Abdul Rahim Muhammad Ashir, University of Baghdad. Second edition. House of Wisdom (1989).
Recommended Books and References (Scientific Journals, Reports...)	Physiology periodicals issued by Elsevier Publishing
Electronic References, Websites	https://www.physiology.org/career/teaching-learning-resources/student-resources/what-is-physiology?SSO=Y

Third Stage Microorganisms

Course Description Form

Course Name:	
Protozoa	
Course Code:	
BioSM-324	
Semester / Year:	
)6-2025Second Semester (202	
Description Preparation Date:	
6/20261/	
Available Attendance Forms:	
Actual Attendance	
Number of Credit Hours (Total) / Number of Units (Total)	
(2 Hours Theory)and (2 hours practical)	
Course administrator's name (mention all, if more than one name)	
Name: Russul wassit kadhum <u>Muthanna Naima Karam</u> <u>Dunya Fadhel Abbas</u> Amna Hussein Jejan	
Course Objectives	
Course Objectives	1- To equip learners with knowledge of the importance of parasitic protozoa 2- To develop positive attitudes towards raising awareness of the dangers of these organisms and their modes of transmission 3- To familiarize learners with research methodologies using modern methods in serological and molecular diagnosis of these parasites

	4- To understand the basic concepts of their life cycles and how to complete the life cycle by identifying their different hosts 5- To understand the basic approaches to using appropriate treatments and dosages for these parasites 6- To understand the objectives of teaching this science to prevent infection with parasitic protozoa and minimize infection rates 7- To identify the intermediate and definitive hosts for each type of protozoa				
Teaching and Learning Strategies					
Strategy	1. Utilize modern resources and the internet to obtain information for solving questions related to each lecture. 2. Engage in group discussions and complete assignments. 3. Foster a competitive environment among students and address individual differences using appropriate teaching methods. 4. Conduct research groups and interactive discussion sessions. 5. Integrate educational technology into teaching methods. 6. Encourage students to engage in self-directed learning.				
- Theory Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Parasitic Protozoa	protozoa	Theory	Quiz, monthly
2	2	Amoeboid , Entamoeba histolytica , Iodamoeba butchlii	protozoa	Theory	exams and discussion
3	2	Intestinal flagellates , Giardia lamblia	protozoa	Theory	Quiz, monthly
4	2	Intestinal flagellates , Trichomonas hominis	protozoa	Theory	exams and discussion
5	2	Tissue and Blood flagellates	protozoa	Theory	Quiz, monthly
6	2	Intestinal Sporozoa , Isispora	protozoa	Theory	exams and discussion
7	2	First exam	protozoa	Theory	Quiz, monthly
8	2	Intestinal Sporozoa ,Cryptosporidium	protozoa	Theory	exams and discussion

9	2	Tissue Blood protozoa ,Leishmania	protozoa	Theory	Quiz, monthly
10	2	Tissue Blood protozoa ,Trypanosoma	protozoa	Theory	exams and discussion
11	2	Tissue Blood protozoa , plasmodium	protozoa	Theory	Quiz, monthly
12	2	Ciliates	protozoa	Theory	exams and discussion
13	2	Ciliates , Balantidium coli	protozoa	Theory	Quiz, monthly
14	2	Second exam	protozoa	Theory	exams and discussion
15	2	Oral exam	protozoa	Theory	Quiz, monthly
- Practical Course Structure					
1	2	How to handle and store lecture models in the lab	protozoa	Theory	Quiz, monthly
2	2	Protozoa , General Characteristics	protozoa	Theory	exams and discussion
3	2	Amoeboid , Entamoeba histolytica , Iodamoeba butchlii	protozoa	Theory	Quiz, monthly
4	2	Intestinal flagellates , Giardia lamblia	protozoa	Theory	exams and discussion
5	2	Intestinal flagellates , Trichomonas hominis	protozoa	Theory	Quiz, monthly
6	2	Tissue and Blood flagellates	protozoa	Theory	exams and discussion
7	2	Intestinal Sporozoa , Isispora	protozoa	Theory	Quiz, monthly
8	2	First exam	protozoa	Theory	exams and discussion
9	2	Intestinal Sporozoa ,Cryptosporidium	protozoa	Theory	Quiz, monthly
10	2	Tissue Blood protozoa ,Leishmania	protozoa	Theory	exams and discussion
11	2	Tissue Blood protozoa ,Trypanosoma	protozoa	Theory	Quiz, monthly
12	2	Tissue Blood protozoa , plasmodium	protozoa	Theory	exams and discussion
13	2	Ciliates	protozoa	Theory	Quiz, monthly

14	2	Ciliates , Balantidium coli	protozoa	Theory	exams and discussion
15	2	Second exam	protozoa	Theory	Quiz, monthly
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)			Medical parasitology , CK Jayaram Paniker, 2007, 6nd Ed		
Main references (sources)			Atlas of medical helminthology		
Recommended books and references (scientific journals, reports...)			Medical parasitology , CK Jayaram Paniker, 2018, 8nd Ed		
Electronic References, Websites			Helminths: Structure, Classification, Growth, and Development - Medical Microbiology - NCBI Bookshelf (nih.gov)		

Course Description Form

Course Name:	
Microbial physiology	
Course Code:	
BioSM-311	
Semester / Year:	
2026 /Chapter One	
Description Preparation Date:	
2-6-2026	
Available Attendance Forms:	
Attendance is mandatory	
Number of Credit Hours (Total) / Number of Units (Total)	
Three Units / Four Hours (Practical and Theoretical)	
Course administrator's name (mention all, if more than one name)	
Name: Dr.Zainab Nashaat Al-Saadi Email: zalsaady@uowasit.edu.iq Asst. Lecturer Salam Mohammed Kluaif Asst. Lecturer Rusul Abdul Redha Biologist Noor Sadiq Jassim	
Course Objectives	
Course Objectives	- Gain a fundamental understanding of cellular composition, membrane transport, genomic diversity, horizontal gene transfer, diversity of metabolic processes, growth and cell death, communication, and techniques used to elucidate physiological processes. - Understand how to apply theoretical microbiology to practical problems. - Integrate primary scientific literature of microbiology to further your understanding of the ways microbes live and respond to the environment.

	-Develop scientific writing skills and critical thinking about scientific research. Learn how to plan, conduct, and evaluate research.				
Teaching and Learning Strategies					
Strategy	The main strategy that will be adopted in delivering this module is to encourage students’ participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.				
- Theory Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Introduction, definitions , cell shape and size	=	=	=
2	4	Cell Composition and Structure 1	=	=	=
3	4	Cell Composition and Structure 2	=	=	=
4	4	Growth and Cell Division 1	=	=	=
5		First exam	=	=	=
6	4	Growth curve and Cell Division 2	=	=	=
7	4	Stress Response 1	=	=	=
8	4	Stress Response 2	=	=	=
9	4	Membrane Transport	=	=	=

		Secretion Systems			
10	4	Second exam	=	=	=
11	4	Nutrition requirements	=	=	=
12	4	Oxidation and reduction reactions	=	=	=
13	4	Fermentation	=	=	=
14	4	Microbial control	=	=	=
15	4	Enzymes	=	=	=
- Practical Course Structure					
1	4	Microbial growth 1	=	=	=
2	4	Microbial growth 2	=	=	=
3	4	Methods to Detect and Measure bacterial growth	=	=	=
4	4	Physical effects on microbial growth 1	=	=	=
5		First exam	=	=	=
6	4	Physical effects on microbial growth 2	=	=	=
7	4	Antimicrobial medications and chemical material effects	=	=	=

		to growth of microorganisms ,produce the bacteriocen and the mechanism of the effects. 1			
8	4	Antimicrobial medications and chemical material effects to growth of microorganisms ,produce the bacteriocen and the mechanism of the effects. 2	=	=	=
9	4	Antimicrobial medications and chemical material effects to growth of microorganisms ,produce the bacteriocen and the mechanism of the effects. 3	=	=	=
10	4	Second exam	=	=	=
11	4	Microbial enzymes /production and extraction 1		=	=
12	4	Microbial enzymes /production and extraction 2	=	=	=
13	4	Kinetics of enzymes		=	
14	4	Microbial fermentation	=	=	=

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)	PRESCOTT, HARLEY, AND KLEIN'S MICROBIOLOGY, SEVENTH EDITION ,QR41.2.P74 2008				
Main references (sources)	Lippincott's Illustrated Reviews: Microbiology Third Edition Copyright © 2013 Lippincott Williams & Wilkins, a Wolters Kluwer business				
Recommended books and references (scientific journals, reports...)	Lippincott's Illustrated Reviews: Microbiology Third Edition Copyright © 2013 Lippincott Williams & Wilkins, a Wolters Kluwer business				
Electronic References, Websites	http://www.mhhe.com/ http://www.lww.com/				

Course Description Form

Course Name:	
Artificial fermentation	
Course Code:	
BioSM-323	
Semester / Year: 2025 -2026	
Description Preparation Date:	
Available Attendance Forms:	
Number of Credit Hours (Total) / Number of Units (Total)	
2 hours theoretical + 2 hours practical	
Course administrator's name (mention all, if more than one name)	
Name: Asst.Prof.Dr Jawad Kadhim Issa Asst. Lecturer Rusul Abdul Redha Asst. Lecturer Huda Abdul Hadi Qadir Asst. Lecturer Rusul Ahmed Mohsen	
Course Objectives	
Course Objectives	1. Providing learners with knowledge of the principles of industrial fermentation. 2. Developing positive attitudes towards this knowledge. 3. Identify research methods in industrial fermentation. 4. Identify the basic concepts in the material of industrial fermentation. 5. Identify the objectives of industrial microbiology and the basics of industrial fermentation.
Teaching and Learning Strategies	
Strategy	1. The method of delivery, live questioning, problem solving and discussion. 2. Include teaching methods using educational technology (data show for face-to-face education and linking lectures with videos Educational support for the subject).

	3. The method of distance learning by holding electronic meetings by (Google Mate or FCC and others for e-learning). 4. Encouraging students to self-learn.
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- Theory Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Identify the fundamental principles of industrial fermentation	Introduction to Industrial Fermentations	Lecture + Discussion	Short quiz
2	2	Understand the basic principles of the fermentation process	Basic principles of the fermentation process	Lecture + Case study	Written assignment
3	2	Recognize microbial metabolites and their industrial importance	Microbial metabolites	Lecture + Group activity	Quiz
4	2	Define the main components of the fermentation process	The main components of the fermentation process	Lecture + Diagram analysis	Homework
5	2	Distinguish between types of fermenters and their applications	Fermenters	Lecture + Lab demonstration	Practical report
6	2	Understand the	Fermentation	Lecture + Lab	Lab quiz

		composition and role of fermentation culture media	culture media	practice	
7	2	Exam	Exam		
8	2	Recognize physical and chemical factors affecting fermentation efficiency	Physical and chemical conditioning affecting the fermentation processing	Lecture + Problem-solving	Assignment
9	2	Apply methods for extracting fermentation products	extracting the products of the fermentation process	Lecture + Lab practice	Lab report
10	2	Understand industrial production of bread yeast	Industrial production of bread yeast	Lecture + Case study	Quiz
11	2	Explain the production of single-cell protein	Single-cell protein production	Lecture + Group discussion	Assignment
12	2	Describe the process of vinegar production	Vinegar production	Lecture + Lab demonstration	Practical report
13	2	Understand antibiotics production through fermentation	Antibiotics production	Lecture + Case study	Written quiz
14	2	Explain the production of organic acids	Organic acids Production	Lecture + Lab practice	Lab report
15	2	Exam	Exam		
- Practical Course Structure					
1	2	Selection of microorganism used in industry	Industrial Microorganism Selection	Lab practice + Discussion	Lab report
2	2	Nutritional requirements of	Microbial Nutrition	Lab experiment + Case study	Quiz

		(microorganisms			
3	2	Media formulation	Fermentation Media Design	Lab preparation + Group activity	Practical report
4	2	Fermentation types	Types of Fermentation Processes	Lab demonstration + Comparative analysis	Assignment
5	2	Exam			
6	2	Ethanol fermentation, acetic acid fermentation, lactic acid fermentation	Alcoholic & Organic Acid Fermentations	Lab practice + Observation	Lab report
7	2	Production of various fermentation products(vitamins,organic acids,etc)	Industrial Microbial Products	Lab experiment + Case study	Quiz
8	2	Enzyme Production	Microbial Enzyme Technology	Lab practice + Group work	Practical report
9	2	Single Cell Protein Production	SCP Technology	Lab experiment + Discussion	Lab report
10	2	Exam			
11	2	Production technology of Fermented vegetable products(vinegar,pickle)	Vegetable Fermentation Technology	Lab practice + Demonstration	Practical report
12	2	Production of technology of Fermented dairy products(kıymız,kefir,cheese, yogurt))	Dairy Fermentation Technology	Lab practice + Group activity	Lab report
13	2	Production of technology of Fermented meat products(sucuk)	Meat Fermentation Technology	Lab practice + Case study	Practical report
14	2	Antibiotics Production	Industrial	Lab experiment +	Lab report

			Antibiotics Production	Discussion	
15	2	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)					
Main references (sources)					
Recommended books and references (scientific journals, reports...)					
Electronic References, Websites					

Course Description Form

Molecular Biology 1

61.Course Code

BioSM-326

62.Semester / Year

)6-2025Second Semester (202

63.Description Preparation Date:

6/20261/

64.Available Attendance Forms

Actual Attendance

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

(2 Hours Theory)and (2 hours practical)

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

Name: Dr.Alyaa Abdulhadi Salih

Email: Alyaasaleh@uowasit.edu.iq

67.Course Objectives

Course Objectives

- (1)Caring for students and developing their abilities.
- (2) Attracting and retaining distinguished faculty members.
- (3) Developing education and providing an attractive learning environment.
- (4) Continuous development and enhancement of quality applications.
- (5) Serving graduates and interacting with the labor market.
- (6) Completing the establishment of the infrastructure for postgraduate studies and scientific research.
- (7) Completing the establishment of the university's infrastructure.
- (8) Building an effective partnership locally and globally.
- (9) Developing the university's financial resources.
- (10) Develop a supportive administrative system.

68.Teaching and Learning Strategies

Strategy		- Group discussions and assignments - Creating a competitive atmosphere among students and addressing individual differences using appropriate educational methods - Research projects - Interdisciplinary discussion circles - Incorporating teaching methods that utilize educational technology - Encouraging students for self-directed learning.				
– Theory Course Structure						
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method	
1	2	Introduction and protein structure	Molecular 2Biology	Theory	Quiz, monthly exams and discussion	
2	2	Type of protein	Molecular 2Biology	Theory	Quiz, monthly exams and discussion	
3	2	Mitochondrial DNA	Molecular 2Biology	Theory	Quiz, monthly exams and discussion	
4	2	Telomerase and Cellular Senescence	Molecular 2Biology	Theory	Quiz, monthly exams and discussion	
5	2	DNA Mutation	Molecular 2Biology	Theory	Quiz, monthly exams and discussion	
6	2	Common Gene Mutation in Cancerous Cells	Molecular 2Biology	Theory	Quiz, monthly exams and discussion	
7	2	DNA Repair	Molecular 2Biology	Theory	Quiz, monthly exams and discussion	
8	2	First Exam	Molecular	Theory	Quiz, monthly	

			2Biology		exams and discussion
9	2	Chromosome Aberrations	Molecular 2Biology	Theory	Quiz, monthly exams and discussion
10	2	Horizontal gene transfer	Molecular 2Biology	Theory	Quiz, monthly exams and discussion
11	2	Transduction	Molecular 2Biology	Theory	Quiz, monthly exams and discussion
12	2	Basics of DNA Cloning	Molecular 2Biology	Theory	Quiz, monthly exams and discussion
13	2	Type of vectors	Molecular 2Biology	Theory	Quiz, monthly exams and discussion
14	2	Cloning Applications	Molecular 2Biology	Theory	Quiz, monthly exams and discussion
15	2	Second exam	Molecular 2Biology	Theory	Quiz, monthly exams and discussion

– Practical Course Structure

1	2	protein extraction	Molecular 2Biology	Theory	Quiz, monthly exams and discussion
2	2	Lab2 : Extraction of protein from plant tissue	Molecular 2Biology	Theory	Quiz, monthly exams and discussion
3	2	Lab3: Protein Extraction From Bacteria	Molecular 2Biology	Theory	Quiz, monthly exams and discussion
4	2	Lab4: Protein purification techniques	Molecular 2Biology	Theory	Quiz, monthly exams and discussion
5	2	Lab5 : Gel	Molecular	Theory	Quiz, monthly

		filtration chromatography	2Biology		exams and discussion
6	2	Lab6:Protein Detection Methods	Molecular 2Biology	Theory	Quiz, monthly exams and discussion
7	2	Lab 7: Western blot	Molecular 2Biology	Theory	Quiz, monthly exams and discussion
8	2	First Exam	Molecular 2Biology	Theory	Quiz, monthly exams and discussion
9	2	Lab8: Immunohistochemi stry (IHC)	Molecular 2Biology	Theory	Quiz, monthly exams and discussion
10	2	Practical sera vaccine	Molecular 2Biology	Theory	Quiz, monthly exams and discussion
11	2	Immune complex disease	Molecular 2Biology	Theory	Quiz, monthly exams and discussion
12	2	Nuclic acid hybridization	Molecular 2Biology	Theory	Quiz, monthly exams and discussion
13	2	DNA probes	Molecular 2Biology	Theory	Quiz, monthly exams and discussion
14	2	Protein extraction	Molecular 2Biology	Theory	Quiz, monthly exams and discussion
15	2	Second exam	Molecular 2Biology	Theory	Quiz, monthly exams and discussion
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)	David Clark, Nanette Pazdernik, Michelle McGehee.2018, Molecular Biology 3rd Edition - November 2
Main references (sources)	Sue Carson, Heather Miller, Melissa Srougi, D. Scott Witherow .2019. Molecular Biology Techniques A Classroom Laboratory Manual 4th Edition - March 5, 2019
Recommended books and references (scientific journals, reports...)	Textbook of Biotechnology, Kara and Ghosh Dalai British biotechnology journal
Electronic References, Websites	Biology: Cell Structure - YouTube

Course Description Form

Course Name:
Molecular Biology
Course Code:
<i>BioSM-314</i>
Semester / Year:
First Semester 2025–2026
Description Preparation Date:
20/06/2026
Available Attendance Forms:
On-site
Number of Credit Hours (Total) / Number of Units (Total)
Total Hours: 60 hours (30 theoretical + 30 practical)

Course administrator's name (mention all, if more than one name)	
Name: Dr. Alya'a Abdul-Hadi Salih Email: alyaasaleh@uowasit.edu.iq	
• <u>Partical</u> Staff:- • Dr. Nuha Alaa Hamza • Dr. Asyad Abdul Abbas • Asst. Lecturer Noor Aziz	
Course Objectives	
Course Objectives	• Understand the molecular structure of DNA and RNA. • Explain the mechanisms of DNA replication, transcription, and translation. • Study gene expression regulation and genetic mutations. • Become familiar with modern molecular biology techniques such as PCR, DNA sequencing, and genetic engineering. • Develop laboratory skills and the ability to analyze experimental results.
Teaching and Learning Strategies	
Strategy	• Theoretical lectures • Scientific discussions • Practical laboratory sessions • Presentations and reports

	Self-learning using electronic resources				
– Theory Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Students define molecular biology and its importance.	Introduction to Molecular Biology	Lecture	Discussion
2	2	Students compare eukaryotic and prokaryotic DNA.	Eukaryotic DNA versus Prokaryotic DNA	Lecture	Discussion
3	2	Students describe DNA and RNA structure.	Structure of DNA and RNA	Lecture	Discussion
4	2	Assessment of previous concepts.	First Monthly Examination	exam	Written Exam
5	2	Students explain DNA replication.	DNA Replication	Lecture	Questions and assignments
6	2	Students explain DNA replication.	DNA Replication	Lecture	Questions and assignments
7	2	Students explain transcription.	Transcription	Lecture	Questions and assignments
8	2	Students explain transcription.	Transcription	Lecture	Questions and assignments
9	2	Students explain protein synthesis.	Translation	Lecture	Questions and assignments
10	2	Students explain protein synthesis.	Translation	Lecture	Questions and assignments
11	2	Students explain protein synthesis.	Translation	Lecture	Questions and assignments
12	2	Assessment.	Second Monthly	Lecture	Written Exam

			Examination		
13	2	Assessment.	Midterm Examination	Lecture	Written Exam
14					
15					
– Practical Course Structure					
1	2	Introduction to Molecular Biology	Define molecular biology and its importance.	Lecture	Questions and assignments
2	2	Micropipette	Use micropipettes accurately.	Lecture	Questions and assignments
3	2	DNA Extraction from Blood	Perform DNA extraction from blood samples.	Lecture	Questions and assignments
4	2	Chromosomal DNA Extraction from Bacteria	Evaluate bacterial DNA quality.	Lecture	Questions and assignments
5	2	Gel Electrophoresis	Analyze DNA bands.	Lecture	Questions and assignments
6	2	Gel Electrophoresis	Analyze DNA bands.	Lecture	Questions and assignments
7	2	First Monthly Examination	Assess previous topics.	exam	Written Exam
8	2	Polymerase Chain Reaction (PCR)	Explain PCR principles.	Lecture	Questions and assignments
9	2	Polymerase Chain Reaction (PCR)	Interpret PCR results.	Lecture	Questions and assignments
10	2	RNA Extraction	Perform RNA extraction.	Lecture	Questions and

					assignments
11	2	DNA & RNA Concentration Measurement	Measure concentration and purity.	Lecture	Questions and assignments
12	2	Second Monthly Examination	Assessment.	exam	Written Exam
13	2	Introduction to Molecular Biology	Define molecular biology and its importance.	Lecture	Questions and assignments
14	2	Micropipette	Use micropipettes accurately.	Lecture	Questions and assignments
15	2	DNA Extraction from Blood	Perform DNA extraction from blood samples.	Lecture	Questions and assignments
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)			Molecular Biology of the Gene – Watson et al		
Main references (sources)			6. Molecular Cell Biology – Lodish et al. 7. Lewin's Genes XII – Krebs et al.		
Recommended books and references (scientific journals, reports...)			6. Principles of Gene Manipulation and Genomics – Primrose & Twyman.		
Electronic References, Websites			☐ NCBI: https://www.ncbi.nlm.nih.gov/ ☐ PubMed:		

	https://pubmed.ncbi.nlm.nih.gov/ ☐ Nature Reviews Molecular Cell Biology: https://www.nature.com/nr
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Course Description Form

Course Name:	
Serology and Vaccines	
Course Code:	
BioSM-327	
Semester / Year:	
2025-2026	
Description Preparation Date:	
16-07-2026	
Available Attendance Forms:	
Actual Attendance	
Number of Credit Hours (Total) / Number of Units (Total)	
(2 Hours Theory)and (2 hours practical)	
Course administrator's name (mention all, if more than one name)	
Name: Asst. Prof. Dr. Alaa Ali Matrood Email: amatrood@uowasit.edu.iq Dr. Marwa Ali Ibrahim marwaa@uowasit.edu.iq	
Course Objectives	
Course Objectives	– Study of serum, its components and its role in immunity – Identify vaccines, their components, types, and how they work. – Identify the most important methods used in immunological tests – Identifying the importance of serums in protecting humans from infections – Identify the importance of vaccines and

			methods of producing and dealing with them		
Teaching and Learning Strategies					
Strategy	- Group discussions and assignments - Creating a competitive atmosphere among students and addressing individual differenc using appropriate educational methods - Research projects - Interdisciplinary discussion circles - Incorporating teaching methods that utilize educational technology - Encouraging students for self-directed learning.				
– Theory Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction in serology and vaccination		Data show	Quizzes and monthly exam.
2	2	Serology diagnostic methods		Data show	Quizzes and monthly exam.
3	2	Herd Immunity		Data show	Quizzes and monthly exam.
4	2	Types of immunity		Data show	Quizzes and monthly exam.
5	2	Types of Vaccines		Data show	Quizzes and monthly exam.
6	2	First Exam			
7	2	Vaccine composition and production		Data show	Quizzes and monthly exam.
8	2	Bacilli calmette-erin (BCG) vaccine and Polio vaccines		Data show	Quizzes and monthly exam.
9	2	DPT vaccine and MMR vaccine		Data show	Quizzes and monthly exam.
10	2	Hepatitis B vaccine, Rotavirus vaccine and		Data show	Quizzes and monthly exam.

		haemophiles influenza type b vaccine			
11	2	Rabies vaccine and Chickenpox (Varicella zoster vaccine)		Data show	Quizzes and monthly exam.
12	2	Second Exam			
13	2	Typhoid, Cholera and Influenza vaccine		Data show	Quizzes and monthly exam.
14	2	DNA Vaccination		Data show	Quizzes and monthly exam.
15	2	Third exam			
– Practical Course Structure					
1	2	Biosafety & blood collection		Theoretical background, short demonstration, and practical hands-on application	Lab report, oral exam & quiz
2	2	Serum Separation & Storage		Theoretical background, short demonstration, and practical hands-on application	Lab report, oral exam & quiz
3	2	Direct Agglutination		Theoretical background, short demonstration, and practical hands-on application	Lab report, oral exam & quiz
4	2	Indirect Agglutination		Theoretical background, short demonstration, and practical hands-on application	Lab report, oral exam & quiz
5	2	Precipitation test		Theoretical background, short demonstration, and practical hands-on	Lab report, oral exam & quiz

				application	
6	2	First Exam			
7	2	ELISA 1		Theoretical background, short demonstration, and practical hands-on application	Lab report, oral exam & quiz
8	2	ELISA 2		Theoretical background, short demonstration, and practical hands-on application	Lab report, oral exam & quiz
9	2	Dilutions & Antibody titer		Theoretical background, short demonstration, and practical hands-on application	Lab report, oral exam & quiz
10	2	Second Exam			
11	2	Adjuvants		Theoretical background, Few short demonstrations,	oral exam & quiz
12	2	Types of vaccine		Theoretical background, Few short demonstrations,	oral exam & quiz
13	2	Methods of viruses inactivated for vaccina		Theoretical background, Few short demonstrations,	oral exam & quiz
14	2	Vaccine Storage		Theoretical background, Few short demonstrations,	oral exam & quiz
15	2	Third 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		1-Immunology and serology (fifth edition) Mary L.			

books, if any)	Turgeon 2- Clinical Immunology & Serology (fifth edition) Linda E. Miller
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

Name:	
Soil and Water Microbiology / احياء مجهرية تربة ومياه	
Course Code:	
BioSM-312	
Semester / Year:	
Third Year (UG 3) — First Semester	
Description Preparation Date:	
2025–2026	
Available Attendance Forms:	
In-person weekly attendance (theoretical lectures + practical laboratory)	
Number of Credit Hours (Total) / Number of Units (Total)	
4 units (ECTS 4) — 100 teaching hours per semester (theoretical + practical)	
Course administrator's name (mention all, if more than one name)	
Name: : Asst. Prof. Dr. Ali Kareem Sarbout Email: aksarbout@uowasit.edu.iq Asst. Lecturer Rusul Ahmed Mohsen	
Course Objectives	
Course Objectives	1. Provide students with knowledge of the

			historical background and importance of soil and water microbiology. 2. Identify and classify the main microbial groups in soil (bacteria, fungi, algae, actinomycetes, protozoa, mycorrhizal fungi). 3. Understand the biochemical transformations in soil, including the nitrogen cycle (urea hydrolysis, nitrification, ammonification, N-fixation) and the C/N ratio. 4. Explain the phosphorus and sulfur biogeochemical cycles and the role of microorganisms. 5. Analyse rhizosphere activity and the factors affecting microbial growth and distribution in soil and water. 6. Develop laboratory skills for isolating and identifying pathogenic and indicator microorganisms from soil and water.		
Teaching and Learning Strategies					
Strategy		The main strategy adopted in delivering this module is to encourage students' participation in the exercises while refining and expanding their critical-thinking skills. This is achieved through lectures, interactive tutorials, and simple experiments involving sampling activities that engage the students, in addition to laboratory practicals and continuous formative assessment.			
Course Structure – Theory					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	LO1	Introduction and historical background: importance of soil and water microbiology; position of	Lecture + interactive discussion	Quizzes, assignments, and exams

			microorganisms among living organisms; characteristics of microorganisms (cultural, morphological, metabolic, chemical, genetic).		
2	2	LO2	Main microbial groups in soil – Part 1: bacteria (structure, classification); fungi (types, roles); algae (classification, role in soil fertility).	Lecture + interactive discussion	Quizzes, assignments, and exams
3	2	LO2	Main microbial groups in soil – Part 2: actinomycetes (characteristics, antibiotic production); protozoa (classification, soil ecology); mycorrhizal fungi (types, plant associations).	Lecture + interactive discussion	Quizzes, assignments, and exams
4	2	LO3	Organic matter in soil: carbon cycle; enzymatic activity in soil; decomposition and mineralization of organic matter.	Lecture + interactive discussion	Quizzes, assignments, and exams
5	2	LO3	Nitrogen cycle – Part 1: biological nitrogen fixation (symbiotic and non-symbiotic); ammonification; urea hydrolysis; C/N ratio and its significance.	Lecture + interactive discussion	Quizzes, assignments, and exams
6	2	LO3	Nitrogen cycle – Part 2: nitrification (ammonium → nitrite → nitrate); denitrification; mineralization and assimilation; factors	Lecture + interactive discussion	Quizzes, assignments, and exams

			affecting nitrogen transformations.		
7	2	LO4	Phosphorus biogeochemical cycle: forms of phosphorus in soil; role of microorganisms in phosphorus solubilization and mineralization; phosphate-solubilizing bacteria.	Lecture + interactive discussion	Quizzes, assignments, and exams
8	2	LO4	Sulfur cycle: forms of sulfur in soil; microbial mineralization of organic sulfur; microbial oxidation and reduction of inorganic sulfur compounds.	Lecture + interactive discussion	Quizzes, assignments, and exams
9	2	LO5	Rhizosphere: definition and properties; microbial activity in the rhizosphere; rhizodeposition and root exudates; factors affecting rhizosphere populations.	Lecture + interactive discussion	Quizzes, assignments, and exams
10	2	LO6	Factors affecting microbial growth in soil: temperature, pH, moisture, light; organic-matter content and its effect on microbial diversity.	Lecture + interactive discussion	Quizzes, assignments, and exams
11	2	LO6	Water microbiology – introduction: biological indicators of water pollution; drinking-water quality standards; sources and types of water contamination.	Lecture + interactive discussion	Quizzes, assignments, and exams
12	2	LO6	Biological Oxygen Demand (BOD) and Chemical Oxygen	Lecture + interactive discussion	Quizzes, assignments, and exams

			Demand (COD): measurement methods and significance in assessing water quality.		
13	2	LO7	Pathogenic microorganisms in water: bacteria (Vibrio, Salmonella, Shigella, E. coli); viruses; protozoa (Giardia, Cryptosporidium); detection and identification methods.	Lecture + interactive discussion	Quizzes, assignments, and exams
14	2	LO6, LO7	Water pollution control: physical, chemical and biological treatment methods; wastewater treatment stages; standards and legislation.	Lecture + interactive discussion	Quizzes, assignments, and exams
15	2	All	General review and exam preparation: summary of key topics and discussion of common questions.	Lecture + interactive discussion	Quizzes, assignments, and exams
– Practical Course Structure					
1	2	LO1, LO7	Introduction to soil and water microbiology; position of microorganisms; cultural and morphological characteristics; preparation and sterilization of culture media.	Practical laboratory experiments	Lab reports and practical assessment
2	2	LO7	Bacterial nutrition and culture media: types of culture media; growth factors; inorganic nutrients; nutrient transport across the plasma membrane.	Practical laboratory experiments	Lab reports and practical assessment

3	2	LO7	Bacterial growth and multiplication; pure-culture isolation (streak plate, pour plate); growth phases and enumeration of bacteria.	Practical laboratory experiments	Lab reports and practical assessment
4	2	LO6, LO7	Soil microorganisms; soil environment (temperature, pH, light, organic matter); factors affecting microbial distribution; soil sampling and preparation.	Practical laboratory experiments	Lab reports and practical assessment
5	2	LO7	Isolation and identification of bacteria from contaminated water samples; serial-dilution techniques and plating methods.	Practical laboratory experiments	Lab reports and practical assessment
6	2	LO7	Isolation and identification of Escherichia coli from water; MacConkey agar, EMB agar, confirmatory tests.	Practical laboratory experiments	Lab reports and practical assessment
7	2	LO7	Isolation and identification of Enterobacteriaceae from water; biochemical tests (IMViC); final practical assessment.	Practical laboratory experiments	Lab reports and practical assessment
8					
9					
10					
11					
12					
13					
14					
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 Score distribution: Quizzes : 10 Assignments : 10 Projects / Lab. : 10 Report : 10 Midterm exam : 10 Final exam : 50 Total : 100	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Microbiology of Soil and Water (main course textbook — Arabic and English references).
Main references (sources)	Madigan, M.T. et al. (2021). Brock Biology of Microorganisms (16th ed.). Pearson.
Recommended books and references (scientific journals, reports...)	Atlas, R.M. (2010). Handbook of Microbiological Media. CRC Press; and relevant scientific journals and reports in soil and water microbiology.
Electronic References, Websites	https://www.uowasit.edu.iq https://www.ncbi.nlm.nih.gov https://www.asm.org

Course Description Form

Course Name:
food poisoning
Course Code:
BioSM-316
Semester / Year:
First semester/ 2025 - 2026
Description Preparation Date:
2026
Available Attendance Forms:
(Theoretical and practical) weekly
Number of Credit Hours (Total) / Number of Units (Total)
30 theoretical hours + 30 practical hours = 60 hours Number of units= 3
Course administrator's name (mention all, if more than one name)
Name: Prof. Khairi Jameel Email: khjameel@uowasit.edu.iq Marwa Ali Ibrahim marwaa@uowasit.edu.iq Bdour Muhammed Al-Shweily bedoorm@uowasit.edu.iq Manahel hadi mjefi manahel.hadi@uowasit.edu.iq Donia Fadhel Abass donia.fadhel@uowasit.edu.iq Muammar Abdel-Ammer Kadhim

muammar@uowasit.edu.iq

Course Objectives	
Course Objectives	1. Identify the common causes and sources of food poisoning. 2. Recognize the symptoms and signs of foodborne illnesses. 3. Explain the methods used to prevent food poisoning. 4. Understand the importance of food hygiene and safe food handling practice.
Teaching and Learning Strategies	
Strategy	1- The method of delivery, live questioning, problem solving and discussion 2- Include teaching methods using educational technology (data show for face-to-face education and linking lectures with videos Educational support for the subject) 3- The method of distance learning by holding electronic meetings by (Google Mate or FCC and others for e-learning) 4- Encouraging students to self-learn.

– Theory Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction to food poisoning Classification of food Toxins safety assessment	Definition of food poisoning External toxins Internal toxins	Data show	Quizzes and monthly exam
2	2	Classification of bacterial cause food poisoning	due to differences between them in terms of composition, thermal stability, and mechanism of action	Data show	Quizzes and monthly exam.
3	2	Mechanisms of action of bacterial food poisoning	its effect on cell membranes. Inhibition of protein synthesis	Data show	Quizzes and monthly exam.
4	2	-	Effects on the nervous system. Disruption of cellular signaling.	Data show	Quizzes and monthly exam.
5	2	The most important	Clostridium botulinum	Data show	Quizzes and monthly

		bacterial food poisoning			exam.
6	2	-	Clostridium tetani	Data show	Quizzes and monthly exam.
7	2	-	Corynebacterium diphtheriae	Data show	Quizzes and monthly exam.
8	2	-	enterotoxin	Data show	Quizzes and monthly exam.
9	2	Factors affecting toxin production	Environmental conditions. Nutrient medium. Genetic factors.	Data show	Quizzes and monthly exam.
10	2	Diagnosis of bacterial food toxins	Culture methods. Immunological tests.	Data show	Quizzes and monthly exam.
11	2	-	PCR	Data show	Quizzes and monthly exam.
12	2	=	Toxicology tests	Data show	Quizzes and monthly

					exam.
13	2	Prevention and treatment	For sterilization and disinfection. Vaccines and antitoxins.	Data show	Quizzes and monthly exam.
14	2	=	Antibiotics when needed.	Data show	Quizzes and monthly exam.
15	2	Exam	Exam	Data show	Quizzes and monthly exam.
– Practical Course Structure					
1	2	Gaining practical skills through training in labs and research centers.	Introduction	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam.
2	2	=	Preparing sample for testing	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam.
3	2	Detection of food	Clostridium botulinum	Using Data Show	Quizzes and

		poisoning toxin- producing bacteria		projectors and applying the practical part in the lab	monthly exam
4	2	=	Clostridium tetani	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
5	2	=	Corynebacterium diphtheriae	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
6	2	=	Test		Quizzes and monthly exam
7	2	=	Vibrio cholerae	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
8	2	=	Staphylococcus aureus	Using Data Show projectors and applying the	Quizzes and monthly exam

				practical part in the lab	
9	2	=	Bacillus cereus	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
10	2	=	Clostridium perfringens	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
11	2	=	Escherichia coli O157:H7	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
12	2	=	Shigella dysenteriae	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
13	2	=	Pseudomonas aeruginosa Exotoxin A	Using Data Show projectors and	Quizzes and monthly

				applying the practical part in the lab	exam
14	2	=	Test		Quizzes and monthly exam
15	2	=	Helicobacter pylori	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly 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)					
Main references (sources)			1- food poisoning (James M. Jay) 2007 2- medical Micro . Series Editor Michael P. Doyle Center of Food Safety, University of Georgia, Griffin, GA, USA		
Recommended books and references (scientific journals, reports...)					
Electronic References, Websites					

Course Description Form

Course Name:
Microbial contamination
Course Code:
BioSM-321
Semester / Year:
Second semester/ 2025 - 2026
Description Preparation Date:
2026
Available Attendance Forms:
(Theoretical and practical) weekly
Number of Credit Hours (Total) / Number of Units (Total)
30 theoretical hours + 30 practical hours = 60 hours Number of units= 3
Course administrator's name (mention all, if more than one name)
Name: Prof. Khairi Jameel Email: khjameel@uowasit.edu.iq Marwa Ali Ibrahim marwaa@uowasit.edu.iq Bdour Muhammed Al-Shweily bedoorm@uowasit.edu.iq Manahel hadi mjefi manahel.hadi@uowasit.edu.iq Donia Fadhel Abass donia.fadhel@uowasit.edu.iq

Muammar Abdel-Ammer Kadhim
muammar@uowasit.edu.iq

Course Objectives

Course Objectives

The objective of studying Microbial Contamination is to understand the sources, mechanisms, and effects of microbial contamination, identify pathogenic microorganisms, apply appropriate detection methods, and implement effective prevention and control measures to ensure public health and safety.

Teaching and Learning Strategies

Strategy

- 1- The method of delivery, live questioning, problem solving and discussion
- 2- Include teaching methods using educational technology (data show for face-to-face education and linking lectures with videos Educational support for the subject)
- 3- The method of distance learning by holding electronic meetings by (Google Mate or FCC and others for e-learning)
- 4- Encouraging students to self-learn.

Course Structure – Theory					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Types of Healthcare-Associated Infection (HAI)	Nosocomial infection	Data show	Quizzes and monthly exam
2	2	Virulence factors of <i>Staphylococcus aureus</i>	Staphylococcus aureus	Data show	Quizzes and monthly exam.
3	2	Transmission, Pathogenicity and virulence factors	Pseudomonas aeruginosa	Data show	Quizzes and monthly exam.
4	2	Transmission, Pathogenicity and virulence factors	Mucormycosis	Data show	Quizzes and monthly exam.
5	2	Transmission, Pathogenicity and virulence factors	Coronaviruses	Data show	Quizzes and monthly exam.
6	2	Transmission, Pathogenicity and virulence factors	Infection with Candidiasis	Data show	Quizzes and monthly exam.
7	2	Transmission of <i>H.</i>	<i>Helicobacter pylori</i>	Data show	

		<i>pylori</i> , Pathogenicity and virulence factors.	(<i>H. pylori</i>) Diagnosis		Quizzes and monthly exam.
8	2	Biochemical Test of <i>Helicobacter pylori</i>	. Stool Antigen Test (SAT)	Data show	Quizzes and monthly exam.
9	2	Causative Agents of UTI, Symptoms of UTI	Diagnosis of Bacteria Causing UTI (Urinary Tract Infection)	Data show	Quizzes and monthly exam.
10	2	Cultural characteristics of <i>E.coli</i> <i>Identification of the isolates by API20E system,</i>	Isolation of <i>E.coli</i>	Data show	Quizzes and monthly exam.
11	2	<i>Clinical cases of Staphylococcus aureus</i> Virulence factors.	Diagnosis of <i>Staphylococcus aureus</i> <i>in clinical cases</i>	Data show	Quizzes and monthly exam.
12	2	General Characteristics of <i>Aspergillus</i> spp	Diagnosis of <i>Aspergillus fumigatus</i> infection	Data show	Quizzes and monthly exam.
13	2	Cultural isolation , Antigen detection, Serology	Laboratory diagnosis of <i>Aspergillus fumigatus</i>	Data show	Quizzes and monthly exam.
14	2	Cultural isolation , Antigen detection, Serology	Diagnosis of <i>candida fumigatus</i> infection	Data show	Quizzes and monthly exam.
15	2	Exam	Exam	Data show	Quizzes and

					monthly exam.
– Practical Course Structure					
1	2	Gaining practical skills through training in labs and research centers.	Introduction	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam.
2	2	=	Preparing sample for testing	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam.
3	2	Detection of bacteria	Staphylococcus aureus	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
4	2	=	Pseudomonas aeruginosa	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
5	2	Detection of fungi	Mucormycosis	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
6	2	Detection of viruses	Coronaviruses		Quizzes and monthly exam
7	2	Detection of fungi	Infection with Candidiasis	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam

8	2	Detection of bacteria	<i>Helicobacter pylori</i> (H. pylori) Diagnosis	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
9	2	=	. Stool Antigen Test (SAT)	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
10	2	=	Diagnosis of Bacteria Causing UTI (Urinary Tract Infection)	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
11	2	=	Isolation of E.coli	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
12	2	=	Shigella dysenteriae	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
13	2	=	Pseudomonas aeruginosa Exotoxin A	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
14	2	=	Test		Quizzes and monthly exam
15	2	Detection of fungi	<i>Aspergillus fumigatus</i>	Using Data Show projectors and applying	Quizzes and monthly exam

				the practical part in the lab	
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)					
Main references (sources)			1- Microbiology (James M. Jay) 2007 2- Medical Microbiology, 8th Edition, Series Editor Michael P. Doyle Center of Food Safety, University of Georgia, Griffin, GA, USA		
Recommended books and references (scientific journals, reports...)					
Electronic References, Websites					

Course Structure - Theory					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understand basic concepts of hematology	Introduction to Hematology & Composition of Blood	Lectures & Discussion	Quizzes & Exams
2	2	Explain blood cell formation processes	Hematopoiesis: Bone Marrow & Stem Cells	Lectures & Discussion	Quizzes & Exams
3	2	Describe erythrocyte structure and production	Erythrocytes (RBCs): Erythropoiesis & Regulation	Lectures & Discussion	Quizzes & Exams

Course Structure - Theory					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
4	2	Identify hemoglobin structure and synthesis	Hemoglobin: Structure, Function & Synthesis	Lectures & Discussion	Quizzes & Exams
5	2	Understand iron metabolism mechanisms	Iron Metabolism & Hemoglobin Degradation	Lectures & Discussion	Quizzes & Exams
6	2	Explain classification of anemias	Erythrocyte Disorders: Introduction to Anemias	Lectures & Discussion	Quizzes & Exams
7	2	Describe specific types of anemias	Hemolytic Anemias & Hemoglobinopathies	Lectures & Discussion	Quizzes & Exams
8	-	Exam	First Monthly Exam	Exam	Written Exam
9	2	Explain leukocyte types and functions	Leukocytes (WBCs): Granulocytes & Agranulocytes	Lectures & Discussion	Quizzes & Exams
10	2	Describe benign leukocyte variations	Leukopoiesis & Non-malignant WBC Disorders	Lectures & Discussion	Quizzes & Exams
11	2	Understand malignant leukocyte disorders	Malignant WBC Disorders: Leukemias & Lymphomas	Lectures & Discussion	Quizzes & Exams
12	2	Explain platelet structure and production	Platelets (Thrombocytes) & Thrombopoiesis	Lectures & Discussion	Quizzes & Exams
13	2	Describe blood coagulation pathways	Hemostasis & Mechanisms of Blood Coagulation	Lectures & Discussion	Quizzes & Exams
14	2	Understand bleeding and transfusion basics	Coagulation Disorders & Blood Transfusion Basics	Lectures & Discussion	Quizzes & Exams
15	-	Exam	Second Monthly Exam	Exam	Written Exam
Course Structure - Practical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Recognize laboratory safety and instruments	Introduction to Hematology Lab & Safety Rules	Lab Experiments	Lab Reports & Quizzes
2	2	Master blood sample	Blood Collection Techniques	Lab Experiments	Lab Reports &

Course Structure - Theory					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
		collection methods	& Anticoagulants		Quizzes
3	2	Prepare and stain blood films	Preparation and Staining of Peripheral Blood Smears	Lab Experiments	Lab Reports & Quizzes
4	2	Identify blood cell morphology	Microscopic Examination of Blood Cells	Lab Experiments	Lab Reports & Quizzes
5	2	Perform manual red blood cell counting	Hematology: Manual Red Blood Cell (RBC) Count	Lab Experiments	Lab Reports & Quizzes
6	2	Perform manual white blood cell counting	Hematology: Manual White Blood Cell (WBC) Count	Lab Experiments	Lab Reports & Quizzes
7	2	Determine packed cell volume	Determination of Packed Cell Volume (PCV) / Hematocrit	Lab Experiments	Lab Reports & Quizzes
8	-	Exam	Practical Midterm Exam	Exam	Practical Exam
9	2	Estimate hemoglobin concentration	Hemoglobin Estimation Methods (Sahli's & Cyanmethemoglobin)	Lab Experiments	Lab Reports & Quizzes
10	2	Calculate erythrocyte indices	Calculation of Red Blood Cell Indices (MCV, MCH, MCHC)	Lab Experiments	Lab Reports & Quizzes
11	2	Perform differential cell counts	Differential White Blood Cell Count	Lab Experiments	Lab Reports & Quizzes
12	2	Measure bleeding and clotting times	Platelet Count, Bleeding Time & Clotting Time Tests	Lab Experiments	Lab Reports & Quizzes
13	2	Determine erythrocyte sedimentation rate	Erythrocyte Sedimentation Rate (ESR) Determination	Lab Experiments	Lab Reports & Quizzes
14	2	Perform blood grouping and cross-matching	ABO and Rh Blood Typing & Cross-matching	Lab Experiments	Lab Reports & Quizzes
15	-	Exam	Practical Final Exam	Exam	Practical Exam

Course Evaluation		
Assessment Method	Timeline / Week	Weight / Percentage
Theoretical Monthly Exam 1	Week 8	10%
Theoretical Monthly Exam 2	Week 15	10%
Practical Midterm Exam	Week 8 & 15	10%
Quizzes & Homework	Continuous	10%
Lab Reports & Active Participation	Continuous	10%
Practical Final Exam	Week 15	15%
Theoretical Final Exam	Final Exam Week	35%
Total		100%

Learning and Teaching Resources	
Resource Category	Details / Source Title
Required textbooks (curricular books, if any)	Essential Haematology by A. Victor Hoffbrand and Paul A. H. Moss
Main references (sources)	Dacie and Lewis Practical Haematology by Barbara J. Bain, Imelda Bates, and Mike A. Laffan
Recommended books and references (scientific journals, reports...)	Blood Journal, British Journal of Haematology, American Journal of Hematology

Course Description Form

Course Name:	
Immunology	
Course Code:	
BioSM-313	
Semester / Year:	
2025-2026 -first	
Description Preparation Date:	
2026-07-23	
Available Attendance Forms:	
Actual Attendance	
Number of Credit Hours (Total) / Number of Units (Total)	
2 hr. theoretical + 2 hr. practical (weekly)	
Course administrator's name (mention all, if more than one name)	
Name: Asst. Prof. Dr. Alaa Ali Matrood Email: amatrood@uowasit.edu.iq Lec. Mohammed Assi Samir Dr. Asyad Abdulabbas Dr. Marwa Ali marwaa@uowasit.edu.iq Lect. Hussein Ali Mohammed Lect. Duha Hamzah Abboud	
Course Objectives	
Course Objectives	• Understand the principles and functions of the immune system. • Interpret humoral and cell-mediated immune responses. • Recognize major immunological disorders and basic diagnostic methods. • Apply immunological concepts in medical and laboratory

	settings.					
Teaching and Learning Strategies						
Strategy	-Teaching and learning strategies and methods adopted in implementing the program in general - Style of thinking and discussion - Practical tests used in laboratories - Lecture, use of the blackboard, and delivery. - Illustrative presentations (using diagrams, pictures, and educational films) - Interactive discussion - Self-education)					
Course Structure – Theory						
Week	Hours	Required	Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction to Immunology as Science			Data Show	Daily & monthly Exam
2	2	Innate Immunity			Data show	Daily & monthly Exam
3	2	Cells of the immune system			Data Show	Daily & monthly Exam
4	2	Adaptive immunity			Data show	Daily & monthly Exam
5	2	Lymphatic organs			Data Show	Daily & monthly Exam
6	2	The effectiveness of the immune system and the immune response			Data show	Daily & monthly Exams

7	2	Antigens and Immunogen		Data Show	Daily & monthly Exams
8	2	Antibodies		Data show	Daily & monthly Exams
9	2	Antigen-Antibody Reaction		Data Show	Daily & monthly Exams
10	2	Complement System		Data show	Daily & monthly Exams
11	2	Autoimmune diseases		Data Show	Daily & monthly Exams
12	2	Immunologic Tolerance		Data show	Daily & monthly Exams
13	2	Immunodeficiency		Data Show	Daily & monthly Exams
14	2	Relationship between tumor and immunity		Data show	Daily & monthly Exams
15	2	Exam			
– Practical Course Structure					
1	2	Animal Marking		Theoretical background short demonstration & practical hands-on application	Daily & monthly Exams +lab report
2	2	Injection methods and Blood Sampling		Theoretical background short demonstration & practical hands-on	Daily & monthly Exams +lab report

				application	
3	2	Immune System Structures, Components and Functions		Theoretical background short demonstration & practical hands-on application	Daily & monthly Exams +lab report
4	2	First exam			
5	2	Isolation of Serum and Plasma		Theoretical background short demonstration & practical hands-on application	Daily & monthly Exams +lab report
6	2	Serological test		Theoretical background short demonstration & practical hands-on application	Daily & monthly Exams +lab report
7	2	Agglutination test		Theoretical background short demonstration & practical hands-on application	Daily & monthly Exams +lab report
8	2	Second exam			

9	2	Complement Fixation Test (CFT)		Theoretical background short demonstration & practical hands-on application	Daily & monthly Exams +lab report
10	2	Enzyme - Linked Immunosorbent Assay (ELISA)		Theoretical background short demonstration & practical hands-on application	
11		Third Exam			
12					
13					
14					
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)			Medical Microbiology and Immunology, Warren Levinson, 2016 . - Microbiology and Immunology ,Subhash Chandra Parija, 2012 - Cellular and molecular immunology 2015 - Sara's Immunology 2014		

Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	https://teachmephysiology.com/immune-system/?utm_source=chatgpt.com https://teachmephysiology.com/immune-system/?utm_source=chatgpt.com

Course Name:	
Mycology2	
Course Code:	
BioSM-325	
Semester / Year:	
Second Semester (2025-2026)	
Description Preparation Date:	
15/7/2026	
Available Attendance Forms:	
Actual Attendance	
Number of Credit Hours (Total) / Number of Units (Total)	
(2 Hours Theory)and (2 hours practical)	
Course administrator's name (mention all, if more than one name)	
Name: Name: Prof.Dr. Mohammed Jubair Hanawi Email: mjbaier@uowasit.edu.iq : Nawar Jaber Hussein Ikram Saad Abdal Hussein Manahil Hadi Mujifi Asawer Faiq Halil	
Course Objectives	
Course Objectives	-To know the structural, description and growth characteristics of fungi. -To understand the principles and schemes used to classify fungi. -To appreciate the beneficial roles fungi play in biotechnology, food production, and the environment, as well as the negative impact of certain fungi on humans.....

Teaching and Learning Strategies					
Strategy	- Lecturing and presentation information - Entertains student questions during the presentation of information - encourages greater student participation Discussion				
– Theory Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understanding the theoretical principles of mycology	Growth of fungi and factors that affect growth	Lecturing and Discussion	Exam , Discussion and attendance
2	2	Understanding the theoretical principles of mycology	Conidiogenesis or spore formation	Lecturing and Discussion	Exam , Discussion and attendance
3	2	Understanding the theoretical principles of mycology	Structure of cell wall	Lecturing and Discussion	Exam , Discussion and attendance
4	2	Understanding the theoretical principles of mycology	Primary and secondary metabolism of fungi	Lecturing and Discussion	Exam , Discussion and attendance
5	2	Understanding the theoretical principles of mycology	Mycotoxin , types and importance	Lecturing and Discussion	Exam , Discussion and attendance
6	2	Understanding the theoretical principles of mycology	Medical fungi and fungal infection	Lecturing and Discussion	Exam , Discussion and attendance

7	2	Understanding the theoretical principles of mycology	First exam	Lecturing and Discussion	Exam , Discussion and attendance
8	2	Understanding the theoretical principles of mycology	Classification of medical fungi	Lecturing and Discussion	Exam , Discussion and attendance
9	2	Understanding the theoretical principles of mycology	Types of Aspergillosis	Lecturing and Discussion	Exam , Discussion and attendance
10	2	Understanding the theoretical principles of mycology	Types of Candidiasis	Lecturing and Discussion	Exam , Discussion and attendance
11	2	Understanding the theoretical principles of mycology	Types of dermatophytosis	Lecturing and Discussion	Exam , Discussion and attendance
12	2	Understanding the theoretical principles of mycology	Types of Cryptococcosis	Lecturing and Discussion	Exam , Discussion and attendance
13	2	Understanding the theoretical principles of mycology	Treatment of fungal infections	Lecturing and Discussion	Exam , Discussion and attendance
14	2	Understanding the theoretical principles of mycology	Fungi and industry and biocontrol	Lecturing and Discussion	Exam , Discussion and attendance
15	2	Understanding the theoretical principles of mycology	Second exam.	Lecturing and Discussion	Exam , Discussion and attendance
– Practical Course Structure					
1	2	Practical experience in medical mycology	Types of conidiogenesis	Classification of fungi ,	Exam , Discussion and attendance

		involves isolating, identifying, and testing fungal pathogens.		microscopic identification of yeasts and molds	
2	2	Practical experience in medical mycology involves isolating, identifying, and testing fungal pathogens.	Samples of mycotoxins	Classification of fungi , microscopic identification of yeasts and molds	Exam , Discussion and attendance
3	2	Practical experience in medical mycology involves isolating, identifying, and testing fungal pathogens.	Samples of fungi that producing mycotoxins	Classification of fungi , microscopic identification of yeasts and molds	Exam , Discussion and attendance
4	2	Practical experience in medical mycology involves isolating, identifying, and testing fungal pathogens.	Fungal infections or mycosis	Classification of fungi , microscopic identification of yeasts and molds	Exam , Discussion and attendance
5	2	Practical experience in medical mycology involves isolating, identifying, and testing fungal pathogens.	Samples of Aspergillosis	Classification of fungi , microscopic identification of yeasts and molds	Exam , Discussion and attendance
6	2	Practical experience in medical mycology involves isolating, identifying, and testing fungal pathogens.	Samples of Candidiasis	Classification of fungi , microscopic identification of yeasts and molds	Exam , Discussion and attendance
7	2	Practical experience in medical mycology involves isolating, identifying, and testing fungal	Samples of Cryptococcosis	Classification of fungi , microscopic identification of yeasts and molds	Exam , Discussion and attendance

		pathogens.			
8	2	Practical experience in medical mycology involves isolating, identifying, and testing fungal pathogens.	First exam	Classification of fungi , microscopic identification of yeasts and molds	Exam , Discussion and attendance
9	2	Practical experience in medical mycology involves isolating, identifying, and testing fungal pathogens.	Samples of Dermatophytosis	Classification of fungi , microscopic identification of yeasts and molds	Exam , Discussion and attendance
10	2	Practical experience in medical mycology involves isolating, identifying, and testing fungal pathogens.	Samples of Blastomycosis	Classification of fungi , microscopic identification of yeasts and molds	Exam , Discussion and attendance
11	2	Practical experience in medical mycology involves isolating, identifying, and testing fungal pathogens.	Samples of Histoplasmosis	Classification of fungi , microscopic identification of yeasts and molds	Exam , Discussion and attendance
12	2	Practical experience in medical mycology involves isolating, identifying, and testing fungal pathogens.	Samples of coccidiomycosis	Classification of fungi , microscopic identification of yeasts and molds	Exam , Discussion and attendance
13	2	Practical experience in medical mycology involves isolating, identifying, and testing fungal pathogens.	Antifungal compounds	Classification of fungi , microscopic identification of yeasts and molds	Exam , Discussion and attendance
14	2	Practical experience in medical mycology involves isolating,	Samples of fungal bioagents in biocontrol	Classification of fungi , microscopic	Exam , Discussion and attendance

		identifying, and testing fungal pathogens.		identification of yeasts and molds	
15	2	Practical experience in medical mycology involves isolating, identifying, and testing fungal pathogens.	Second exam	Classification of fungi , microscopic identification of yeasts and molds	Exam , Discussion and attendance
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)		Ibrahim Aziz Alsuhalay Fungi ,			
Main references (sources)		, Roland Weber . 2007. Introduction to Fungi 3rd John Webster Edition. 867 pages.			
Recommended books and references (scientific journals, reports...)		, Charles W. Mims , Meredith M. Constantine J. Alexopoulos Blackwell . 1996. Merz, W. G. and Hay, R. J. 2005. Medical mycology. 10th Edition .ASM Press. Introductory Mycology, 4th Edition, 880 pages. Journal of mycology			
Electronic References, Websites		https://libguides.tcu.edu/environmental-science/websites			

Fourth Stage Biotechnology

Course Name:

The Philosophy of science and logic of research
Course Code:
BioST-411
Semester / Year:
First semester 2025-2026
Description Preparation Date:
1/9/2025
Available Attendance Forms:
mandatory
Number of Credit Hours (Total) / Number of Units (Total)
Number of hours (2) Number of units (1)
Course administrator's name (mention all, if more than one name)
Name: Ph.D. Zainab Mohammed Abbas Email: zmabbas@uowasit.edu.iq

Course Objectives	
Course Objectives	1. To grasp the fundamental concepts in the philosophy and logic curriculum. 2. To introduce students to the development of philosophical and logical thought and their relationship to other sciences. 3. To familiarize students with key terminology specific to philosophical and logical studies. 4. To introduce students to the human, scientific, and civilizational necessities of philosophy and logic.

	5. To familiarize students with the main topics commonly discussed in both philosophy and logic
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Teaching and Learning Strategies	
Strategy	1. Students participate in solving and analyzing philosophical problems and develop the ability to read philosophical texts. 2. Simulation, storytelling, role-playing, and analogy. 3. The professor delivers the lecture, which is then summarized by the student, effectively taking over the role of the professor in delivering the lecture.

– Theory Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Students should become familiar with the basic definitions of philosophy and knowledge.	Introduction - Philosophy as a Language -	Presentation & discussion	Daily exam
2	2	Students should become familiar with the basic definitions of philosophy and	Knowledge and ways to attaining knowledge	Presentation & discussion	Daily exam

		knowledge.			
3	2	Students should learn the definition of science.	Science and its objectives	Presentation & discussion	Daily exam
4	2		Types of philosophy	Presentation & discussion	Daily exam
5	2		The connection between philosophy & other sciences	Presentation & discussion	Daily exam
6	2	Students should learn about the methodology of thinking and problem-solving.	The difference between the philosophy of scientific research & the scientific method	Presentation & discussion	Daily exam
7	2	What is scientific research and its importance?	Introduction to scientific research	Presentation & discussion	Daily exam
8		First month exam			
9	2	Scientific method of research	Philosophy of scientific research	Presentation & discussion	Daily exam
10	2	What is the	Steps of the	Presentation	Daily exam

		research problem, Characteristics, originality?	scientific method	& discussion	
11	2	Research steps, methods, and tools.	Proposed research plan and steps of scientific research.	Presentation & discussion	Daily exam
12	2	His attributes	Good research	Presentation & discussion	Daily exam
13	2	His qualities	Good researcher	Presentation & discussion	Daily exam
14	2	Identifying the types of scientific research in terms of their methodologies and implementing bodies.	Types of scientific research	Presentation & discussion	Daily exam
15		Second month 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)	nothing
Main references (sources)	An Introduction to the Meanings of Philosophy – Dr. Irfan Abdul Hamid
Recommended books and references (scientific journals, reports...)	1. Periodicals 2. Journal of philosophy and the Al-Alam Al-Fikr /contemporary Era journal.
Electronic References, Websites	1. The Arab Philosophers website 2. The Wisdom Forum for Thinkers and Researchers 3. The Philosophy website

Course Name:
Genetic engineerig1
Course Code:
BioST-412
Semester / Year:
First Semester 2025–2026
Description Preparation Date:
28/06/2026
Available Attendance Forms:
In-person study
Number of Credit Hours (Total) / Number of Units (Total)
Total Hours: 60 hours (30 theoretical + 30 practical)

Course administrator's name (mention all, if more than one name)					
Name: Assist Prof. Dr. Alya'a Abdul-Hadi Salih Dr. Zainab Dia'a Jaboury - Dr. Asyad Abdul-Abbas - Dr. Nuha Ala'a Hamza Email: alyaasaleh@uowasit.edu.iq					
Course Objectives					
Course Objectives		- Understand the fundamental principles of genetic engineering and gene manipulation. - Learn the structure and function of DNA and genes. - Study DNA amplification and analysis techniques, including PCR. - Understand methods used for mutation detection and genetic analysis. - Learn gene cloning techniques and recombinant protein production. - Explore the applications of genetic engineering in medicine and molecular diagnostics. - Understand the role of genetic engineering in agriculture, industry, and biotechnology. - Understand the ethical and legal issues related to genetic engineering. - Enhance the ability to analyze experimental data and apply genetic engineering techniques in research and clinical practice.			
Teaching and Learning Strategies					
Strategy		- Theoretical lectures - Scientific discussions - Practical laboratory sessions - Presentations and reports - Self-learning using electronic resources			
- Theory Course Structure					
Week	Hours	Required Learning	Unit or subject name	Learning method	Evaluation method

		Outcomes			
1	2	Identify genetic engineering techniques and explain their role in biotechnology and molecular diagnostics.	Genetic Engineering	Lecture	Discussion
2	2	Explain the concept of restriction enzymes, describe their mechanism of action, and recognize their major applications in genetic engineering.	Restriction enzymes	Lecture	Discussion
3	2	Explain the basic principles of DNA cloning and identify its main steps and essential components.	Basics of DNA Cloning	Lecture	Discussion
4	2	Identify the types, structure, and functions of nucleic acids, and distinguish between DNA and RNA and their roles in storing and transmitting	Nucleic acids	Lecture	Discussion

		genetic information.			
5	2	Assessment of previous concepts.	First Monthly Examination	Exam	Written Exam
6	2	Explain the concept of recombinant DNA technology, describe its basic steps, and recognize its applications in medicine and biotechnology.	Recombinant DNA technology	Lecture	Questions and assignments
7	2	Explain the principle of the Polymerase Chain Reaction (PCR), describe its basic steps, and recognize its applications in molecular diagnostics and scientific research.	The Polymerase Chain Reaction (PCR)	Lecture	Questions and assignments
8	2	Describe the construction of genomic and cDNA libraries and understand their importance in genetic engineering.	Genomic and cDNA Libraries	Lecture	Questions and assignments

9	2	Explain the major applications of genetic engineering in medicine, agriculture, and industry, and evaluate its role in advancing biotechnology..	Applications of Genetic Engineering in Medicine, Agriculture, and Industry	Lecture	Questions and assignments
10	2	Describe the basic steps of DNA sequencing technologies and interpret their results in genetic studies.	DNA Sequencing Technologies	Lecture	Questions and assignments
11	2	Students will be able to discuss the applications of gene therapy and personalized medicine and evaluate their importance in treating genetic diseases.	Gene Therapy and Personalized Medicine	Lecture	Questions and assignments
12	2	Assessment.	Second Monthly Examination	Lecture	Written Exam
13					
14					
15					
- Practical Course Structure					
1	2	Students will be	Introduction to practical genetic	Lecture	Questions and

		able to understand the basic concepts of practical genetic engineering and its major laboratory applications.	engineering		assignments
2	2	Students will be able to distinguish between different genetic engineering laboratory instruments and use appropriate scientific terminology to describe their functions.	Equipment's in genetic engineering lab	Lecture	Questions and assignments
3	2	Understand the basic principles and workflow of gene cloning in the laboratory.	Cloning	Lecture	Questions and assignments
4	2	Explain the steps of gene cloning using appropriate vectors and enzymes.	Gene cloning	Lecture	Questions and assignments
5	2	Identify the basic structure of genetic vectors and their laboratory applications.	The vectors	Lecture	Questions and assignments
6	2	First Monthly Examination	Assessment.	exam	Written Exam

7	2	Explain the methodology of plasmid DNA purification using appropriate laboratory techniques.	Plasmid DNA Purification	Lecture	Questions and assignments
8	2	Understand the types and mechanism of action of restriction enzymes in DNA cleavage.	Restrictions Enzymes	Lecture	Questions and assignments
9	2	Explain the steps involved in preparing competent bacterial cells and the factors affecting their competence.	Preparation of Competent Bacterial Cells	Lecture	Questions and assignments
10	2	Understand the principles and steps of bacterial transformation for introducing DNA into bacterial cells.	Bacterial transformation	Lecture	Questions and assignments
11		Learn and perform the basic procedures for screening recombinant colonies in the	Screening of Recombinant Colonies	Lecture	Questions and assignments

		laboratory.			
12	2	Second Monthly Examination	Assessment.	exam	Written Exam
13					
14					
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)			An Introduction to Genetic Engineering – Nicholl		
Main references (sources)			Principles of Gene Manipulation and Genomics – Primrose & Twyman		
Recommended books and references (scientific journals, reports...)			Molecular Biotechnology: Principles and Applications of Recombinant DNA		
Electronic References, Websites			https://www.cambridge.org/core/books/an-introduction-to-genetic-engineering/frontmatter/FA3087E63F04C91733F7A64A4633E809 https://www.ncbi.nlm.nih.gov/books/NBK9950/?utm_source=chatgpt.com		

Course Name:
Genital biotechnology
Course Code:
BioST-413
Semester / Year:
semester
Description Preparation Date:

2026	
Available Attendance Forms:	
(theoretical and practical) weekly	
Number of Credit Hours (Total) / Number of Units (Total)	
60 theoretical hours + 60 practical hours = 120 hours	
Number of units =3	
Course administrator's name (mention all, if more than one name)	
Name: Assist.Prof. Asmaa Musead Salih Alkinani Email: amesad@uowasit.edu.iq	
Course Objectives	
Course Objectives	-Providing learners with knowledge of the subjects of reproductive biotechnology - Developing positive attitudes towards this knowledge - Identifying research methods for the subjects of reproductive biotechnology - Identifying the basic concepts in the subjects of biotechnology - Identifying the basic trends in the subjects of biotechnology - Identifying the objectives of studying the sciences of biotechnology - Acquiring theoretical and practical knowledge about biological reproductive techniques -Identify the consequences of this knowledge - Acquiring practical skills by performing various practical experiments in physiology laboratories.
Teaching and Learning Strategies	
Strategy	1. Active and Interactive Learning • Classroom discussions: Encourage students to ask questions and analyze problems related to reproductive technologies. • Problem-Based Learning (PBL): Present real-life scenarios such as infertility cases or artificial insemination techniques for students to solve. • Collaborative learning: Divide students into small groups to discuss topics such as artificial insemination or in vitro fertilization

(IVF).

2. Use of Technology and Multimedia

- **Virtual simulations:** Use simulation programs to explain steps of fertilization or embryo transfer.
- **Virtual classrooms:** Through platforms like Moodle or Microsoft Teams, where students can interact with content synchronously or asynchronously.
- **Educational videos:** Show explanatory clips of complex laboratory procedures such as intracytoplasmic sperm injection (ICSI).

3. Practical and Laboratory Applications

- **Hands-on experiments:** Train students in equipped laboratories on techniques such as sample collection, artificial insemination, and embryo cryopreservation.
- **Project-based learning:** Assign students to prepare a research project on the latest reproductive technologies, such as using artificial intelligence in embryo selection.

4. Developing 21st-Century Skills

- **Critical thinking and problem-solving:** Analyze ethical challenges related to reproductive technologies.
- **Communication and collaboration:** Prepare group presentations and discuss research findings.
- **Use of artificial intelligence:** Apply tools such as Micro:bit to develop design thinking in studying biological processes.

- Theory Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	hours 2	(its parts and functions)	The male reproductive system	-Theoretical lecture using PowerPoint -White board -Video	Quizzes , monthly exam and

					report
2	hours 2	Type of disease	Diseases of the male reproductive system	-Theoretical lecture using PowerPoint White board - Video	Quizzes , monthly exam and report
3	hours 2	(its parts and functions)	The female reproductive system	-Theoretical lecture using PowerPoint White board - Video	Quizzes , monthly exam and report
4	hours 2	Type of disease	Diseases of the female reproductive system	-Theoretical lecture using PowerPoint White board - Video	Quizzes , monthly exam and report
5	hours 2	(fertilization of the egg by the sperm, stages of formation of the fertilized egg)	Pregnancy	-Theoretical lecture using PowerPoint White board - Video	Quizzes , monthly exam and report
6	hours 2	Pregnancy problems and treatment	Pregnancy problems	-Theoretical lecture using PowerPoint White board - Video	Quizzes , monthly exam and report
7	hours 2	Exam	Exam	Exam	Exam
8	hours 2	Types of Infertility	Infertility	-Theoretical lecture using PowerPoint White board - Video	Quizzes , monthly exam and report
9	hours 2		Assisted Reproductive Techniques	-Theoretical lecture using PowerPoint White board - Video	Quizzes , monthly exam and report
10	hours 2	(The most common reasons for doing, Successful rate, side effect reasons for fails)	Artificial insemination technology	-Theoretical lecture using PowerPoint White board - Video	Quizzes , monthly exam and report
11	hours 2	(The most common	IVF-in vitro	-Theoretical	Quizzes ,

		reasons for doing, Successful rate, side effect reasons for fails)	fertilization and embryo transfer	lecture using PowerPoint White board - Video	monthly exam and report
12	hours 2	(The most common reasons for doing, Successful rate, side effect reasons for fails)	ICSI - Intracytoplasmic sperm injection technique	-Theoretical lecture using PowerPoint White board - Video	Quizzes , monthly exam and report
13	hours 2	(The most common reasons for doing, Successful rate, side effect reasons for fails)	ZIFT-zygote intrafallopian tube transfer technique	-Theoretical lecture using PowerPoint White board - Video	Quizzes , monthly exam and report
14	hours 2	(The most common reasons for doing, Successful rate, side effect reasons for fails)	Assisted hatching	-Theoretical lecture using PowerPoint White board - Video	Quizzes , monthly exam and report
15	hours 2	Exam	Exam	Exam	Exam
- Practical Course Structure					
1	hours 2	Protecting individuals and the environment from biological hazards through prevention, risk assessment, waste management, and emergency response.	Bio lab safety	Displaying the theoretical part on the screen + practical application + educational videos.	Daily and monthly exams
2	hours 2	Parts of reproductive system for male and female	The reproductive system	Displaying the theoretical part on the screen + practical application + educational videos.	Daily and monthly exams
3	hours 2	Learning how to perform	Seminal fluid	Displaying	Daily and

		seminal fluid analysis	examination	the theoretical part on the screen + practical application + educational videos.	monthly exams
4	hours 2	laboratory Master processing of donated eggs, including quality evaluation, cell preparation.	The Medical Procedure of Egg Donation	Displaying the theoretical part on the screen + practical application + educational videos.	Daily and monthly exams
5	hours 2	Understand the pathophysiology, risk severity factors, classification, prevention strategies, clinical and management of Ovarian Hyperstimulation Syndrome (OHSS).	Ovarian Hyper stimulation	Displaying the theoretical part on the screen + practical application + educational videos.	Daily and monthly exams
6	hours 2	Understand the patient preparation, ultrasound-guided transvaginal aspiration technique, oocyte identification, complication management, and post-operative care of egg retrieval.	Egg Retrieval	Displaying the theoretical part on the screen + practical application + educational videos.	Daily and monthly exams
7	hours 2	Exam	Exam	Exam	Exam
8	hours 2	Understand the patient screening, semen	Artificial insemination (AI)	Displaying the	Daily and monthly

		preparation techniques, timing of ovulation, intrauterine insemination (IUI) procedure, and clinical success tracking of artificial insemination.		theoretical part on the screen + practical application + educational videos.	exams
9	hours 2	Understand the patient selection, hormonal monitoring, sperm washing and processing techniques, catheter insertion procedure, and post-insemination care for Intrauterine Insemination (IUI).	Intrauterine insemination (IUI)	Displaying the theoretical part on the screen + practical application + educational videos.	Daily and monthly exams
10	hours 2	Understand the clinical phases, laboratory techniques (ICSI/IVF), embryo culture and grading, transfer procedures, and post-transfer clinical management	in vitro fertilization and embryo transfer	Displaying the theoretical part on the screen + practical application + educational videos.	Daily and monthly exams
11	hours 2	Understand patient indications, oocyte denudation, microscopic sperm selection, microinjection mechanics, embryo culture, and the clinical outcomes of Intracytoplasmic Sperm Injection (ICSI).	ICSI - Intracytoplasmic sperm injection	Displaying the theoretical part on the screen + practical application + educational videos.	Daily and monthly exams
12	hours 2	Understand patient indications, zygote identification, laparoscopic tubal transfer techniques, embryo developmental	ZIFT-zygote intrafallopian tube transfer	Displaying the theoretical part on the screen + practical	Daily and monthly exams

		timing, and the clinical outcomes of Zygote Intrafallopian Transfer (ZIFT).		application + educational videos.	
13	hours 2	Understand patient indications, gamete collection, laparoscopic tubal transfer mechanics, in-vivo fertilization physiology, and the clinical outcomes of Gamete Intrafallopian Transfer (GIFT).	GIFT-gamete intrafallopian tube transfer	Displaying the theoretical part on the screen + practical application + educational videos.	Daily and monthly exams
14	hours 2	Understand the clinical indications, mechanical/chemical/laser drilling techniques, embryonic development physiology, implantation enhancement outcomes, and safety risks of Assisted Hatching.	Assisted hatching	Displaying the theoretical part on the screen + practical application + educational videos.	Daily and monthly exams
15	hours 2	Exam	Exam	Exam	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)			No		
Main references (sources)			1-Assisted Reproductive Technology Artificial insemination: A tool to improve livestock productivity -Effectiveness of Assisted Reproductive Technology 4-Essentials of Medical Physiology		

Recommended books and references (scientific journals, reports...)	"Reputable scientific journals specialized in reproductive biotechnology."
Electronic References, Websites	"Recent sources via the Internet."

Course Name	
Pathological Analysis	
Course Code	
BioST-414	
Semester / Year	
First Semester / Fourth Stage (2025-2026)	
Date of Description Preparation	
1-9-2025	
Available Attendance Modes	
Face-to-face	
Number of Hours / Units	
4 Hours / 3 Units	
Course Director	Prof. Dr. Mohammed R. S. Al-Attabi
Email	malattabi@uowasit.edu.iq

Course Objectives
● Understand the basic principles of laboratory techniques and quality control systems within medical laboratories. ● Study the scientific basis of biochemical tests (clinical chemistry, hematology, body fluids, and serology). ● Develop practical skills in handling modern laboratory equipment and performing diagnostic tests with high accuracy. ● Analyze and interpret laboratory test results and correlate them with the patient's pathological condition to support medical diagnosis.
Teaching and Learning Strategies
● Lectures and Presentations: Presenting theoretical concepts and scientific bases of analyses using PowerPoint presentations and visual aids to clarify complex pathological conditions.

Course Objectives					
● Laboratory Experiments (Practical Sessions): Conducting direct hands-on practical experiments inside the laboratory to enable students to measure biomarkers accurately and use standard equipment. ● Interactive Discussions: Stimulating critical thinking by asking open-ended questions about specific analysis results and discussing the causes of overlapping readings. ● Case Studies and Group Work: Dividing students into small groups to analyze real laboratory reports (Case Studies) and ensure cooperation in solving diagnostic problems.					
Course Structure - Theoretical Part					
Week	Hours	Required Learning Outcomes	Unit or Topic Name	Teaching Method	Assessment Method
1	2	Understand the principles of safety and quality control	Introduction to Medical Laboratories and Quality Control (QC)	Lectures and Discussion	Quizzes and Exams
2	2	Explain carbohydrate metabolism and its disorders	Blood Glucose Testing and Diabetes Mellitus	Lectures and Discussion	Quizzes and Exams
3	2	Describe lipid profile testing and interpret its results	Lipids and Lipoproteins	Lectures and Discussion	Quizzes and Exams
4	2	Identify and evaluate kidney efficiency laboratory-wise	Kidney Function Tests (Urea, Creatinine)	Lectures and Discussion	Quizzes and Exams
5	2	Explain liver functions and its associated enzymes	Liver Function Tests (Bilirubin, Enzymes)	Lectures and Discussion	Quizzes and Exams
6	2	Identify cardiac biomarkers and electrolytes	Cardiac Biomarkers and Electrolytes (Na, K)	Lectures and Discussion	Quizzes and Exams
7	2	Understand physiological and pathological blood components	Hematology: Blood Components and Anemia	Lectures and Discussion	Quizzes and Exams
8	Midterm Exam				

Course Objectives					
9	2	Explain blood coagulation mechanism and its disorders	Blood Coagulation System and Clotting Factors (PT, PTT)	Lectures and Discussion	Quizzes and Exams
10	2	Describe the physical and chemical characteristics of urine	Urinalysis: Physical and Chemical Examination	Lectures and Discussion	Quizzes and Exams
11	2	Identify the microscopic components of urine sediment	Urinalysis: Microscopic Examination of Sediments and Crystals	Lectures and Discussion	Quizzes and Exams
12	2	Understand diagnostic immune reactions	Immunology and Serology: Antigen-Antibody Reactions	Lectures and Discussion	Quizzes and Exams
13	2	Explain hormonal analyses and endocrine glands	Hormonal Assays (Thyroid and Reproductive Hormones)	Lectures and Discussion	Quizzes and Exams
14	2	Identify tumor markers and modern techniques	Tumor Markers and Modern Techniques	Lectures and Discussion	Quizzes and Exams
15	Final Exam				

Course Structure - Practical Part					
Week	Hours	Required Learning Outcomes	Unit or Topic Name	Teaching Method	Assessment Method
1	2	Identify laboratory equipment and blood collection methods	Laboratory Safety Standards, Specimen Collection and Anticoagulants	Laboratory Experiments	Practical Reports and Exams
2	2	Measure blood glucose level accurately	Quantitative Determination of Blood Glucose (Fasting and Random)	Laboratory Experiments	Practical Reports and Exams

Course Structure - Practical Part					
Week	Hours	Required Learning Outcomes	Unit or Topic Name	Teaching Method	Assessment Method
3	2	Measure cholesterol and triglycerides	Measurement of Total Cholesterol and Triglycerides in Serum	Laboratory Experiments	Practical Reports and Exams
4	2	Estimate non-protein nitrogenous compounds	Laboratory Measurement of Blood Urea and Creatinine	Laboratory Experiments	Practical Reports and Exams
5	2	Measure bilirubin and liver enzymes	Examination of Bilirubin and Liver Enzymes (GOT, GPT)	Laboratory Experiments	Practical Reports and Exams
6	2	Measure vital electrolytes concentration	Quantitative Determination of Electrolytes (Sodium and Potassium)	Laboratory Experiments	Practical Reports and Exams
7	2	Perform manual and automated blood cell counting	Complete Blood Count (CBC): Blood Cell Counting	Laboratory Experiments	Practical Reports and Exams
8	Practical Midterm Exam				
9	2	Estimate hemoglobin percentage and packed cell volume	Measurement of Hemoglobin (Hb) Concentration and PCV Test	Laboratory Experiments	Practical Reports and Exams
10	2	Calculate clotting and bleeding times	Blood Fluidity and Coagulation Tests (Bleeding, Clotting, PT)	Laboratory Experiments	Practical Reports and Exams
11	2	Perform routine urinalysis	Routine Urinalysis: Physical and Chemical Examination	Laboratory Experiments	Practical Reports and Exams
12	2	Diagnose crystals and cells under the microscope	Microscopic Examination of Urine Sediment (Cells, Crystals)	Laboratory Experiments	Practical Reports and

Course Structure - Practical Part					
Week	Hours	Required Learning Outcomes	Unit or Topic Name	Teaching Method	Assessment Method
					Exams
13	2	Perform common serological tests	Serological Tests: CRP Test, Rheumatoid Factor	Laboratory Experiments	Practical Reports and Exams
14	2	Read hormone analyses and semen analysis	Applications of Pregnancy Testing and Hormone Evaluation Tests	Laboratory Experiments	Practical Reports and Exams
15	-	Practical Final Exam			

Course Evaluation		
Assessment Method	Timeline / Week	Weight / Percentage
Theoretical Monthly Exam 1	Week 8	12%
Theoretical Monthly Exam 2	Week 15	12%
Practical Midterm Exam	Week 8 & 15	12%
Quizzes & Homework	Continuous	2%
Lab Reports & Active Participation	Continuous	2%
Practical Final Exam	Week 15	20%
Theoretical Final Exam	Final Exam Week	40%
Total		100%

Learning and Teaching Resources	
Required Textbook	Tietz Textbook of Clinical Chemistry and Molecular Diagnostics (6th Edition)

s	
Main References	Henry's Clinical Diagnosis and Management by Laboratory Methods District Laboratory Practice in Tropical Countries by Monica Cheesbrough
Recommended Journals	Clinical Chemistry (Journal) Annals of Clinical Biochemistry

Course Name:	
Microbial physiology	
Course Code:	
BioSM-311	
Semester / Year:	
2026 /Chapter One	
Description Preparation Date:	
2-6-2026	
Available Attendance Forms:	
Attendance is mandatory	
Number of Credit Hours (Total) / Number of Units (Total)	
Three Units / Four Hours (Practical and Theoretical)	
Course administrator's name (mention all, if more than one name)	
Name: Dr.Zainab Nashaat Al-Saadi Email: zalsaady@uowasit.edu.iq	
Course Objectives	
Course Objectives	• Gain a fundamental understanding of cellular composition, membrane transport, genomic diversity, horizontal gene transfer, diversity of metabolic processes, growth and cell death, communication, and techniques used to elucidate physiological processes. • Understand how to apply theoretical microbiology to practical problems.

	• Integrate primary scientific literature of microbiology to further your understanding of the ways microbes live and respond to the environment. • -Develop scientific writing skills and critical thinking about scientific research. Learn how to plan, conduct, and evaluate research.
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Teaching and Learning Strategies

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

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Introduction, definitions , cell shape and size	=	=	=
2	4	Cell Composition and Structure 1	=	=	=
3	4	Cell Composition and Structure 2	=	=	=
4	4	Growth and Cell Division 1	=	=	=
5		First exam	=	=	=

1	4	Microbial growth 1	=	=	=
2	4	Microbial growth 2	=	=	=
3	4	Methods to Detect and Measure bacterial growth	=	=	=
4	4	Physical effects on microbial growth 1	=	=	=
5		First exam	=	=	=
6	4	Physical effects on microbial growth 2	=	=	=
7	4	Antimicrobial medications and chemical material effects to growth of microorganisms ,produce the bacteriocen and the mechanism of the effects. 1	=	=	=
8	4	Antimicrobial medications and chemical material effects to growth of microorganisms ,produce the bacteriocen and the mechanism of the effects. 2	=	=	=
9	4	Antimicrobial medications and chemical material effects to growth of microorganisms ,produce the bacteriocen and the mechanism of the effects. 3	=	=	=
10	4	Second exam	=	=	=
11	4	Microbial enzymes /production and extraction 1		=	=
12	4	Microbial enzymes /production and extraction 2	=	=	=
13	4	Kinetics of enzymes		=	
14	4	Microbial fermentation	=	=	=

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)			PRESCOTT, HARLEY, AND KLEIN'S MICROBIOLOGY, SEVENTH EDITION ,QR41.2.P74 2008		
Main references (sources)			Lippincott's Illustrated Reviews: Microbiology Third Edition Copyright © 2013 Lippincott Williams & Wilkins, a Wolters Kluwer business		
Recommended books and references (scientific journals, reports...)			Lippincott's Illustrated Reviews: Microbiology Third Edition Copyright © 2013 Lippincott Williams & Wilkins, a Wolters Kluwer business		
Electronic References, Websites			http://www.mhhe.com/ http://www.lww.com/		

Course Name:		
Endocrine gland		
Course Code:		
BioST-422		
Semester / Year:		
semester		
Description Preparation Date:		
2026		
Available Attendance Forms:		
(theoretical and practical) weekly		
Number of Credit Hours (Total) / Number of Units (Total)		
60 theoretical hours + 60 practical hours = 120 hours		
Number of units =3		
Course administrator's name (mention all, if more than one name)		
Name: Assist.Prof. Asmaa Musead Salih Alkinani		
Email: amesad@uowasit.edu.iq		
Course Objectives		
Course Objectives	Provide learners with knowledge of endocrinology.	1.
	Develop positive attitudes toward this knowledge.	2.
	Become familiar with research methodologies in endocrinology.	3.
	Understand the fundamental concepts of endocrinology.	4.
	Recognize the main approaches in endocrinology.	5.
	Identify the objectives of studying endocrinology.	6.
	Learn about the endocrine glands in the human body, their locations, and the key differences among them.	7.

	Acquire theoretical and practical knowledge about hormones secreted by endocrine glands and their mechanisms of action. 8. Understand the outcomes resulting from this knowledge. 9. Gain practical skills through performing various laboratory experiments in physiology 10.
Teaching and Learning Strategies	
Strategy	1. Understanding the concept of endocrinology and its role in regulating body functions. 2. Knowing the basic laws that govern hormone secretion and its regulatory mechanisms. 3. Comparing functions that are subject to direct hormonal regulation with those that are not. 4. Identifying the mechanism of hormone interaction with receptors and target organs. 5. Determining the mechanism of hormonal signal transmission between glands and different organs. 6. Learning the concepts and fundamentals related to the work of the endocrine glands and the regulation of hormone secretion. 7. Developing a future vision of how hormones affect various body functions and the emergence of symptoms associated with their disorders. 8. Solving practical exercises through studying clinical cases related to endocrine disorders such as diabetes or hypothyroidism. 9. Enhancing self-assessment skills through feedback provided by tests regarding the student's understanding of endocrine mechanisms.

– Theory Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	hours 2	Introduction	Introduction to endocrinology	-Theoretical - lecture using PowerPoint -White board -Video	Quizzes , monthly exam and report
2	hours 2	(synthesis, classification, chemical composition, nature of their work, functions...)	Hormones	-Theoretical - lecture using PowerPoint -White board -Video	Quizzes , monthly exam and report
3	hours 2		Types of endocrine glands	-Theoretical - lecture using PowerPoint -White board -Video	Quizzes , monthly exam and report
4	hours 2	(its location, nature of its work, function, hormones secreted from it, diseases of the hypothalamus...)	The hypothalamic gland	-Theoretical - lecture using PowerPoint -White board -Video	Quizzes , monthly exam and report
5	hours 2	(its location, nature of work, function, hormones secreted from it, diseases...)	The pituitary gland	-Theoretical - lecture using PowerPoint -White board -Video	Quizzes , monthly exam and report
6	hours 2	(its location, nature of work, function, hormones secreted from it, diseases...)	The thyroid gland	-Theoretical - lecture using PowerPoint -White board -Video	Quizzes , monthly exam and report
7	hours 2	(its location,	The parathyroid	-Theoretical -	Quizzes ,

		nature of work, function, hormones secreted from it, diseases...)	gland	lecture using PowerPoint -White board -Video	monthly exam and report
8	hours 2	First Exam	First Exam	First Exam	First Exam
9	hours 2	(its location, nature of work, function, hormones secreted from it, diseases...)	The adrenal gland	-Theoretical - lecture using PowerPoint -White board -Video	Quizzes , monthly exam and report
10	hours 2	(its location, nature of work, function, hormones secreted from it, diseases...)	The pancreas	-Theoretical - lecture using PowerPoint -White board -Video	Quizzes , monthly exam and report
11	hours 2	(its location, nature of work, function, hormones secreted from it, diseases...)	The ovary	-Theoretical - lecture using PowerPoint -White board -Video	Quizzes , monthly exam and report
12	hours 2	(its location, nature of work, function, hormones secreted from it, diseases...)	The testicles	-Theoretical - lecture using PowerPoint -White board -Video	Quizzes , monthly exam and report
13	hours 2	(its location, nature of work, function, hormones secreted from it, diseases...)	The pineal gland	-Theoretical - lecture using PowerPoint -White board -Video	Quizzes , monthly exam and report
14	hours 2	(its location, nature of work, function, hormones secreted from it, diseases...)	The thymus gland	-Theoretical - lecture using PowerPoint -White board -Video	Quizzes , monthly exam and report
15	hours 2	Second Exam	Second Exam	Second Exam	Second Exam
- Practical Course Structure					
1	hours 2	Endocrine System	Getting to know the components of	Displaying the	Quizzes and

			the endocrine system and the hormones secreted by each gland	theoretical part on the screen and applying the practical part in the lab + showing educational videos	monthly exam
2	hours 2	ELISA Technique	Getting to know the types of ELISA, how each type works, and how to perform this test.	Displaying the theoretical part on the screen and applying the practical part in the lab + showing educational videos	Quizzes and monthly exam
3	hours 2	Growth Hormone (GH)	Learning about the chemical composition of this hormone, the symptoms of its high and low levels, how to measure it in the lab, and its normal and abnormal values.	Displaying the theoretical part on the screen and applying the practical part in the lab + showing educational videos	Quizzes and monthly exam
4	hours 2	Prolactin	Learning about the chemical composition of this hormone, the symptoms of its high and low	Displaying the theoretical part on the screen and applying the	Quizzes and monthly exam

			levels, how to measure it in the lab, and its normal and abnormal values.	practical part in the lab + showing educational videos	
5	hours 2	Thyroid-Stimulating Hormone (TSH)	Learning about the chemical composition of this hormone, the symptoms of its high and low levels, how to measure it in the lab, and its normal and abnormal values.	Displaying the theoretical part on the screen and applying the practical part in the lab + showing educational videos	Quizzes and monthly exam
6	hours 2	Thyroid Hormone	Learning about the chemical composition of this hormone, the symptoms of its high and low levels, how to measure it in the lab, and its normal and abnormal values.	Displaying the theoretical part on the screen and applying the practical part in the lab + showing educational videos	Quizzes and monthly exam
7	hours 2	First Exam	First Exam	First Exam	First Exam
8	hours 2	Parathyroid Hormone (PTH)	Learning about the chemical composition of this hormone, the symptoms of its high and low levels, how to measure it in the lab, and its normal	Displaying the theoretical part on the screen and applying the practical part in the lab +	Quizzes and monthly exam

			and abnormal values.	showing educational videos	
9	hours 2	Calcitonin	Learning about the chemical composition of this hormone, the symptoms of its high and low levels, how to measure it in the lab, and its normal and abnormal values.	Displaying the theoretical part on the screen and applying the practical part in the lab + showing educational videos	Quizzes and monthly exam
10	hours 2	Vitamin D	Getting to know the chemical structure of this vitamin (hormone), its symptoms when levels are high or low, how to measure it in the lab, and what its normal and abnormal values are.	Displaying the theoretical part on the screen and applying the practical part in the lab + showing educational videos	Quizzes and monthly exam
11	hours 2	Pancreas	Getting to know the chemical structure of the hormone secreted by the pancreas, its symptoms when high or low, how to measure it in the lab, and its normal and abnormal values	Displaying the theoretical part on the screen and applying the practical part in the lab + showing educational videos	Quizzes and monthly exam

12	hours 2	Adrenal Gland Hormones	Learning about the chemical composition of this hormone, the symptoms of its high and low levels, how to measure it in the lab, and its normal and abnormal values.	Displaying the theoretical part on the screen and applying the practical part in the lab + showing educational videos	Quizzes and monthly exam
13	hours 2	Pineal Gland Hormone	Learning about the chemical composition of this hormone, the symptoms of its high and low levels, how to measure it in the lab, and its normal and abnormal values.	Displaying the theoretical part on the screen and applying the practical part in the lab + showing educational videos	Quizzes and monthly exam
14	hours 2	Ovaries and Testes	Getting to know the chemical composition of hormones secreted by the ovaries and testes, the symptoms of their high and low levels, how to measure them in the lab, and their normal and abnormal values	Displaying the theoretical part on the screen and applying the practical part in the lab + showing educational videos	Quizzes and monthly exam
15	hours 2	Second Exam	Second Exam	Second Exam	Second 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)	No
Main references (sources)	lmed, S., et al. Williams Textbook of docrinology, 15th ed., Elsevier, 2024. ll, J.E. Guyton and Hall Textbook of Medical ysiology, 15th ed., Elsevier, 2025. rrett, K.E., et al. Ganong's Review of Medical ysiology, 27th ed., McGraw-Hill, 2023. rdner, D.G., Shoback, D. Greenspan's Basic l Clinical Endocrinology, 11th ed., McGraw-Hill, 2023. Molina, P.E. Endocrine Physiology, 6th ed., McGraw-Hill, 2024.
Recommended books and references (scientific journals, reports...)	"Reputable scientific journals specialized in Endocrinology
Electronic References, Websites	"Recent sources via the Internet."

Course Name:	
Industrial microbiology	
Course Code:	
BioSM-424	
Semester / Year:	
Second semester/ 2025 - 2026	
Description Preparation Date:	
2026	
Available Attendance Forms:	
(Theoretical and practical) weekly	
Number of Credit Hours (Total) / Number of Units (Total)	
60 theoretical hours + 60 practical hours = 120 hours Number of units= 3	
Course administrator's name (mention all, if more than one name)	
Name: Assist.Prof. Jawad Kadhim Isa Email: jalzubeidy@uowasit.edu.iq	
Course Objectives	
Course Objectives	1- Providing learners with knowledge of the principles of industrial microbiology 2- Developing positive attitudes towards this knowledge 3- Identify research methods in industrial microbiology 4- Identify the basic concepts in the material of industrial microbiology

			5- Identify the objectives of industrial microbiology and the basics of industrial microbiology.....		
Teaching and Learning Strategies					
Strategy	1- The method of delivery, live questioning, problem solving and discussion 2- Include teaching methods using educational technology (data show for face-to-face education and linking lectures with videos Educational support for the subject) 3- The method of distance learning by holding electronic meetings by (Google Mate or FCC and others for e-learning) 4- Encouraging students to self-learn.				
– Theory Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 hours	Identify learning objectives in the assessment of industrially important microorganisms	Introduction and a brief history of industrial fermentation	Data show	Quizzes and monthly exam
2	2 hours	Identify the important laws of		Data show	Quizzes

		industrial microbiology applications	Industrially significant microorganisms		and monthly exam.
3	2 hours	Comparison of industrial microbiology and other applied microbiology sciences	Fermentation requirements	Data show	Quizzes and monthly exam.
4	2 hours	Identify important recommendations to ensure a safe environment free of contamination using industrial microbiology.	Starters or vaccines used in industrial fermentation	Data show	Quizzes and monthly exam.
5	2 hours	Definition of industrial products that can be obtained using microbiology for industrial purposes	General principles of microbial aerobic fermentation	Data show	Quizzes and monthly exam.
6	2 hours	Identify the types of microorganisms that can be used for industrial	Anaerobic fermentation industries	Data show	Quizzes and monthly exam.

		purposes			
7	2 hours	Exam	Exam	Data show	Quizzes and monthly exam.
8	2 hours	Forming a future vision on the possibility of searching for effective, fermented and therapeutic foods that result from the growth of industrial microorganisms	Aerobic Fermentation Microbial Industries	Data show	Quizzes and monthly exam.
9	2 hours	Absorb training in research centers and learn how to deal with devices and equipment related to industrial microbiology	Citric acid – acetic acid	Data show	Quizzes and monthly exam.
10	2 hours	Developing the skill of self- evaluation through the feedback	Enzymes – Microbial protein	Data show	Quizzes and monthly exam.

		provided by the tests			
11	2 hours	=	Vitamins	Data show	Quizzes and monthly exam.
12	2 hours	=	Fats	Data show	Quizzes and monthly exam.
13	2 hours	=	Types of cultures used for industrial purposes	Data show	Quizzes and monthly exam.
14	2 hours	=	Improvement of microbiology strains for industrial purpose	Data show	Quizzes and monthly exam.
15	2 hours	Exam	Exam	Data show	Quizzes and monthly exam.
– Practical Course Structure					
1	2	Gaining practical skills through training in labs and	Introduction to industrial microbiology	Using Data Show projectors and applying	Quizzes and monthly

		research centers.		the practical part in the lab	exam.
2	2	=	Producing baker's yeast and measuring its fermentation power and efficiency	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam.
3	2	=	Penicillin production along with methods of extraction and explanation of the reaction mechanism	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
4	2	=	Lactic acid production	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
5	2	=	Measuring the activity of the protease enzyme	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
6	2	=	Test		Quizzes and monthly exam
7	2	=	Citric acid production	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
8	2	=	Industrial microbiology in	Using Data Show projectors	Quizzes and

			dairy products	and applying the practical part in the lab	monthly exam
9	2	=	Alcohol production	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
10	2	=	Fermented food production	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
11	2	=	Pickle making and	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
12	2	=	Acetic acid production	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
13	2	=	How to prepare the starter	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
14	2	=	Test		Quizzes and monthly exam
15	2	=	Lipase enzyme	Using Data Show	Quizzes and monthly exam

			production	projectors and applying the practical part in the lab	
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)					
Main references (sources)			1-Industrial Microbiology: An Introduction Michael J. Waites BSc, PhD, CBiol, MIBiol Neil L. Morgan BSc, PhD, MIFST John S. Rockey BSc, MSc, PhD Gary Higton BSc, PhD All: School of Applied Science, South Bank University, London, UK , 2007 2-Food Biotechnology edited by Kalidas Shetty Gopinadhan Paliyath Anthony Pometto Robert E. Levin ,2006		
Recommended books and references					

(scientific journals, reports...)	
Electronic References, Websites	

Course Name:	
Virology and vaccines	
Course Code:	
Bio-421	
Semester / Year:	
2026 /Chapter One	
Description Preparation Date:	
2-6-2026	
Available Attendance Forms:	
Attendance is mandatory	
Number of Credit Hours (Total) / Number of Units (Total)	
Three Units / Four Hours (Practical and Theoretical)	
Course administrator's name (mention all, if more than one name)	
Name: Dr.Zainab Nashaat Al-Saadi	
Email: zalsaady@uowasit.edu.iq	
Course Objectives	
Course Objectives	1. The course will give an overview of medically important virus families, their replication strategies and mechanisms for development of viral infectious diseases. 2. Topics will include taxonomy, replication strategies, pathogenicity and transmission of viruses and, additionally, diagnosis, prevention and treatment of viral diseases. 3. Antiviral immunity and viral evasion will also be covered. 4. Common human vaccine will be the main focus of the course, and emphasis on key to understanding the diversity of viruses bacterial and viral vaccines.
Teaching and Learning Strategies	

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

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Introduction to viruses (general 1 properties of viruses , terms and definitions in virology)		The use of data projectors.	
2	4	Structure of viruses (types of symmetry of viruses , chemical composition of viruses) week th 10 week th 11 week th & 13th Final exa		=	
3	4	Classification of viruses			=
4	4	Classification of viruses			
5		First exam			
6	4	Assay of viruses (detection of virus- 5 infected cells		=	

		Microbiology labs.			
2	4	General Introduction			
3	4	Reaction to Physical & Chemical Agents			=
4	4	Cultivation of Viruses: Fertile Hen's eggs			
5		Fertile Hen's eggs: candling			
6	4	Fertile Hen's eggs: Routes of Inoculation: Allantoic cavity inoculation-1			
7	4	Fertile Hen's eggs: Routes of Inoculation: Allantoic cavity inoculation-2			
8	4	Fertile Hen's eggs: Routes of Inoculation: Allantoic cavity inoculation-3			
9	4	Fertile Hen's eggs: Routes of Inoculation: Allantoic cavity inoculation-4			
10	4	Fertile Hen's eggs: Routes of Inoculation: Chorioallantoic membrane inoculation-1			
11	4	Fertile Hen's eggs: Routes of Inoculation: Chorioallantoic membrane inoculation-2			

12		Cultivation of Viruses: tissue culture-1			
13		Cultivation of Viruses: tissue culture-2			
14		Cultivation of Viruses: tissue culture-3			
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)		-Jawetz, Melnick, & Adelberg's Medical Microbiology, 27th ed., 2016. Carroll et al. Professor of Pathology -			
Main references (sources)		-Lippincott's Illustrated Reviews: Microbiology Third Edition Copyright © 2013 Lippincott Williams & Wilkins, a Wolters Kluwer business			
Recommended books and references (scientific journals, reports...)		-Lippincott's Illustrated Reviews: Microbiology Third Edition Copyright © 2013 Lippincott Williams & Wilkins, a Wolters Kluwer business			
Electronic References, Websites		CLSI and WHO			

69.Course Name	
Nanobiotechnology	
70.Course Code	
71.Semester / Year	
)6-2022025Second Semester (	
72.Description Preparation Date:	
6/20221/	
73.Available Attendance Forms	
Actual Attendance	
74.Number of Credit Hours (Total) / Number of Units (Total)	
(2 Hours Theory)and (2 hours practical)	
75.Course administrator's name (mention all, if more than one name)	
Name: Prof. doctor : Wasan Hamza Mezail	
Email: whamza@uowasit.edu.iq	
76.Course Objectives	
Course Objectives	The main objective of the course is to provide an introduction to nanomaterials relevant to biological and medical applications and provide the basis for understanding the properties of materials in the nanometer scale by emphasizing the aspects related to preparation, purification, functionalization, characterization and toxicity.

77. Teaching and Learning Strategies					
at y	-Knowledge and understanding: - understanding the basic concepts of nanotechnology and nanobiotechnology; - understanding the methodologies to prepare some nanomaterials; knowledge of the methodologies and techniques for the characterization of nanomaterials;nowledge of the methodological basis for the functionalization and modification of nanomaterials; - understanding the possible causes of toxicity of nanomaterials				
78. Course Structure					
Week	Hours	Required Learning Outcomes	/Unit or subject name Theoretical	/Learning method practical	Evaluation method
1	4	Referred to in the previous axis and each according to the content	Nanotechnology • What is Nanotechnology?	Nanobiotechnology	Daily preparation and oral exam and Discussion
2	4		Properties of Nanomaterials	Outline of Best Practices for Safe Handling of Nanomaterials in research	Daily preparation and oral exam and Discussion
3	4		Synthesis of Nanomaterials	Exposure pathways and safety measures	Daily preparation and oral exam and Discussion
4	4		PROTEINS AS COMPONENTS FOR NANODEVICES	Selection & Use of Personal protective equipment (PPE)	Daily preparation and oral exam and Discussion
5	4		S-LAYER PROTEINS	Nanobiotechnology	Daily preparation and oral exam and Discussion
6	4		MAGNETOSOMES	Atomic force microscopy (AFM)	Daily preparation and oral exam and Discussion
7	4		Nanotechnology and Drug Delivery	Synthesis nanoparticles	Daily preparation and oral exam and Discussion

8	4		Gene Delivery	Nanoparticles Applications	Exam.
9	4		TOXICITY OF NANOPARTICLES	The Applications of nanotechnology in neurodegenerative disorders	Daily preparation and oral exam and Discussion
10	4		Nanotechnology • What is Nanotechnology?	Nanobiotechnology	Daily preparation and oral exam and Discussion
11	4		Properties of Nanomaterials	Outline of Best Practices for Safe Handling of Nanomaterials in research	Daily preparation and oral exam and Discussion
12	4		Synthesis of Nanomaterials	Exposure pathways and safety measures	Daily preparation and oral exam and Discussion
13	4		PROTEINS AS COMPONENTS FOR NANODEVICES	Selection & Use of Personal protective equipment (PPE)	Daily preparation and oral exam and Discussion
14	4		S-LAYER PROTEINS	Nanobiotechnology	Daily preparation and oral exam and Discussion
16	4			Atomic force microscopy (AFM)	Exam.

79.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

Course	THEORETICAL			PRACTICAL			Final -Exam
	First Exam.	First Exam.	Quizzes	First Exam.	First Exam.	Quizzes	
1nd	12	12	4	4	4	4	60

80.Learning and Teaching Resources								
Required textbooks (curricular books, if any)	Material provided by the teacher on MOODLE2. Biotechnology: Concepts, Applications and Perspectives”, Eds. Christof M. Niemeyer, Chad A. Mirkin, Wiley-VCH, 2005. Biotechnology II. More Concepts and Applications”, Eds Chad A. Mirkin, Christof M. Niemeyer, Wiley-VCH, 2007.							
Main references (sources)								
Recommended books and references (scientific journals, reports...)								
Electronic References, Websites								

Fourth Stage Microorganisms

Course Name:
Philosophy of Science and Scientific Research Methodology
Course Code:
BioSM-411
Semester / Year:
First Semester / 2025–2026
Description Preparation Date:
04/06/2025
Available Attendance Forms:
Face-to-Face
Number of Credit Hours (Total) / Number of Units (Total)
2 hours per week / 1 credit
Course administrator's name (mention all, if more than one name)
Name: Zainab Dhiyaa Jabuori Alkhateeb Email: zalkhateeb@uowasit.edu.iq
Course Objectives

Course Objectives	The course aims to: • Introduce students to the nature of science, its characteristics, historical origins, and development. • Enhance understanding of the differences between scientific thinking and philosophical thinking. • Explain the relationship between philosophy and science and its impact on the development of research methodologies. • Familiarize students with the major schools of philosophy of science. • Develop understanding of fundamental concepts such as hypothesis, theory, deduction, and scientific reasoning.				
Teaching and Learning Strategies					
Strategy	1- Using lectures combined with discussion and dialogue to explain theoretical concepts. 2- Presenting real-life research issues and encouraging students to propose scientific methods for addressing them. 3- Training students in formulating research questions and developing scientific hypotheses.				
– Theory Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Philosophy of Science	Philosophy of Science and Research Methodology	Lecture and Discussion	Daily and Monthly Examinations

2	2	Functions and Laws of Science	=	=	=
3	2	Greek Philosophy	=	=	=
4	2	Arab-Islamic Philosophical Studies	=	=	=
5	2	Philosophical Foundations of Philosophy of Science	Philosophy of Science and Research Methodology	Lecture and Discussion	Daily and Monthly Examinations
6	2	First Midterm Examination	=	=	=
7	2	Scientific Research Methodology	=	=	=
8	2	Steps of Scientific Research	=	=	=
9	2	Criteria for Selecting and Defining a Research Problem	=	=	=
10	2	Research Hypotheses	Philosophy of Science and Research Methodology	Lecture and Discussion	Daily and Monthly Examinations
11	2	Data Collection Methods and Tools	=	=	=
12	2	Measurements and Tests	=	=	=
13	2	Interview and Observation Techniques	=	=	=
14	2	Research Sampling Methods	=	=	=
15	2	Second Midterm	Philosophy of	Lecture and	Daily and Monthly

		Examination	Science and Research Methodology	Discussion	Examinations
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)	Introduction to the Philosophy of Science				
Main references (sources)	Philosophy of Science: The Relationship Between Science and Philosophy				
Recommended books and references (scientific journals, reports...)	Theory of Knowledge and the Natural Attitude of Human Beings				
Electronic References, Websites					

13.	Course Name: Pathogenic Bacteriology	
14.	Course Code: BioSM-412	
15.	Semester / Year: Semester	
16.	Description Preparation Date:13/6/2026	
17.	Available Attendance Forms:	
18.	Number of Credit Hours (Total) / Number of Units (Total): 75/3	
19.	Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr. Sareaa Maseer Gaty Al-Mayahie		
Email: salmayahie@uowasit.edu.iq		
20.	Course Objectives	
Course Objectives	• Learning students about genera and species of pathogenic bacteria. • Learning students about Pathogenesis of pathogenic bacteria including: reservoirs, modes of transmission, portals of entry & virulence factors. • Learning students about epidemiology and prophylaxis from infectious agents.	
21.	Teaching and Learning Strategies	
Strategy		

	1. Classroom education through theoretical and practical lectures. 2. Preparing scientific reports and research. 3.
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22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
	s.	ck's postulates t-Parasite Relationships	History	entation by erPoint program uding slides, scientific os and pictures. of blackboard when in l	Scientific Discussions and reasonable thinking during the lecture time
	s.	Terms of bacterial pathogenesis & bacterial Virulence Factors	ogenicity of roorganisms	=	
	s.	urrence, spread & control of infectious agents	Epidemiology		
	s.	hune response to Pathogens and antibiotics	Host Resistance to Pathogenic microorganisms & antimicrobial Agents		

s.	Pathogenesis of staphylococci & streptococci	Gram-Positive Gram-positive Cocci Gram-Negative Gram-negative Cocci		
s.	Pathogenesis of <i>Escherichia</i> , Pathogenesis of <i>Corynebacterium</i> & <i>Yersinia</i>	Gram-negative Cocci (Neisseriaceae)+ Gram-positive bacilli		
s.		1 st . monthly exam.		
s.	Pathogenesis of <i>Shigella</i> spp. & <i>Stridium</i> spp.	Gram-Forming Gram-Positive Bacilli		
s.	Pathogenesis of <i>E. coli</i> , <i>Klebsiella</i> , <i>Proteus</i> , <i>Yersinia</i>	Gram-Negative Rods Related to the Enteric Tract-1		
s.	Pathogenesis of <i>Shigella</i> & <i>Yersinia</i>	Gram-Negative Rods Related to the Enteric Tract-2		
s.	Pathogenesis of <i>Campylobacter</i> & <i>Helicobacter</i>	Gram-Negative Rods Related to the Enteric Tract-3		
s.	Pathogenesis of <i>Shigella</i> , <i>Francisella</i> , <i>Amoebae</i> , <i>Legionella</i>	Gram-Negative Rods Related to Animal Sources		
s.	Pathogenesis of <i>Mycobacterium</i> , <i>Legionella</i> & <i>Campylobacter</i>	Respiratory Tract Pathogens		
s.	Common causes of nosocomial infections control of them	Nosocomial Infections/ Sterilization & Disinfection		
s.		2 nd . monthly exam		
23. Course Evaluation				
1. Monthly exams, Quizzes, Oral (Scientific discussions): 40%				

2. Final: 60%	
24. Learning and Teaching Resources	
Medical Microbiology books	
Manuals of clinical microbiology	
U-tube scientific videos	
Internet platforms for scientific videos and pictures	

Genetic Engineering	
25. Course Code:	BioSM-413
26. Semester / Year:	Second semester/ 2025-2026
27. Description Preparation Date:	4 / 6 / 2025
28. Available Attendance Forms:	
29. Number of Credit Hours (Total) / Number of Units (Total)	4 hours / 3 units
30. Course administrator's name (mention all, if more than one name)	Name: Zainab Dhiyaa Jabuori Alkhateeb Email: zalkhateeb@uowasit.edu.iq
31. Course Objectives	
Course Objectives	1. Understand the basic scientific principles of genetic engineering and DNA/gene concepts. 2. Learn gene editing techniques such as CRISPR and molecular engineering methods. 3. Study the applications of genetic engineering

	in medicine, agriculture, and industry. 4. Develop skills in analyzing and interpreting genetic information. 5. Understand the ethical and legal issues related to genetic engineering research. 6. Apply theoretical knowledge in practical experiments and projects. 7. Recognize the role of genetic engineering in treating genetic disorders and producing pharmaceuticals.
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32. Teaching and Learning Strategies

Strategy	1. Interactive Learning Use discussions and open-ended questions to enhance understanding of genetic concepts. 2. Laboratory-Based Learning Perform practical experiments such as DNA extraction and CRISPR simulations. 3. Problem-Based Learning (PBL) Present real-life problems like genetic diseases and solve them using genetic engineering approaches. 4. Use of Modern Educational Media Employ images, videos, and digital simulations to explain complex processes. 5. Collaborative Learning Divide students into groups to work on research projects. 6. Real-Life Applications Connect the subject to applications in medicine, agriculture, and environmental science. 7. Continuous Assessment Use quizzes, reports, and presentations to evaluate understanding.
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33. Course Structure theoretical

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Central dogma	Genetic engineering	Use of devices Data show and materials require	Daily and monthly examinations
2	2	Regulation of gene expression	=	=	=

3	2	Cloning and basic of DNA cloning	=	=	=
4	2	Transformation of bacterial	=	=	=
5	2	Restriction enzymes	=	=	=
6	2	Monthly evaluation	=		=
7	2	Polymerase of chain reaction	=	=	=
8	2	Principle of gel electrophore	=	=	=
9	2	DNA sequencing	Genetic engineering	=	=
10	2	Nucleic acids blotting	=	=	=
11	2	Genome Editing	=	=	=
12	2	Monthly evaluation	=		=
13	2	Gene Therapy: From Theory to Practice	=	=	=
14	2	Recombinant DNA Technology	=	=	=
15	2	Genomics and Modern Genome Projects	=	=	=

34. course structure practical

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Equipments in Genetic Engineering laboratory	Genetic engineering	Use of devices Data show and materials required	Daily and monthly examinations
2	2	DNA Extraction	=	=	=

3	2	RNA Isolation	=	=	=
4	2	RNA and Its Types	=	=	=
5	2	synthesis of cDNA	=	=	=
6	2	Monthly evaluation	=	=	=
7	2	Real time PCR	=	=	=
8	2	DNA Restriction Digestion Analysis:	=	=	=
9	2	cloning vector	Genetic engineering	=	=
10	2	Plasmid DNA Isolation	=	=	=
11	2	PCR Primer Design	=	=	=
12	2	Monthly evaluation	=	=	=
13	2	Plasmid Vector D	=	=	=
14	2	Bacterial Transformation by H Shock	=	=	=
15	2	Bacterial Electroporation	=	=	=

12. 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

35. Learning and Teaching Resources

Required textbooks (curricular books, if any)

- -Klug, W. S., Palladino, M. A., & Killian, D. (2025).

Concepts of Genetics (13th ed.). Pearson.

-Clark, D. P., Pazdernik, N. J., McGehee, M. R., & Rader, B. A. (2025). *Biotechnology: The*

	<i>Technological Applications of Genetics and Genomics</i> (3rd ed.). Elsevier. -Stewart, C. N. (Ed.). (2025). <i>Plant Biotechnology and Genetics: Principles, Techniques, and Applications</i> (3rd ed.). Wiley. -Kumar, N. (Ed.). (2025). <i>Transgenic Plants: Methods and Protocols</i>. Humana Press / Springer Nature. - Dubey, R. C. (2025). <i>A Textbook of Biotechnology</i> (6th ed.). S. Chand Publishing.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Name:	
Food microbiology	
Course Code:	
BioSM-414	
Semester / Year:	
First semester/ 2025 - 2026	
Description Preparation Date:	
2026	
Available Attendance Forms:	
(Theoretical and practical) weekly	
Number of Credit Hours (Total) / Number of Units (Total)	
30 theoretical hours + 30 practical hours = 60 hours Number of units= 3	
Course administrator's name (mention all, if more than one name)	
Name: Assist.Prof. Jawad Kadhim Isa Email: jalzubeidy@uowasit.edu.iq	
Course Objectives	
Course Objectives	1- Providing learners with knowledge of the principles of food microbiology 2- Developing positive attitudes towards this knowledge 3- Identify research methods in food microbiology 4- Identify the basic concepts in the material of food microbiology 5- Identify the objectives of food microbiology and the basics of food fermentation.

					
Teaching and Learning Strategies					
Strategy	1- The method of delivery, live questioning, problem solving and discussion 2- Include teaching methods using educational technology (data show for face-to-face education and linking lectures with videos Educational support for the subject) 3- The method of distance learning by holding electronic meetings by (Google Mate or FCC and others for e-learning) 4- Encouraging students to self-learn.				
– Theory Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Identify the learning objectives in food safety assessment	A. A brief history of food microbiology B. Microbiology in food	Data show	Quizzes and monthly exam
2	2	Identify important laws to ensure food health and safety	Internal and external standards affecting microbial growth in food	Data show	Quizzes and monthly exam.

3	2	Comparison of food microbiology with other applied microbiology sciences	Sources of food contamination with microorganisms	Data show	Quizzes and monthly exam.
4	2	Learn about important recommendations to ensure food health and safety	General base in food preservation and factors affecting microorganisms	Data show	Quizzes and monthly exam.
5	2	Definition of foodborne illness and how to prevent it or reduce its severity	Food preservation methods and their effect on microorganisms	Data show	Quizzes and monthly exam.
6	2	Learn about food preservation methods to prevent food spoilage and spoilage	A. Food preservation using high temperatures B. Food preservation using low temperatures	Data show	Quizzes and monthly exam.
7	2	Exam	Exam	Data show	Quizzes and monthly exam.
8	2	Organizing learning for the concepts and basics of nutritional microbiology	A. Food preservation using drying B. Food preservation using preservatives	Data show	Quizzes and monthly exam.
9	2	Forming a future vision on the possibility of	A. Food preservation using irradiation	Data show	Quizzes and monthly exam.

		searching for effective and therapeutic foods	B. Food preservation using heating		
10	2	Interesting training in health centers and learning how to deal with devices and equipment related to food microbiology	Microbiology of milk and milk products	Data show	Quizzes and monthly exam.
11	2	Developing the -skill of self evaluation the through feedback provided by the tests	Microbiology of meat and meat products	Data show	Quizzes and monthly exam.
12	2	=	Microbiology of cereals and cereals products	Data show	Quizzes and monthly exam.
13	2	=	Microbiology of fruits and vegetables and their products	Data show	Quizzes and monthly exam.
14	2	=	A- Microbiology of dispersed foods (sugar, fat, dried foods, etc.) B- Food poisoning and contamination	Data show	Quizzes and monthly exam.
15	2	Exam	Exam	Data show	Quizzes and monthly exam.

– Practical Course Structure

1	2	Gaining practical skills through training in labs and research centers.	Introduction to Food Microbiology	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam.
2	2	=	Preparing the food sample for testing	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam.
3	2	=	Microorganisms in vegetables and fruits	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
4	2	=	Microorganisms in milk	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
5	2	=	Microorganisms in red and white meat	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
6	2	=	Test		Quizzes and monthly exam
7	2	=	Microorganisms in eggs	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam

8	2	=	Microorganisms in sweetened foods (honey, date syrup)	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
9	2	=	Microorganisms in pickles	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
10	2	=	Microorganisms in dairy	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
11	2	=	Detecting microorganisms in canned foods	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
12	2	=	Modern techniques for food processing and preventing contamination	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
13	2	=	Detecting microorganisms that cause food spoilage	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
14	2	=	Test		Quizzes and monthly exam

15	2	=	Detecting microorganisms that cause food poisoning	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
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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)	
Main references (sources)	1- Modern food microbiology (James M. Jay) 2007 2- Food Microbiology and Food Preservation . Series Editor Michael P. Doyle Center of Food Safety, University of Georgia, Griffin, GA, USA
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Name:
Antibiotics
Course Code:
BioSM-415
Semester / Year:
2026 /Chapter One

Description Preparation Date:					
2-6-2026					
Available Attendance Forms:					
Attendance is mandatory					
Number of Credit Hours (Total) / Number of Units (Total)					
Three Units / Four Hours (Practical and Theoretical)					
Course administrator's name (mention all, if more than one name)					
Name: Dr.Zainab Nashaat Al-Saadi					
Email: zalsaady@uowasit.edu.iq					
Course Objectives					
Course Objectives	5. Antibiotics is an advanced course 6. the study of resistance processes and its mechanisms by microorganisms 7. This course provides students with a comprehensive understanding of the principles and applications of microbial resistance, 8. focusing on the genetic and non genetic mechanisms				
Teaching and Learning Strategies					
Strategy	The course utilizes a combination of theoretical lectures, interactive group discussions, and visual aids such as diagrams and illustrations to enhance the explanation of the material.				
– Theory Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	History of antibiotics	introduction	The use of data projectors.	
2	4	A clinically-useful antibiotic should have as many of	Antibiotics characterization	=	

		characteristics as possible			
3	4		Beta-Lactams	classification	=
4	4	Macrolide & Ketolide Antibiotics Comparison			
5		=	=		
6	4	Quinolones	=	=	
7	4	Tetracyclines	=	=	
8	4	Aminoglycosides	=	=	
9	4	Glycopeptides	=	=	
10	4	Lincomycin	=	=	
11	4	-Inhibition of cell wall synthesis			
12	-Inhibition of Bacterial Nucleic Acid Synthesis	Mode and site of action	=		
13	4	-Inhibition of bacterial protein synthesis			
14	- /Antibiotics which inhibit bacterial RNA:	=	=		

– Practical Course Structure					
1	4	History of antibiotics	introduction	The use of data projectors.	
2	4	A clinically-useful antibiotic should have as many of characteristics as possible	Antibiotics characterization	=	
3	4		Beta-Lactams	classification	=
4	4	Macrolide & Ketolide Antibiotics Comparison			
5		=	=		
6	4	Quinolones	=	=	
7	4	Tetracyclines	=	=	
8	4	Aminoglycosides	=	=	
9	4	Glycopeptides	=	=	
10	4	Lincomycin	=	=	
11	4	-Inhibition of cell wall synthesis			
12	-Inhibition of Bacterial Nucleic Acid Synthesis	Mode and site of action	=		
13	4	-Inhibition of bacterial protein			

		synthesis			
14	- /Antibiotic s which inhibit bacterial RNA:	=	=		
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)		Antibiotics text books Pharmacology text books			
Main references (sources)		Basic and Clinical Pharmacology, 15e by Bertram G. Katzung; Anthony J. Trevor ISBN: 9781260452310 Publication Date: 2021 AccessMedicine			
Recommended books and references (scientific journals, reports...)		1-Clinical Drug Data, 11th Edition by Kelly Smith, Daniel M. Riche, et al. Apr 15, 2010 2-Drug Information Handbook 2012-2013: A Comprehensive Resource for All Clinicians and Healthcare Professionals Lexi-Comp Inc. 2052 pages, Paperback First published April 1, 2012 3-Basic and Clinical Pharmacology by Bertram G. Katzung; Susan B. Masters; Anthony J. Trevor Call Number: PRINT BOOK--ASK AT LIBRARY ISBN: 9780071764018 Publication Date: 2012-01-03			

Electronic References, Websites	CLSI and WHO

Course Name:
Microbial toxin
Course Code:
BioSM-416
Semester / Year:
First semester/ 2025 – 2026
Description Preparation Date:
2026
Available Attendance Forms:
(Theoretical and practical) weekly
Number of Credit Hours (Total) / Number of Units (Total)
30 theoretical hours + 30 practical hours = 60 hours Number of units= 3
Course administrator's name (mention all, if more than one name)

Name: Prof. Khairi Jameel
Email: khjameel@uowasit.edu.iq

Marwa Ali Ibrahim
marwaa@uowasit.edu.iq
Bdour Muhammed Al-Shweily
bedoorm@uowasit.edu.iq
Manahel hadi mjefi
manahel.hadi@uowasit.edu.iq

Donia Fadhel Abass
donia.fadhel@uowasit.edu.iq
Muammar Abdel-Ammer Kadhim
muammar@uowasit.edu.iq

Course Objectives	
Course Objectives	1.To understand the concept of microbial toxins, their types, and sources. 2. To differentiate between toxins produced by bacteria, fungi, algae, and other microorganisms. 3. To understand the mechanism of toxin production and the factors that influence its formation. 4. To study the mechanism of action of microbial toxins on the cells and tissues of the human and animal body. 5. To identify diseases and poisonings resulting from microbial

toxins and their symptoms.

Teaching and Learning Strategies

Strategy

- 1- The method of delivery, live questioning, problem solving and discussion
- 2- Include teaching methods using educational technology (data show for face-to-face education and linking lectures with videos Educational support for the subject)
- 3- The method of distance learning by holding electronic meetings by (Google Mate or FCC and others for e-learning)
- 4- Encouraging students to self-learn.

– Theory Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction to Bacterial	Definition of bacterial toxins	Data show	Quizzes and monthly exam

		Toxins Classification of Bacterial Toxins safety assessment	External toxins Internal toxins		
2	2	Classification of bacterial toxins	due to differences between them in terms of composition, thermal stability, and mechanism of action	Data show	Quizzes and monthly exam.
3	2	Mechanisms of action of bacterial toxins	its effect on cell membranes. Inhibition of protein synthesis	Data show	Quizzes and monthly exam.
4	2	-	Effects on the nervous system. Disruption of cellular signaling.	Data show	Quizzes and monthly exam.
5	2	The most important bacterial toxins	Clostridium botulinum	Data show	Quizzes and monthly exam.
6	2	-	Clostridium tetani	Data show	Quizzes and monthly exam.
7	2	-	Corynebacterium diphtheriae	Data show	Quizzes and monthly exam.

8	2	-	enterotoxin	Data show	Quizzes and monthly exam.
9	2	Factors affecting toxin production	Environmental conditions. Nutrient medium. Genetic factors.	Data show	Quizzes and monthly exam.
10	2	Diagnosis of bacterial toxins	Culture methods. Immunological tests.	Data show	Quizzes and monthly exam.
11	2	-	PCR	Data show	Quizzes and monthly exam.
12	2	=	Toxicology tests	Data show	Quizzes and monthly exam.
13	2	Prevention and treatment	For sterilization and disinfection. Vaccines and antitoxins.	Data show	Quizzes and monthly exam.
14	2	=	Antibiotics when needed.	Data show	Quizzes and monthly exam.
15	2	Exam	Exam	Data show	Quizzes and monthly exam.
– Practical Course Structure					
1	2	Gaining practical skills through training in labs and research centers.	Introduction	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam.

2	2	=	Preparing sample for testing	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam.
3	2	Detection of toxin-producing bacteria	<i>Clostridium botulinum</i>	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
4	2	=	<i>Clostridium tetani</i>	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
5	2	=	<i>Corynebacterium diphtheriae</i>	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
6	2	=	Test		Quizzes and monthly exam
7	2	=	<i>Vibrio cholerae</i>	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
8	2	=	<i>Staphylococcus aureus</i>	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
9	2	=	<i>Bacillus cereus</i>	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam

10	2	=	Clostridium perfringens	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
11	2	=	Escherichia coli O157:H7	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
12	2	=	Shigella dysenteriae	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
13	2	=	Pseudomonas aeruginosa Exotoxin A	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
14	2	=	Test		Quizzes and monthly exam
15	2	=	Helicobacter pylori	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly 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)					

Main references (sources)	1- microbial toxin (James M. Jay) 2007 2- medical Microbiology . Series Editor Michael P. Doyle Center of Food Safety, University of Georgia, Griffin, GA, USA
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

25.	Course Name: Virology
26.	Course Code: BioSM-421
27.	Semester / Year: semester
28.	Description Preparation Date: 13/6/2026
29.	Available Attendance Forms:
30.	Number of Credit Hours (Total) / Number of Units (Total): 75 / 3

31. Course administrator's name (mention all, if more than one name)					
Name: Prof. Dr. Sareaa Maseer Gatya Al-Mayahie Email: salmayahie@uowasit.edu.iq					
32. Course Objectives					
Course Objectives		• Learning students about general characteristics of viruses. • Learning students about replication of viruses. • Learning students about classification of viruses • Learning students about Pathogenesis of viruses: reservoirs, modes transmission, portals of entry.			
33. Teaching and Learning Strategies					
Strategy		4. Classroom education through theoretical and practical lectures. 5. Preparing scientific reports and research.			
34. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	s.	ory, General	duction to viruses	use of	Scientific

		Structure of Viruses		Projectors	discussions
2	s.	Chemical Composition of viruses	Introduction to viruses	=	=
3	s.	Replication strategies in animal viruses	Replication of Viruses	=	=
4	s.	Families of viruses with their characteristics	Classification of Viruses	=	=
5	s.	Systems of viral multiplication (embryonated eggs & tissue culture)	Isolation of Viruses	=	=
6	s.	Viral pathogens including: reservoirs, modes of transmission, portals of entry and sites of shedding)	Principles of Viral Disease-1	=	=
7	s.	Viral pathogens including: reservoirs, modes of transmission, portals of entry and sites of shedding)	Principles of Viral Disease-2	=	=
8	s.	Immune response to viral infections, antiviral drugs & vaccines	Prevention & Treatment of Viral Infections	=	=
9	s.		1st monthly exam	=	=
10	s.	Genetic & non-genetic interactions among viruses in mixed infections	Viral Genetics	=	=

11	s.	inition, general racteristics & ases	Subviral Pathogens: Viroids, Virusoids, and Prions	=	=
12	s.	nogenesis, tment, prophylaxis	AIDS & Hepatitis B	=	=
13	s.	& lysogenic es. nsduction	The Life Cycle of Viruses with Prokaryote Hosts	=	=
14	s.	lytic & lysogenic cycles. latent & persistent infections	Life Cycle of Viruses with Animal Hosts	=	=
15	s.		2nd monthly exam	=	=

35. Course Evaluation

3. Monthly exams, Quizzes, Oral (Scientific discussions): 40%
4. Final: 60%

36. Learning and Teaching Resources

Medical Microbiology books	
Manuals of clinical microbiology	
U-tube scientific videos	
Internet platforms for scientific videos and pictures	

1. Course Name:
biotechnology
2. Course Code:
BioSM-422
3. Semester / Year:
semester
4. Description Preparation Date:

12 20261-6-	
5. Available Attendance Forms:	
existence	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hrs practical and therotical 2hrs ,2hrs	
7. Course administrator's name (mention all, if more than one name)	
Name: Hiba Taqi Email: hibataqi211986@gmail.com	
8. Course Objectives	
Course Objectives	 1.Informing students about the latest technologies. 2- Explaining the most important biological dilemmas and methods of diagnosing and treating them. 3- Opening new horizons for developing and equipping the most important required devices.
9. Teaching and Learning Strategies	
Strategy	Educational strategy, collaborative concept planning. Brainstorming education strategy. Education Strategy Notes Series

Week 4	2	Referred to in the previous axis, each according to the content	Gene cloning application	- discussion Deliverance - discussion	Questions, answers, assignments, written tests
Week 5	2	Referred to in the previous axis, each according to the content	Inserting foreign DNA into cloning vectors	Deliverance - discussion	Questions, answers, assignments, written tests
Week6	2	Referred to in the previous axis, each according to the content	Restriction enzyme		/

		/		Deliverance - discussion	/
Week7			Restriction enzyme application		/
	2	/		/	
Week 8					/
		/			
Week 9			Gene therapy	/	/
	2	/		/	
Week 10					/
		/	Gene therapy application		
Week 11	/			/	

Week 12	/	/	Fermentor	/	
	/				
		/	Fermentor developed		/
Week 13	/			/	
Week 14			Crisper		
	/			/	
		/	Crisper development		
	/				
Week 15	/		Various lectures within the subject specific to students, prepared and delivered by students	/	
			Exam		

/					
11. Course Evaluation					
The distribution is as follows: 40 marks for the monthly and daily practical and theoretical exams, and a final practical and theoretical exam out of 60					
12. Learning and Teaching Resources					
Required textbooks (curricular books, if any)		/			
Main references (sources)		/			
Recommended books and references (scientific journals, reports...)		David-P.-Clark-BA -Bristol-(England) applying the genetic revolution Molecular Biology and Biotechnology, Helen Kreuzer and Adrienne Massey introduction of biotechnology gene cloning and restriction			
Electronic References, Websites		Various communication sites, social networking sites, and the comprehensive electronic library.			

13. Course Structure - Practical					
1	2	Students will perform genomic bacterial DNA	Lab 1: Genomic Bacterial DNA Extraction	Lecture	Questions and assignments

		extraction and evaluate the quality of the extracted DNA.			
2	2	Students will explain the principle of Southern blotting and interpret DNA hybridization results.	Southern Blot	Lecture	Questions and assignments
3	2	Students will isolate and purify proteins and assess their purity.	Isolation and Purification of Proteins	Lecture	Questions and assignments
4	2	Students will apply column chromatography for biomolecule separation and analyze the obtained fractions.	Column Chromatography	Lecture	Questions and assignments
5	2	Students will perform SDS-PAGE and analyze protein band patterns according to molecular weight.	SDS-PAGE (Sodium Dodecyl Sulfate Polyacrylamide Gel Electrophoresis)	Lecture	Questions and assignments
6	2	=	=		
7	2	Students will explain the principle of Western blotting and identify specific proteins using	Western Blotting	Lecture	Questions and assignments

		immunodetection techniques.			
8	2	Students will explain the mechanism of restriction enzymes and apply them in DNA analysis and recombinant DNA technology.	Restriction Enzymes	Lecture	Questions and assignments
9	2	=	=		
10	2	Exam	exam	exam	exam
11					
12					
13					
14					
15					

Course Name:
Microbial Genetics
Course Code:
BioSM-423
Semester / Year:
Second semester
Description Preparation Date:
Available Attendance Forms:
Mandatory attendance
Number of Credit Hours (Total) / Number of Units (Total)
30/2
Course administrator's name (mention all, if more than one name)
Name: Prof. Khairi Jameel Email: khjameel@uowasit.edu.iq Marwa Ali Ibrahim marwaa@uowasit.edu.iq

Bdour Muhammed Al-Shweily
bedoorm@uowasit.edu.iq
 Manahel hadi mjefi
manahel.hadi@uowasit.edu.iq

Donia Fadhel Abass
donia.fadhel@uowasit.edu.iq

Course Objectives					
Course Objectives		The methods used to teach and facilitate learning in the course. These strategies include the ways and techniques adopted in the design and application of the academic program in general. These strategies may include: 1-Lectures: Delivering interactive lectures to convey foundational concepts and theoretical knowledge in Microbial Genetics. 2-Seminars and discussions: Encouraging active student participation in discussions related to Microbial Genetics topics, promoting idea exchange and opinions. 3-Presentations and multimedia: Utilizing presentations and multimedia resources such as images, illustrations, and videos to clarify concepts and processes in Microbial Genetics.			
Teaching and Learning Strategies					
Strategy	The course utilizes a combination of theoretical lectures, interactive group discussions, and visual aids such as diagrams and illustrations to enhance the explanation of the material.				
- Theory Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	hrs4	Definition of Microbial genetics and Nucleic Acid Structure (DNAstructure),RNA	Introduction to Microbial genetics	The use of data projectors.	Monthly Exams and Quizzes
2	4 hrs	Bacterial genome structure	The structural system of genetic material in the cell	The use of data projectors.	=
3	4 hrs	Bacterial Replication, DNA Replication in Bacteria	DNA replication and characteristics	The use of data projectors.	=
4	4 hrs	Stages of Transcription in bacteria: 1- Initiation 2- Elongation 3-Termination Promoters in bacteria	Transcription in bacteria	The use of data projectors.	=
5	4 hrs	Gene expression in bacteria, How is gene expression regulated? Protein synthesis, The process of protein synthesis involving three distinct steps: 1-Initiation 2-Elongation 3-Termination Protein Targeting, Folding, and Modification	Translation of genetic information and protein synthesis.	The use of data projectors.	=
6			First Monthly		

			Exam		
7	4 hrs	There are two types of gene transfer in bacteria, horizontal gene transfer and vertical gene transfer, The importance of gene transfers, In bacteria, there are three naturally occurring mechanisms of gene transfer which move genes from one cell to another. 1- Transformation 2- Transduction 3- Conjugation	Gene transfer	The use of data projectors.	=
8	4 hrs	Bacterial transformation, Transformation mechanism, The general features of transformation	Transformation	The use of data projectors.	=
9	4 hrs	Important general features of transduction, I- General transduction II- Special transduction	Transduction	The use of data projectors.	=
10	4 hrs	Bacterial conjugation is a mechanism of horizontal gene transfer, Important general features of conjugation	Conjugation	The use of data projectors.	=
11	4 hrs	Effects of Mutations	Genetic Mutation	The use of	

		on DNA Sequence, Effects of Mutations on Protein Structure and Function, Mechanisms of mutation	and Mutagens	data projectors.	=
12	4 hrs	Missense mutation, Nonsense mutation,,,etc Physical Mutagens, Chemical Mutagens, Biological Mutagens	Types of Genetic Mutation and Mutagens	The use of data projectors.	=
13	4 hrs	Repair mechanisms	Repair of Mutation	The use of data projectors.	=
14	4 hrs	Direct reversal of DNA damage repair, Excision repair, DNA mismatch repair (MMR)	Types of repair of Mutation		=
15			Second Monthly Exam		

- Practical Course Structure

1	2 hrs	Introduction to DNA Extraction Methods	DNA extraction from <i>Escherichia coli</i> bacteria	The use of data projectors.	Monthly Exams and Quizzes
2	2 hrs	=	Basic Steps of DNA Extraction	The use of data projectors.	=
3	2 hrs	A mixture of organic solvents used after	Organic Solvent Method	The use of data projectors.	=

		cell disruption to remove salts and proteins that separate into the organic solvent layer.			
4	2 hrs	Introduction to Bacterial Genetic Mutation	Bacterial mutation	The use of data projectors.	=
5		Isolation of streptomycin resistant Mutan	Isolation of streptomycin		
6			First Monthly Exam		
7		The lowest concentration of antibiotic needed to inhibit bacterial growth in test system.	Minimum inhibitory concentration – MIC		
8	2 hrs	The method of Gradient plate	Gradient plate method	The use of data projectors.	=
9	2 hrs	Use of culture medium containing the antibiotic	Preparing a stock solution from an antibiotic capsule	The use of data projectors.	=
10	2 hrs	Introduction	Bacteriocin	The use of data projectors.	=
11	2 hrs	The effect of bacteriocin on the sensitive bacterial cell	The effect of bacteriocin on the sensitive bacterial cell	The use of data projectors.	=
12	2 hrs	Mechanisms of action of bacteriocins and	Mechanism of	The use of data	=

		procedural steps	action of bacteriocins	projectors.	
13	2 hrs		Second Monthly 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)					
Main references (sources)		1-Environmental Ecology, Maier et al, 2008, 2nd Ed 2-Griffith F. 1928. The Significance of Pneumococcal Types. J. Hyg.. 27(2):113-159. https://doi.org/10.1017/s0022172400031879 . 3- Avery OT, MacLeod CM, McCarty M. 1944. STUDIES ON THE CHEMICAL NATURE OF THE SUBSTANCE INDUCING TRANSFORMATION OF PNEUMOCOCCAL TYPES. 79(2):137-158. https://doi.org/10.1084/jem.79.2.137 4- Jeremy W. Dale and Simon F. Park (2010) Molecular Genetics of Bacteria 5th edition, 2010 by John Wiley & Sons, Ltd University of Surrey, UK. ISBN: 978-0-470-74184-			
Recommended books and references (scientific journals, reports...)		1-Molecular Genetics of Bacteria 5th edition, 2010 by John Wiley & Sons, Ltd University of Surrey, UK. ISBN: 978-0-470-74184- 2-Microbiology text book Arnold Ventures			
Electronic References, Websites		https://microbiologysociety.org/			

Course Name:	
Industrial microbiology	
Course Code:	
BioSM-424	
Semester / Year:	
Second semester/ 2025 - 2026	
Description Preparation Date:	
2026	
Available Attendance Forms:	
(Theoretical and practical) weekly	
Number of Credit Hours (Total) / Number of Units (Total)	
60 theoretical hours + 60 practical hours = 120 hours Number of units= 3	
Course administrator's name (mention all, if more than one name)	
Name: Assist.Prof. Jawad Kadhim Isa Email: jalzubeidy@uowasit.edu.iq	
Course Objectives	
Course Objectives	1- Providing learners with knowledge of the principles of industrial microbiology 2- Developing positive attitudes towards this knowledge 3- Identify research methods in industrial microbiology 4- Identify the basic concepts in the material of industrial microbiology 5- Identify the objectives of industrial microbiology and the basics of industrial microbiology.....
Teaching and Learning Strategies	
Strategy	1- The method of delivery, live questioning, problem solving and discussion 2- Include teaching methods using educational technology (data show for face-to-face education and linking lectures with videos Educational support for the subject) 3- The method of distance learning by holding electronic meetings by (Google Mate or FCC and others for e-learning)

	4- Encouraging students to self-learn.				
- Theory Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 hours	Identify learning objectives in the assessment of industrially important microorganisms	Introduction and a brief history of industrial fermentation	Data show	Quizzes and monthly exam
2	2 hours	Identify the important laws of industrial microbiology applications	Industrially significant microorganisms	Data show	Quizzes and monthly exam.
3	2 hours	Comparison of industrial microbiology and other applied microbiology sciences	Fermentation requirements	Data show	Quizzes and monthly exam.
4	2 hours	Identify important recommendations to ensure a safe environment free of contamination using industrial microbiology.	Starters or vaccines used in industrial fermentation	Data show	Quizzes and monthly exam.
5	2 hours	Definition of industrial products that can be	General principles of microbial	Data show	Quizzes and monthly exam.

		obtained using microbiology for industrial purposes	aerobic fermentation		
6	2 hours	Identify the types of microorganisms that can be used for industrial purposes	Anaerobic fermentation industries	Data show	Quizzes and monthly exam.
7	2 hours	Exam	Exam	Data show	Quizzes and monthly exam.
8	2 hours	Forming a future vision on the possibility of searching for effective, fermented and therapeutic foods that result from the growth of industrial microorganisms	Aerobic Fermentation Microbial Industries	Data show	Quizzes and monthly exam.
9	2 hours	Absorb training in research centers and learn how to deal with devices and equipment related to industrial microbiology	Citric acid – acetic acid	Data show	Quizzes and monthly exam.
10	2 hours	Developing the skill of self-evaluation through the feedback provided by the tests	Enzymes – Microbial protein	Data show	Quizzes and monthly exam.

11	2 hours	=	Vitamins	Data show	Quizzes and monthly exam.
12	2 hours	=	Fats	Data show	Quizzes and monthly exam.
13	2 hours	=	Types of cultures used for industrial purposes	Data show	Quizzes and monthly exam.
14	2 hours	=	Improvement of microbiology strains for industrial purpose	Data show	Quizzes and monthly exam.
15	2 hours	Exam	Exam	Data show	Quizzes and monthly exam.
- Practical Course Structure					
1	2	Gaining practical skills through training in labs and research centers.	Introduction to industrial microbiology	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam.
2	2	=	Producing baker's yeast and measuring its fermentation power and efficiency	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam.
3	2	=	Penicillin	Using Data	Quizzes and monthly exam

			production along with methods of extraction and explanation of the reaction mechanism	Show projectors and applying the practical part in the lab	
4	2	=	Lactic acid production	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
5	2	=	Measuring the activity of the protease enzyme	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
6	2	=	Test		Quizzes and monthly exam
7	2	=	Citric acid production	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
8	2	=	Industrial	Using Data	Quizzes and monthly exam

			microbiology in dairy products	Show projectors and applying the practical part in the lab	
9	2	=	Alcohol production	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
10	2	=	Fermented food production	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
11	2	=	Pickle making and	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
12	2	=	Acetic acid production	Using Data Show	Quizzes and monthly exam

				projectors and applying the practical part in the lab	
13	2	=	How to prepare the starter	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly exam
14	2	=	Test		Quizzes and monthly exam
15	2	=	Lipase enzyme production	Using Data Show projectors and applying the practical part in the lab	Quizzes and monthly 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)					
Main references (sources)			1-Industrial Microbiology: An Introduction Michael J. Waite BSc, PhD, CBiol, MIBiol Neil L. Morgan		

	BSc, PhD, MIFST John S. Rockey BSc, MSc, PhD Gary Higton BSc, PhD All: School of Applied Science, South Bank University, London, UK , 2007 2-Food Biotechnology edited by Kalidas Shetty Gopinadhan Paliyath Anthony Pometto Robert E. Levin ,2006
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Name:
Microbial Ecology
Course Code:
BioSM-425
Semester / Year:
2026/2025Second /
Description Preparation Date:
2026/2/1
Available Attendance Forms:
In-person learning
Number of Credit Hours (Total) / Number of Units (Total)
Theoretical (2 hours)
Practical (2 hours)
Course administrator's name (mention all, if more than one name)
Name: L.Dr. Fatima Kareem Shandookh Email: fkareem@uowasit.edu.iq

Course Objectives					
Course Objectives		1-Studying environmental components and microbial interactions in soil, water, and air 2-Identifying the types of microbes in soil and water environments and studying the types of microbes used as microbial indicators of water pollution 3-Studying the environmental factors and conditions that affect it and are optimal for it 4-Understanding the roles that microbes play in their various environments 5- Ways to utilize microbial species in different environmental treatments			
Teaching and Learning Strategies					
Strategy	1- Discussing how to utilize the information presented in the lectures for development. 2- Giving students the opportunity and encouraging them to discuss the information given to them. 3-Integrating the use of educational technology into teaching methods 4- Group discussions and homework completion				
- Theory Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	As referred to in the previous section	Ecology	In-person learning	Daily preparation and daily exams
2	2	As referred to in the previous section	Microbial ecology	In-person learning	Daily preparation and daily exams
3	2	As referred to in the previous section	Aquatic Microbiology	In-person learning	Daily preparation and daily exams
4	2	As referred to in the previous section	Soil Microbiology	In-person learning	Daily preparation and daily

					exams
5	2	As referred to in the previous section	Bioremediation	In-person learning	Daily preparation and daily exams
6			monthly exam		
7	2	As referred to in the previous section	Biodegradation	In-person learning	Daily preparation and daily exams
8	2	As referred to in the previous section	Biofuel	In-person learning	Daily preparation and daily exams
9			monthly exam		
- Practical Course Structure					
1	2	As referred to in the previous section	Microbiological safety in laboratories	In-person learning	Daily preparation and daily exams
2	2	As referred to in the previous section	Microbial ecology	In-person learning	Daily preparation and daily exams
3	2	As referred to in the previous section	Disinfection and Sterilization	In-person learning	Daily preparation and daily exams
4	2	As referred to in the previous section	MICROBIAL STAINS	In-person learning	Daily preparation and daily exams
5			monthly exam		
6	2	As referred to in the previous section	The growth of bacterial population and measurement of	In-person learning	Daily preparation and daily

			bacterial growth		exams
7	2	As referred to in the previous section	Isolation of soil microorganisms	In-person learning	Daily preparation and daily exams
8	2	As referred to in the previous section	Isolation of water microorganisms	In-person learning	Daily preparation and daily exams
9			monthly 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

Final exam	Practical			Theoretical			Semester
	Quizzes	Second exam	First exam	Quizzes	Second exam	First exam	
60	4	4	4	4	12	12	Second

Learning and Teaching Resources

Required textbooks (curricular books, if any)	Introduction to Environmental Microbiology
Main references (sources)	ENVIRONMENTAL SCIENCE MICROBIOLOGY (Awoderu <i>etal.</i>,2025)
Recommended books and references (scientific journals, reports...)	Environmental Microbiology and Biotechnology. UTTARAKHAND OPEN UNIVERSITY. Teenpani Bypass Road, Transport Nagar, Haldwani - 263 139. email : info@uou.ac.in. http://www.uou.ac.in.
Electronic References, Websites	Textbook of Microbial Ecology. ISBN- 10:1682865444.ISBN-13:9781682865446.Pub. Date:05/16/2018.Publisher:Syrawood Publishing House

Course Name:	
Phycology	
Course Code:	
BioSM-427	
Semester / Year:	
Second Semester/ 2025-2026	
Description Preparation Date:	
12/6/2026	
Available Attendance Forms:	
Number of Credit Hours (Total) / Number of Units (Total)	
3	
Course administrator's name (mention all, if more than one name)	
Name: Roaa Mohammad Hasan Shoker Email: rmhasan@uowasit .edu.iq	
Course Objectives	
Course Objectives	1- A comprehensive definition of plant groups in terms of common characteristics, the development, and the classification basis. 2- Explaining the benefits and harms of these groups from an industrial,

		agricultural and medical perspective. 3- Emphasis on the damage caused by these groups in terms of the production of toxins and types of toxins. 4- Methods of treating toxins. 5- The common characteristics between them and higher plants and the basic differences. 6- Classifying the family these groups and studying their most important genera.			
Teaching and Learning Strategies					
Strategy		1-Explaining the scientific contain to students in detail. 2- Students participate in group discussions and submit assignments and seminars. 3- Collecting information about the latest discovery on the topic from the Internet.			
- Theory Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction to algae, its benefits, harms, and presence.	Phycology	Theory	Quiz, monthly exams and discussion
2	2	External appearance and composition, classification foundations, and reproduction methods	Phycology	Theory	Quiz, monthly exams and discussion
3	2	Cyanophyta (Cynobacteria) blue-	Phycology	Theory	Quiz, monthly exams and discussion

		green algae			
4	2	Chlorophyta	Phycology	Theory	Quiz, monthly exams and discussion
5	2	Classification basics of and unicellular and colonial forms	Phycology	Theory	Quiz, monthly exams and discussion
6	2	Charophyta	Phycology	Theory	Quiz, monthly exams and discussion
7	2	Pyrrophyta	Phycology	Theory	Quiz, monthly exams and discussion
8	2	Euglenophyta	Phycology	Theory	Quiz, monthly exams and discussion
9	2	Chrysophyta	Phycology	Theory	Quiz, monthly exams and discussion
10	2	Phaeophyta (Brown algae)	Phycology	Theory	Quiz, monthly exams and discussion
11	2	Rhodophyta	Phycology	Theory	Quiz, monthly exams and discussion
12	2	Plant classification – Embryophyta (Bryophyta-Pteridophyta-spermatophyte)	Phycology	Theory	Quiz, monthly exams and discussion
13	2	Bryophyta	Phycology	Theory	Quiz, monthly exams and discussion
14	2	Pterioophyta	Phycology	Theory	Quiz, monthly exams and discussion
15	2	Gymnosperms	Phycology	Theory	Quiz, monthly exams and discussion
- Practical Course Structure					
1	1	Microscope parts	Phycology	Practical	Quiz, monthly exams and discussion
2	1	Algae sample	Phycology	Practical	Quiz, monthly exams and discussion
3	1	Cyanophyta	Phycology	Practical	Quiz, monthly

		(Cynobacteria) blue-green algae			exams and discussion
4	1	Chlorophyta	Phycology	Practical	Quiz, monthly exams and discussion
5	1	unicellular and colonial forms	Phycology	Practical	Quiz, monthly exams and discussion
6	1	Charophyta	Phycology	Practical	Quiz, monthly exams and discussion
7	1	Pyrrophyta	Phycology	Practical	Quiz, monthly exams and discussion
8	1	Euglenophyta	Phycology	Practical	Quiz, monthly exams and discussion
9	1	Chrysophyta	Phycology	Practical	Quiz, monthly exams and discussion
10	1	(Phaeophyta Brown algae)	Phycology	Practical	Quiz, monthly exams and discussion
11	1	Rhodophyta	Phycology	Practical	Quiz, monthly exams and discussion
12	1	Plant classification – Embryophyta (Bryophyta-Pteridophyta-spermatophyte)	Phycology	Practical	Quiz, monthly exams and discussion
13	1	Bryophyta	Phycology	Practical	Quiz, monthly exams and discussion
14	1	Pterioophyta	Phycology	Practical	Quiz, monthly exams and discussion
15	1	Gymnosperms	Phycology	Practical	Quiz, monthly exams and discussion
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)					
Main references (sources)			1- Jawad, A. L. M. 1998. Algicidal properties of Crude extracts and total isolated saponins from		

	different Iraqi :plants. 7th April univ. J. Vol[1]. 2-Jawad, A.L.M. 1982. Interactions between Cyanobacteria and other micro-organisms. Ph.D. thesis, University of Liverpool. 3- Landsberg, J.; F.Van Dolah and G.Doucette.2005.Marine and estuarine harmful algal blooms: Impacts on human and animal health in: Belkin,S.; R.R.Colwell (Ed.),Oceans and health: Pathogens in the marine Environment. Springer, New york :165-215.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Name:
helminthes parasitic
Course Code:
Bio SM-428
Semester / Year:
Year: 2025—2026
Description Preparation Date:
2026
Available Attendance Forms:
Weekly attendance (theoretical and practical)
Number of Credit Hours (Total) / Number of Units (Total)
60 hours of theory + 60 hours of practical work = 120 hours
Number of units = 3
Course administrator's name (mention all, if more than one name)
Name: Dr. Zahraa Ali Faeiq Al-Waeli Email: : Zalwaely@uowasit.edu.iq
Course Objectives

Course Objectives			1. To equip learners with knowledge of the principles of parasitic helminthology. 2. To familiarize learners with research methodologies in the field of parasitic helminthology. 3. To familiarize learners with the basic concepts in the classification and division of parasitic worms. 4. To understand the objectives of studying parasitic helminthology and its effects on the human body. 5. To understand the implications of this knowledge.		
Teaching and Learning Strategies					
Strategy		1- Identifying groups of parasitic worms and understanding their lifestyles and reproduction methods. 2- Understanding the environmental conditions surrounding these organisms and how to prevent and treat them. 3- Knowing the general characteristics of parasitic organisms, classifying them into groups, and understanding the general characteristics of each group. 4- Including realistic images, not just diagrams, and encouraging student discussion and questions to engage them in the lecture.			
- Theory Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	2 hours	Introduction to the vocabulary of parasitic worms	Introduction to the Science of Parasitic Worms	The lecture is theoretical Using a program PowerPoint Whiteboard video	Daily and monthly exams + Reports
2	2 hours	Devices and tools used in diagnosis	Methods of diagnosing parasitic worms	The lecture is theoretical Using a program PowerPoint Whiteboard video	Daily and monthly exams + Reports
3	2 hours	Genera that comprise the phylum flatworm	phylum flatworm	The lecture is theoretical Using a program PowerPoint Whiteboard video	Daily and monthly exams + Reports
4	2 hours	A simple introduction to the characteristics of the phylum Nematodes	General characteristics of the phylum Nematodes	The lecture is theoretical Using a program PowerPoint Whiteboard video	Daily and monthly exams + Reports
5	2 hours	An introduction to some of the characteristics of the genera of this phylum	Study of some genera from the phylum Nematodes	The lecture is theoretical Using a program PowerPoint Whiteboard video	Daily and monthly exams + Reports
6	2	General principles	General	The lecture is	Daily and

	hours	of the phylum Intestinal and Bloodworms	characteristics of intestinal worms and bloodworms	theoretical Using a program PowerPoint Whiteboard video	monthly exams + Reports
7	2 hours	First month exam	First month exam	First month exam	First month exam
8		General characteristics of the hookworm	Geographic distribution, morphology, and life cycle of the hookworm	The lecture is theoretical Using a program PowerPoint Whiteboard video	Daily and monthly exams + Reports
9	2 hours	General characteristics of the genera found in the phylum Nematoda	Study of genera of a group of worms from the phylum Nematoda	The lecture is theoretical Using a program PowerPoint Whiteboard video	Daily and monthly exams + Reports
10	2 hours	General principles regarding the characteristics of the fish tapeworm	Geographic distribution, morphology, and life cycle of the fish tapeworm	The lecture is theoretical Using a program PowerPoint Whiteboard video	Daily and monthly exams + Reports
11	2 hours	General principles about the characteristics of the pinworm	General characteristics, external appearance, and life cycle of the pinworm	The lecture is theoretical Using a program PowerPoint Whiteboard video	Daily and monthly exams + Reports
12	2	Second month exam	Second month exam	Second	Second

	hours			month exam	month exam
13	2 hours	General characteristics of helminthes larvae	Study of some tapeworm larvae	The lecture is theoretical. Using PowerPoint, the whiteboard, and video.	Daily and monthly exams + Reports
14	2 hours	General principles of hydatid cyst worms	General characteristics and external appearance. Life cycle of the hydatid cysts	The lecture is theoretical. Using PowerPoint, the whiteboard, and video.	Daily and monthly exams + Reports
15	2 hours	Final exam	Final exam	Final exam	Final exam
- Practical Course Structure					
1	2 hours	Understanding the most important medical terms used in the science of parasitic helminthes	The system in the science of parasitic helminthes	Theoretical part presented on screen, and practical part applied in the lab + educational videos shown	Daily and monthly exams + Reports
2	2 hours	Laboratory materials used to diagnose all parasitic helminthes	Methods for diagnosing parasitic helminthes	Theoretical part presented on screen, and practical part applied in the lab + educational videos shown	Daily and monthly exams + Reports
3	2	Studying the	Methods of sample	Theoretical	Daily and

	hours	general principles of sample collection and sample preservation methods	collection	part presented on screen, and practical part applied in the lab + educational videos shown	monthly exams + Reports
4	2 hours	General characteristics of the phylum Platyhelminthes	Phylum Platyhelminthes	Theoretical part presented on screen, and practical part applied in the lab + educational videos shown	Daily and monthly exams + Reports
5	2 hours	First month exam	First month exam	First month exam	First month exam
6	2 hours	General characteristics of the phylum Nematoda	Study of genera belonging to the phylum Nematoda	Theoretical part presented on screen, and practical part applied in the lab + educational videos shown	Daily and monthly exams + Reports
7	2 hours	Identifying types of parasitic larvae	Classification of nematode larvae	Theoretical part presented on screen, and practical part applied in the lab + educational videos shown	Daily and monthly exams + Reports

8	2 hours	Characteristics and features of the hookworm	Geographic distribution, morphology, and life cycle of the hookworm	Theoretical part presented on screen, and practical part applied in the lab + educational videos shown	Daily and monthly exams + Reports
9	2 hours	Characteristics and features of blood parasitic trypanosomes	Diagnosis of some blood-parasitic worms (Tremors).	Theoretical part presented on screen, and practical part applied in the lab + educational videos shown	Daily and monthly exams + Reports
10	2 hours	General characteristics of both the beef tapeworm and the pork tapeworm	Diagnosis of a group of beef tapeworms and pork tapeworms	Theoretical part presented on screen, and practical part applied in the lab + educational videos shown	Daily and monthly exams + Reports
11	2 hours	Second month exam	Second month exam	Second month exam	Second month exam
12	2 hours	General characteristics of the phylum Hematopoietic	Geographical distribution and external morphology of the blood-borne foraminifera phylum	Theoretical part presented on screen, and practical part applied in the lab + educational	Daily and monthly exams + Reports

				videos shown	
13	2 hours	Study of the general characteristics of tapeworm larvae	Diagnosis of tapeworm larval models	Theoretical part presented on screen, and practical part applied in the lab + educational videos shown	Daily and monthly exams + Reports
14	2 hours	Studying everything related to parasitic worm eggs	General characteristics and external appearance of parasitic worm eggs of all types	Theoretical part presented on screen, and practical part applied in the lab + educational videos shown	Daily and monthly exams + Reports
15	2 hours	Final exam	Final exam	Final exam	Final 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)			Nothing		
Main references (sources)			1-Roberts, L. S., Janovy, J., & Nadler, S. A. (2013). Foundations of Parasitology (9th ed.). New York: McGraw-Hill Education 2-Garcia, L. S. (2020). Diagnostic Medical Parasitology (7th ed.). Washington, DC: ASM Press 3- Cook, G. C., & Zumla, A. I. (Eds.). (2009). Manson's Tropical Diseases (22nd ed.). Saunders Elsevier 4- Bogitsh, B. J., Carter, C. E., & Oeltmann, T. N. (2018). Human Parasitology (5th ed.).		

	Academic Press 5- Soulsby, E. J. L. (2010). Helminths, Arthropods and Protozoa of Domesticated Animals (7th ed.). Baillière Tindall
Recommended books and references (scientific journals, reports...)	General Parasitology General microbiology Clinical parasitology
Electronic References, Websites	Modern sources via the Internet

Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

