Ministry of Higher Education and Scientific Research

Scientific Supervision and Evaluation Authority

Department of Quality Assurance and Academic Accreditation

Academic Program Description Form for Colleges and Institutes For the academic year 2022- 2023

Publisher: University of Baghdad

Faculty/Institute: College of Science

Scientific Department: Department of Biology

File filling date: 1/10/2022

Signature:	**Signature:**
Scientific Associate Name:	**Head of department:**
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Division of Quality Assurance and University Performance

Name of the Director of the Quality Assurance and University Performance Division: Prof. Esraa Ali Zeidan

Signature

Approval of the Dean

Academic Program Description

This academic program description provides a brief summary of the most important characteristics of the program and the learning outcomes expected of the student to achieve, proving whether he has made the most of the available opportunities. It is accompanied by a description of each course within the program

University of Baghdad	1. Educational institution
College of Science / Department of Biology	2. Scientific Department / Center
Life Sciences Department Programs	3. Name of academic or vocational program
Bachelor of Biology	4. Final Certificate Name
Quarterly	5. Academic System : Annual / Decisions / Other
Sectoral and approval of the Deans Committee	6. Accredited Accreditation Program
Summer training, field visits, training courses, scientific research, laboratories, library.	7. Other external influences
1/ 10/2022	8. History of the preparation of the description
9. Objectives of the Academic Program	
Spreading awareness and knowledge in the fields of life sciences by providing the country with researchers and professors who are able to deal with the changes and modern developments taking place in science and technology to keep pace with the development of the times and contribute to the development of our scientific, health, industrial and environmental institutions. The academic program of the Department of Life Sciences offers studies related to the diversity and evolution of living organisms and the difference in the biological and environmental systems in which they live. Hence his four-dimensional specialization in the study of zoology, botany,	

microbiology, ecology and everything related to other sciences, as well as knowledge and understanding in the use of laboratory devices and microscopes and how to conduct laboratory analyzes.

10. Required Program Outcomes and Teaching, Learning and Assessment Methods

A-A cognitive objectives.

A1- Enable students to obtain knowledge and understanding of the concept of life sciences.

A2- Enable students to obtain knowledge and understanding of the laws of nature related to life sciences.

A3- Enable students to obtain knowledge and understanding of the correct ways to use devices.

A4- Enable students to obtain knowledge and understanding of the standards of auditing and detection of living organisms.

A5- Enabling students to obtain knowledge and understanding to keep pace with global development in all scientific fields of life sciences.

B - Skills objectives of the program:

B1 – Scientific skills.

B2- Reminder and analysis skills.

B3- Skills of use and development.

Teaching and learning methods

1- Clarification and explanation of study materials.

2- Provide students with knowledge through homework.

3- Asking students to increase the library to obtain academic knowledge.

4- Improving students by encouraging them to visit websites.
Evaluation methods
- Daily tests through multiple-choice questions. - Setting grades for daily duties. Setting participation grades in difficult competition questions.
C- Emotional and value goals: C1- Enable students to think and analyze topics related to the subject. C2- Enabling students to think and analyze topics related to the standards of using devices. C3- Enabling students to think and analyze topics related to the laws of science studied. C4- Enable students to think and analyze topics related to scientific standards for study worldwide.
Teaching and learning methods
- Provide students with the basics and additional topics related to the outcomes of thinking and analysis. - Form discussion groups during lectures to discuss specific topics that require reflection and analysis. - Ask a set of thinking questions during lectures such as (how, why, when, what is the reason) of the topics. - Giving students homework that requires self-explanations in scientific causal ways.
Evaluation methods
- Daily exams through multiple-choice questions that require scientific skills.

- Daily exams with scientific questions.
- Setting grades for daily duties.
- Participation grades for competition questions for academic subjects.

d. General and qualifying skills transferred (other skills related to employability and personal development).

D1- Enable students to use models and shapes.

D2- Enabling students to pass job interviews.

D3- Enabling students to pass professional exams organized by local, regional and international bodies.

D4- Enabling students to develop continuously after graduation.

Teaching and learning methods

- Providing students with the basics and topics related to thinking and analysis outputs.
- Form discussion groups during lectures to discuss topics related to life sciences that require reflection and analysis.
- Giving students homework that requires scientific explanations.

11. Evaluation methods

- Daily exams with home questions.
- Give specific grades for homework.

1. Program Architecture

Credit Hours and Units	Course Name	Course or Course Code	Grades
1	Human Rights	101 HR	First stage
2	Freedom and democracy	102 D	

3	General Zoology	103 CY	
3	Biophysics	104 BBP	
3	Organic chemistry	105 BOC	
2	Biological mathematics	106 BBM	
1	Computer science 1	107 BCS1	
3	General Botany	337 BGE	
3	Paleontology	109 BPA	
3	Analytical chemistry	110 BAC	
2	Biostatistics	111 BBS	
1	Computer science 2	112 BCS2	
2	Arabic	113 BA	
1	Biosafety & Biosecurity	BBSA114	
2	English	BE116	
3	Invertebrates	214 IN	Second stage
3	Entomology	215 BETWEEN	
3	Biochemistry 1	216 BBC1	
3	Biosystematics	217 BBT	
3	Plant anatomy	218 BPA	
1	Computer science 1	219 BCS1	
3	Parasitology	220 BPR	
3	Bacteriology	221 BBA	
3	Biochemistry 2	222 BBC2	
3	Development and biodiversity	223 BDB	
3	Plants groups	224 BPG	
1	Computer science 2	225 BCS2	
2	English	BE226	
3	Ecology	326 BEC	Third stage
3	Microbial physiology	327 BMP	
3	Plant physiology	328 BPP	
3	Serology	446 BS	
3	Mycology	331 BMI	
3	Pollution	332 BPO	
3	Animal physiology	33 BAP	
3	Medicinal plants	334 BMEP	
3	Antibiotics	335 BAN	

3	Immunology	336 BIM	
3	Hestology	108 BHI	
2	English		
1	Research Methodology		
3	Molecular biology and bacterial genetics	438BMBG	Fourth stage
3	Biotechnology	439 BBI	
3	Aquatic and soil microbiology	440 IN NAME	
3	Embryology	441 BEM	
3	Genetic engineering	442 BGE	
3	Food microbiology	443 BFM	
3	Virology	444 BVI	
3	Helminthology	445 BHE	
3	Comparative anatomy	330 BCA	
3	Clinical analysis	447 CA	
3	Pathogenic bacteriology	329 BPB	
2	English		
4	Research project	448 BRP	

12. Planning for personal development

- Describe how the department follows up on students' progress, achievements, and grades.
- Participation in scientific conferences.
- Participate in workshops and seminars.

2. Admission criterion (setting regulations related to admission to a college or institute)

Central admission - scientific and according to the instructions of the Ministry of Higher Education and Scientific Research

3. The most important sources of information about the program

Program Skills Map: It is an analysis table showing each subject and the skills it provides to the student, which are mentioned in the previous paragraphs, as follows:

- Knowledge and understanding.
- Scientific problem-solving skills.
- Thinking and analysis skills.
- Skills of use and self-development.
- Coverage of specialized staff.

Curriculum Skills Outline																			
Please tick the boxes corresponding to the individual learning outcomes from the program under evaluation.																			
Learning outcomes required from the program																			
General and Rehabilitation Skills Transferred (or) other skills related to employability and personal development				**Emotional and value goals**				**Program Skills Objectives**				**Cognitive Objectives**				**fundamental Or optional**	**Course Name**	**Course Code**	**Year/Level**
D4	**D3**	**D2**	**D1**	**C4**	**C3**	**C2**	**C1**	**B4**	**B3**	**B2**	**B1**	**A4**	**A3**	**A2**	**A1**				
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Human Rights	101 HR	**First stage**
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Freedom and democracy	102 D	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	General Zoology	103 GZ	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Biophysics	104 BBP	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Organic chemistry	105 BOC	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Biological mathematics	106 BBM	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Computer science 1	107 BCS1	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	General Botany	108 GB	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Paleontology	109 BPA	

+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Analytical chemistry	110 BAC	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Biostatistics	111 BBS	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Computer science 2	112 BCS2	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Arabic	113 BA	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Biosafety & security	BBSA114	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	English	BE116	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Invertebrates	214 IN	**Second stage**
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Entomology	215 BETWEEN	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Biochemistry 1	216 BBC1	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Biosystematics	217 BBT	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Plant anatomy	218 BPA	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Computer science 1	219 BCS1	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Parasitology	220 BPR	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Bacteriology	221 BBA	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Biochemistry 2	222 BBC2	

+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Development and biodiversity	223 BDB	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Plants groups	224 BPG	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Computer science 2	225 BCS2	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	English	226 B	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Ecology	326 BEC	**Third stage**
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Microbial physiology	327 BMP	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Plant physiology	328 BPP	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Serology	446 BS	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Mycology	331 BMI	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Pollution	332 BPO	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Animal physiology	33 BAP	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Medicinal plants	334 BMEP	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Antibiotics	335 BAN	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Immunology	336 BIM	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Genetics	337 BGE	

+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Molecular biology and bacterial genetics	438BMBG	**Fourth stage**
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Biotechnology	439 BBI	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Aquatic and soil microbiology	440 IN NAME	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Embryology	441 BEM	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Genetic engineering	442 BGE	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Food microbiology	443 BFM	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Virology	444 BVI	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Helminthology	445 BHE	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Pathogenic bacteriology	329 BPB	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Clinical analysis	447 CA	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Research project	448 BRP	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**Essential**	Comparative anatomy	330 BCA	

Chapter One: Cell Science

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

Ministry of Higher Education and Scientific ResearchUniversity / Baghdad / College of Science	1. Educational institution
Department of Life Sciences	2. University Department / Center
Cytology	3. Course Name/Code
General Biology	4. Programs in which he enters
Theoretical lectures and practical laboratories	5. Available Attendance Forms
First / 2020- 2021	6. Semester / Year
64 hours per semester (2 theoretical + 2 practical = 4 per week)	7. Number of Credit Hours (Total)
3/9/2020	8. The history of preparation of this description
9. Course Objectives	
1- Study the contents of the living and non-living cell and know its descriptions and functions	
2- Study of cell division methods	
3- Cellular cycle study	
4- Study of cell chemistry (biological molecules, including large and small molecules)	
5- Study of cell membrane structure and mechanics of material transfer to and from cell	
6- Study of energy transition pathways, reproduction and translation processes	

10. Learning outcomes and teaching, learning and assessment methods
A. Knowledge and understanding A1- Identify the structure of the cell and the importance of cellular components A2- Knowing the stages of cell division and the phases of the cellular cycle A3- Understand the importance of chemical compounds in maintaining cell vitality A4- Identify the importance of translation, cloning and protein building processes in the continuity of cell renewal
B - Subject-specific skills B1 - Use of Legends B2 - Use slide show means to review shapes and images
Teaching and learning methods
1- Explanation of the material through lectures in addition to means of illustration 2- Scientific activities by providing research and scientific articles related to the course curriculum
Evaluation methods
By quarterly and daily tests By following up on students' attendance and active participation in the classroom
C- Thinking skills C1- Participation in discussions during the presentation of the scientific material C2- Continuous communication with the update of scientific information
Teaching and learning methods
Evaluation methods

d. General and transferable skills (other skills related to employability and personal development). D1- Keeping pace with global development regarding scientific material D2- Ability to display information using modern media D2- D3- D4-

11. Course Structure					
Evaluation method	Method of education	Name of the unit/course or topic	Required Learning Outcomes	Hours	The week
Live Tests	Lectures	Introduction	concept of cytology, the cell theories	2	1
Classroom Activities	Discussions	The cell	a comparison between prokaryotic cell and eukaryotic cell	2	2
Attendance Follow-up	Legends	Cell contents	the living part of the cell and their functions	2	3
		Cytoplasm and cytoplasmic organelles	the cytoplasmic content, different types of plastids	2	4
		The non-living inclusions	the protoplasmic portion, vacuoles, crystals,	2	5
		Cell division	mitosis, meiosis	2	6
		The cell cycle	Phases of cell cycle	2	7
			Mid examination	**2**	**8**
		Chemistry of the Cell	Micromolecules: Water, Minerals	2	9
		Chemistry of the Cell	Macromolecules: Carbohydrates, Proteins, Lipids, Nucleic acids	2	10
		Cell Membrane	Cell Membrane Structure and Function	2	11
		Transport Mechanisms	Passive Transport: Simple diffusion, Facilitated diffusion, Osmosis	2	12
		Transport Mechanisms	Active Transport: Active transport via	2	13

			protein pumps Vesicular transport		
		Energy-Releasing Pathways	Glycolysis, The preparatory reaction, Krebs cycle, Electron transport chain	2	14
		Replication of DNA	The enzymes needed for DNA replication Virus multiplication cycle	2	15
			Mid Examination	**2**	**16**

12. Infrastructure	
1. Stewart M. (2007): Cell Biology; Twenty-First Century Books (CT). 2- Morgan S. (2005): Cells and Cell Function; Heinemann Educational Books. 3. Hoffman F. and Jamieson J. (1997): Cell Physiology; Oxford University Press	Required readings: ▪ Basic texts ▪ Course Books ▪ Other
	Special requirements (e.g. workshops, periodicals, software and websites)
	Social services (e.g. guest lectures, vocational training and field studies)

13. Acceptance	
	Prerequisites
	Minimum number of students
	The largest number of students

Chapter One: Biosafety

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

University of Baghdad – College of Science	14. Educational institution
Department of Life Sciences	15. University Department / Center
Biosafety Theory	16. Course Name/Code
	17. Programs in which he enters
Traditional lecture	18. Available Attendance Forms
2020-2021	19. Semester / Year
2 hours per week	20. Number of Credit Hours (Total)
1/9/ 2020	21. The history of preparation of this description
22. Course Objectives	
1. The student is introduced to the basic concepts of biosafety	
2. The student learns how to deal with laboratory materials, devices and biological equipment	
3. The student learns how infection and pathogens are transmitted and how to deal with them with caution 4. The student learns how to protect himself and his colleagues by following international guidelines for biosafety	

23. Learning outcomes and teaching, learning and assessment methods
A. Knowledge and understanding A1- The student learns what biosafety is A2- The student learns how to use and protect himself by following the guidelines A3- Handling biological materials and wearing special laboratory clothing A4- A5- A6-
B - Subject-specific skills B1 – Identify local and international guidelines and how to apply them cautiously B2 - B3 - B4-
Teaching and learning methods
1. Using the projector 2. Use drawings and diagrams on the board
Evaluation methods
Written tests Asking intellectual questions during the lecture
C- Thinking skills C1- Intellectual questions A2- A3- A4-

Teaching and learning methods
The use of modern projectors and movies
Evaluation methods
Written and oral tests
d. General and transferable skills (other skills related to employability and personal development). D1- Guiding the student and developing his desire to specialize D2- Expanding the student's ability to understand biosafety laws D3- D4-

24. Course Structure					
Evaluation method	Method of education	Name of the unit/course or topic	Required Learning Outcomes	Hours	The week
Daily tests	Monitor	Introduction to Occupational Safety	**Occupational safety, occupational health, a historical overview of occupational safety and health, biological safety, the emergence and development of the concept of biological safety, accident, injury, occupational diseases. Safety rules in the laboratory.**	4	1+2
Daily tests	Monitor	The importance of biosafety	**Biosafety objectives, the importance of biosafety, the most important methods of controlling biological risks**	4	3+4
Daily tests	Monitor	Occupational hazards	**Types of occupational hazards, biological hazards (general classification), impact of biological risks**	4	5+6
Semester exam	Monitor	Biosafety Instructions	**Requirements for the application of biological safety instructions, the role of management in maintaining safety at work sites**	4	7+8
Daily tests	Monitor	Biological hazards	**Division of laboratories by severity,**	4	9+10

			relationship of risk to laboratory level		
Daily tests	Monitor	Sterilizers & Disinfectants	**The importance of sterilization and disinfection and the most important methods used**	4	11+12
Daily tests	Monitor	Vocational training	**The importance of awareness and training in reducing accidents Work permits, their types, their importance in reducing accidents**	4	12+13+14

25. Infrastructure	
Lectures prepared by the professors of the subject	Required readings: ▪ Basic texts ▪ Course Books ▪ Other
Occupational Safety and Health Objectives - Mustafa Hafez Mohammed Al-Jundi 2015 **The Science of Occupational Safety and Health Management Book by Dr. Youssef Al-Tayeb 2012** **Biosafety in laboratories – WHO 2004** **Biosafety – University of Dalhousie – Canada 2015**	Special requirements (e.g. workshops, periodicals, software and websites)
	Social services (e.g. guest lectures, vocational training and field studies)

26. Acceptance	
	Prerequisites
	Minimum number of students
	The largest number of students

Chapter One: Computer Science

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.;

University of Baghdad	1. Educational institution
College of Science / Department of Computer Science	2. Scientific Department / Center
Computer Skills I	3. Course Name/Code
Presence in the laboratory + due to the Corona pandemic	4. Available Attendance Forms
Semester / First Semester	5. Semester / Year
30 hours of practy	6. Number of Credit Hours (Total)
2020	7. The history of preparation of this description

8. Course Objectives
Teaching the student the basic concepts of the computer in terms of its types, components and uses ... etc and also Windows. Also teaching students how to benefit from the Internet in their field of specialization and also search for the right information ... Etc.

9. Course Outcomes and Methods of Teaching, Learning and Assessment
A- Cognitive objectives A1- The student learned the components of the calculator. A2- The student learned to use the calculator. A3- The student learned the Windows operating system. A4- The student learned how to browse and search on the Internet and benefit from it in their field of specialization. A5- A6-
B - Skills objectives of the course. B1 - Developing skills using the calculator. B2 - Introducing students to how to use the Internet. B3 – B4-
Teaching and learning methods
Explanation on the board and projector. Due to the Corona pandemic, electronic classes (Google Classroom) were used to give the material by uploading pdf files for lectures and explanation videos.
Evaluation methods
Due to the Corona pandemic, Google Classroom was used for daily and quarterly exams and homework.

C. Emotional and value goals A1- A2- A3- A4-
Teaching and learning methods
Explanation on the board and projector. Due to the Corona pandemic, electronic classes (Google Classroom) were used to give the material by uploading pdf files for lectures and explanation videos.
Evaluation methods
Due to the Corona pandemic, Google Classroom was used for daily and quarterly exams and homework.
d. General and rehabilitative skills transferred (other skills related to employability and personal development). D1- D2- D3- D4-

10. Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Daily and quarterly exams and homework	Whiteboard and presentation slides and also in the electronic classroom upload PDF files and videos explanation	1. Basic Introduction to Computers. 1.1 What is a Computer? 1.2 The Components of a Computer. 1.3 Advantages and Disadvantages of Using Computers.		**2**	**1**
		1.4 Networks and the Internet. 1.5 Computer Software. 1.6 Categories of Computers.		**2**	**2**
		1.7 Examples of Computer Usage. 1.8 Computer Applications in Society.		**2**	**3**
		2. The Internet and the World Wide Web 2.1 The Internet 2.2 Connecting to the Internet		**2**	**4**
		2.3 Access Providers 2.4 Internet Addresses		**2**	**5**
		2.5 Browsing the Web 2.6 Web Addresses		**2**	**6**
		2.7 Navigating Web Pages 2.8 Searching the Web		**2**	**7**
		3. Application Software 3.1 The Role of System Software		**2**	**8**
		3.2 Working with Application Software 3.3 Web Applications		**2**	**9**
		3.4 Application Software for Communications		**2**	**10**
		4. Windows 7 4.1 Desktop Components 4.2 Start Menu		**2**	**11**
		4.3 Windows Accessories 4.4 Start and shut down computer 4.5 Searching		**2**	**12**
		4.6 Using Help function 4.7 The Taskbar 4.8 File and Folder		**2**	**13**

		Exam		**2**	**14**

11. Infrastructure	
	1 Required textbooks
1. Assoc. Prof. Dr. Ziad Mohamed Abboud, Prof. Ghassan Hameed, Assoc. Prof. Amir Hussein, Eng. Bilal Kamal, **"Computer Basics and Office Applications - Part I",** University House for Printing, Publishing, Authoring and Translation, 2014 2. G. Shelly, M. Vermaat, J. Quasney, S. Sebok and S. Freund, "**Discovering Computers-Fundamentals: Your Interactive Guide to the Digital World**", Course Technology, Cengage Learning, 2012. 3. M. Miller, "**Absolute Beginner's Guide to Computers and the Internet**", Que Publishing, 2002	2 Main references (sources)
	Recommended books and references (scientific journals, reports ,....)
	B Electronic references, websites ....

12. Course Development Plan
The article was canceled by canceling the system of decisions

Course Description Form

Anatomy of a plant / Chapter One / Second Stage

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

University of Baghdad – College of Science	27. Educational institution

Department of Life Sciences	28. University Department / Center
Anatomy of a plant	29. Course Name/Code
Traditional lecture	30. Available Attendance Forms
2022-2023 First Semester	31. Semester / Year
16 hours per week	32. Number of Credit Hours (Total)
1/10/2022	33. The history of preparation of this description

34. Course Objectives

1- Identify the initial stages of plant cell formation and the stages of cell wall formation

2- Study the types of walls and interstitial spaces

3- Study the contents of the plant cell

4- Studying the different types of plant tissues, including simple and composite, and then finding the different relationships between them to reach a final understanding of the internal structure of the plant body

35. Learning outcomes and teaching, learning and assessment methods

A- Knowledge Objectives

A1- Identify plant cells and their different walls and interstitial spaces

A2- Identification of simple and complex tissues

A3- Identify and study the different shapes and types of each fabric

B - Course skills objectives B1 – Dealing with both light and anatomical microscopy B2 - Study of various educational segments (slides) B3 – Learn different ways to accomplish and study plant anatomical slides
Teaching and learning methods
- The use of projectors for various practical and theoretical lectures - Use drawings and shapes on whiteboards - The use of ready-made and prepared educational slides - Electronic Lectures
Evaluation methods
- Oral tests - Electronic Tests - Written tests - Reporting
C- Emotional and value goals C1- Finding anatomical relationships between different plant families C2- Identify the importance of anatomy for the rest of the sciences C3- Identify the relationships between cells and identify the complex tissues from them
Teaching and learning methods
- The use of projectors for various practical lectures - Use of educational electronic platforms - Use drawings and shapes on whiteboards
Evaluation methods
- Oral tests - Written tests
d. General and rehabilitative skills transferred (other skills related to employability and personal development). D1- Skills of preparing various plant anatomical slides

36. Course Structure					
Evaluation method	Method of education	Name of the unit/course or topic	Required Learning Outcomes	Hours	The week
Oral and written tests	Theoretical lectures and laboratory practical part	Plant cell wall	Identify the cell wall and intervals	2 hr theoretical 2 hr Practical	1
Oral and written tests	Theoretical lectures and laboratory practical part	Plant cell contents	Recognize live and non-living content	2 hr theoretical 2 hr Practical	2
Oral and written tests	Theoretical lectures and laboratory practical part	Meristem tissue	Identify meristem tissues and different theories of evolution	2 hr theoretical 2 hr Practical	3
Oral and written tests	Theoretical lectures and laboratory practical part	Skin texture	Learn about skin texture and various accessories	2 hr theoretical 2 hr Practical	4
Oral and written tests	Theoretical lectures and laboratory	Skin texture	Recognize stomatous complexes	2 hr theoretical 2 hr Practical	5

	practical part				
Oral and written tests	Theoretical lectures and laboratory practical part	Parenchyma tissue	Identify the shapes and types of parenchyma tissue	2 hr theoretical 2 hr Practical	6
Oral and written tests	Theoretical lectures and laboratory practical part	Colenzymic tissue	Identify the shapes and types of collenquima tissue	2 hr theoretical 2 hr Practical	7
Oral and written tests	Theoretical lectures and laboratory practical part	Sklerinkiemie fabric	Identify the shapes and types of sklarnchemia tissue	2 hr theoretical 2 hr Practical	8
Oral and written tests	Theoretical lectures and laboratory practical part	Wood texture	Identify the forms and types of conveyor fabric (wood)	2 hr theoretical 2 hr Practical	9
Oral and written tests	Theoretical lectures and laboratory practical part	Bark texture	Identify the shapes and types of vector tissue (phloem)	2 hr theoretical 2 hr Practical	10

37. Infrastructure	
- Theoretical and practical lectures - General Anatomy Book – Plant anatomy 2 - Practical Anatomy Book	1- Required textbooks
	2- Main references (sources)
• Ashe, A.; L.J. Hickey; P. Wilf; B. Ellis; K. Johnson and S. Wing. 1999. Manual of Leaf architecture Morphological description and categorization of Dicotyledonous and net-veined Monocotyledonous angiosperms. Leaf architecture working Group, Smithsonian Institution, 65 pp • Carpenter, K. J. 2006. Specialized structures in the leaf epidermis of basal Angiosperms morphology, distribution, and homology. Amer. J. Bot. 93(5):665-681 • Fahn, A. 1974. Plant anatomy end ed. Pergamon press, New York. USA	1- Recommended books and references (scientific journals, reports, ...)
Search within the sites below Research gate Google scholar Academic Academy:	2- Electronic references, websites

38. Course Development Plan
Add comparative anatomical information between bicotyledons and monocots and between different plant family species

Practical plant anatomy / first semester / second stage

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

University of Baghdad – College of Science	39. Educational institution
Department of Life Sciences	40. University Department / Center
Anatomy of a plant	41. Course Name/Code
Traditional lecture in the laboratory	42. Available Attendance Forms
2022-2023 First Semester	43. Semester / Year
12 hours per week	44. Number of Credit Hours (Total)
1/10/2022	45. The history of preparation of this description
46. Course Objectives	
1- Identify the initial stages of plant cell formation and the stages of cell wall formation	
2- Study the types of walls and interstitial spaces	
3- Study the contents of the plant cell	
4- Studying the different types of plant tissues, including simple and composite, and then finding the different relationships between them to reach a final understanding of the internal structure of the plant body	

47. Learning outcomes and teaching, learning and assessment methods
A- Knowledge Objectives A1- Identify plant cells and their different walls and interstitial spaces A2- Identification of simple and complex tissues A3- Identify and study the different shapes and types of each fabric
B - Course skills objectives B1 – Dealing with both light and anatomical microscopy B2 - Study of various educational segments (slides) B3 – Learn different ways to accomplish and study plant anatomical slides
Teaching and learning methods
- The use of projectors for various practical and theoretical lectures - Use drawings and shapes on whiteboards - The use of ready-made and prepared educational slides - Electronic Lectures
Evaluation methods
- Oral tests - Electronic Tests - Written tests - Reporting
C- Emotional and value goals C1- Finding anatomical relationships between different plant families C2- Identify the importance of anatomy for the rest of the sciences C3- Identify the relationships between cells and identify the complex tissues from them
Teaching and learning methods
- The use of projectors for various practical lectures - Use of educational electronic platforms - Use drawings and shapes on whiteboards
Evaluation methods
- Oral tests - Written tests

d. General and rehabilitative skills transferred (other skills related to employability and personal development).

D1- Skills of preparing various plant anatomical slides

48. Course Structure					
Evaluation method	Method of education	Name of the unit/course or topic	Required Learning Outcomes	Hours	The week
Oral and written tests	Theoretical lectures and laboratory practical part	Plant cell wall	Identify the cell wall and intervals	2 hr Practical	1
Oral and written tests	Theoretical lectures and laboratory practical part	Plant cell contents	Recognize live and non-living content	2 hr Practical	2
Oral and written tests	Theoretical lectures and laboratory practical part	Meristem tissue	Identify meristem tissues and different theories of evolution	2 hr Practical	3
Oral and written tests	Theoretical lectures and laboratory practical part	Skin texture	Learn about skin texture and various accessories	2 hr Practical	4
Oral and written tests	Theoretical lectures and laboratory	Skin texture	Recognize stomatous complexes	2 hr Practical	5

	practical part				
Oral and written tests	Theoretical lectures and laboratory practical part	Parenchyma tissue	Identify the shapes and types of parenchyma tissue	2 hr Practical	6
Oral and written tests	Theoretical lectures and laboratory practical part	Colenzymic tissue	Identify the shapes and types of collenquima tissue	2 hr Practical	7
Oral and written tests	Theoretical lectures and laboratory practical part	Sklerinkiemie fabric	Identify the shapes and types of sklarnchemia tissue	2 hr Practical	8
Oral and written tests	Theoretical lectures and laboratory practical part	Wood texture	Identify the forms and types of conveyor fabric (wood)	2 hr Practical	9
Oral and written tests	Theoretical lectures and laboratory practical part	Bark texture	Identify the shapes and types of vector tissue (phloem)	2 hr Practical	10

49. Infrastructure	
- Theoretical and practical lectures - General Anatomy Book – Plant anatomy 2 - Practical Anatomy Book	1- Required textbooks
	2- Main references (sources)
• Ashe, A.; L.J. Hickey; P. Wilf; B. Ellis; K. Johnson and S. Wing. 1999. Manual of Leaf architecture Morphological description and categorization of Dicotyledonous and net-veined Monocotyledonous angiosperms. Leaf architecture working Group, Smithsonian Institution, 65 pp • Carpenter, K. J. 2006. Specialized structures in the leaf epidermis of basal Angiosperms morphology, distribution, and homology. Amer. J. Bot. 93(5):665-681 • Fahn, A. 1974. Plant anatomy end ed. Pergamon press, New York. USA	1- Recommended books and references (scientific journals, reports, ...)
Search within the sites below Research gate Google scholar Academic Academy:	2- Electronic references, websites

50. Course Development Plan
Add comparative anatomical information between bicotyledons and monocots and between different plant family species

Chapter One: Stage Two: Entomology

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad/college of science
2. University Department/Centre	Department of Biology
3. Course title/code	**Entomology**
4. Program(s) to which it contributes	Bachelor in Biology
5. Modes of Attendance offered	Teaching Lecture
6. Semester/Year	2023- 2022
7. Number of hours tuition (total)	15 weeks
8. Date of production/revision of this specification	1/ 10/ 2022

9. Aims of the Course

- Learn the basic principles of entomology
  competition among outstanding students in order to obtain better job opportunities in the field of insect research
- Competition among outstanding students in order to obtain opportunities to apply for postgraduate studies in the field of specializations related to entomology
- Building the student's scientific and intellectual capabilities and qualifications in order to communicate in his field of work, whether inside or outside Iraq
- Preparing a qualified graduate cadre to work in the field of insect specialization
- 6- Providing advice and information related to the study of insects to state institutions and departments and to individuals as a service to civil society.

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10· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- **Knowledge and Understanding**:

A1- is the field that provides scientific names for insects, describes them, preserves collections of them.

A2- provides classifications for the insects, keys for their identification.

A3- investigates their importance, and considers their environmental adaptations.

A4- classifications of insects and studying of their internal and external

structural

B. Subject-specific skills:

B1. Including the scientific names of insects, species descriptions and overviews, taxonomic orders, and families

B2. Studying the external and internal structures of insects and the differentiation between extinct and living insect groups.

B3. Explaining the insects biodiversity of the planet.

Teaching and Learning Methods

Preparation of PowerPoint lectures and the use of the presentation screen, using charts of the most prominent information from modern sources

Assessment methods

Weekly, monthly and quarterly tests with reports on related topics

C. Thinking Skills:

C1- Developing the student's ability to learn about the diagnosis of insects in his environment

C2- prepare the student in a way that qualifies him to deal with insects in his environment

Teaching and Learning Methods

By lecturing using the latest methods used in the rugged universities

Assessment methods

1- Directly: the quarterly and monthly written exams2. Indirect: oral tests

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First week	5h	Introduction in Entomology	Why are insects, so successful on earth? Insect Morphology The Importance of Insects to Humans, Environment & Agriculture	PowerPoint + L.C.D	
second week	5h	Basic Insect Morphology Head, Mouthparts types	The exoskeleton, The Head, Head appendages, Types of mouthparts	PowerPoint + L.C.D	written exam
Third week	5h	Head appendage Antennae	Types of Antennae	PowerPoint + L.C.D	
Fourth week	5h	Thorax Thorax appendages Insect legs Insect wings	Types of legs Wings funcions Types of wings	PowerPoint + L.C.D	
Fifth week	5h	Thorax Insect wings	Coupling mechanism in insect wings Wing Venation	PowerPoint + L.C.D	
Sixth week:	5h	Insect Abdomen Abdomen Appendages	Insect Abdomen Abdomen Appendages	PowerPoint + L.C.D	written exam
Seventh week:	5h	Integument (the body wall)	Structure of integument Integument processes Apodemes	PowerPoint + L.C.D	
Eighth week	5h	Internal anatomy Digestive system	Alimentary Canal 1- -foregut 2-midgut 3-Hindgut Salivary gland	PowerPoint + L.C.D	
Ninth week and Tenth week:	5h	Respiratory system	The spiracles: The tracheae and tracheoles: Gas Exchange in Aquatic Insects Gas Exchange in Endoparasitic Insects:	PowerPoint + L.C.D	written exam
Eleventh week	5h	Nervous system Circulatory system	Brain and a ventral nerve cord	PowerPoint +	

				L.C.D	
Twelfth week and thirteenth week	5h	Reproductive system	Female Reproductive system Male Reproductive system	PowerPoint + L.C.D	written exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	• Imms Outlines Of Entomology, O.W Richards and R. G. Davies, Chapman And Hall, 1978 • Principle Of Insect Morphology, E.J. Boell, R. E. Snodgrass 1935 New York And London • The Insects Structure And Function.
Special requirements (include for example workshops, periodicals, IT software, websites)	• www.bio.org • www.khanacademy.org • www.nature.com
Community-based facilities (include for example, guest Lectures , internship , field studies)	Rees, D. (2004). Insects of stored products SCIRO. Publishing,Colling Wood ,Australia

13. Admissions	
Pre-requisites	Bachelor in Biology
Minimum number of students	
Maximum number of students	

COURSE SPECIFICATION
General Entomology Lab./ Undergraduate Students
2022-2023

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Baghdad/college of science
2. University Department/Centre	Department of Biology
3. Course title/code	**General Entomology Lab.**
4. Programme(s) to which it contributes	Bachelor in Biology
5. Modes of Attendance offered	Teaching Lecture
6. Semester/Year	2022-2023
7. Number of hours tuition (total)	15 weeks
8. Date of production/revision of this specification	1/10/2022
9. Aims of the Course	
Study of the order of Insecta, in general and their Morphology, Anatomy Developments and life histories of insects Relationships and their habits and habitats .	

10· Learning Outcomes, Teaching ,Learning and Assessment Methode
B- **Knowledge and Understanding**: A1- is the field that provides scientific names for insect describes them, preserves collections of them. A2- provides classifications for the insects, and for their identification. A3- investigates their anatomy, and considers their environmental habitat. A4- classifications of life histories of insects.
B. Subject-specific skills: B1. Including the scientific names of insects, species descriptions and overviews, taxonomic orders, and classifications of evolutionary and insects histories B2. Studying the diversity of organisms and the differentiation between extinct and living creatures. Biologists study the well-understood relationships between thim B3. Explaining the biodiversity of the insects orders. The systematic study is that of conservation

Teaching and Learning Methods
Preparation of PowerPoint lectures and the use of the presentation screen, using charts of the most prominent information from modern sources
Assessment methods
Weekly, monthly and quarterly tests with reports on related topics
C. Thinking Skills: C1- Developing the student's ability to learn about the diagnosis of living organisms in his environment C2- prepare the student in a way that qualifies him to deal with living organisms in his environment
Teaching and Learning Methods By lecturing using the latest methods used in the rugged universities
Assessment methods
1- Directly: the quarterly and monthly written exams2. Indirect: oral tests

D. **General and Transferable Skills (other skills relevant to employability and personal development)**

D1- Providing the student with the special experiences of collecting, describing and classifying the modelsD2- provide the students with the scientific methods to perform a research

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First week	3h	Introductory remarks (Definition of the insect relationships with other Arthropods) Insects Techniques		PowerPoint + L.C.D	
second week	3h	The body parts (head , Antennae (American cockroaches		PowerPoint + L.C.D	written exam

Third week	3h	(Antennae, mouth parts) (American cockroaches)		PowerPoint + L.C.D	
Fourth week	3h	((American cockroaches) (thorax, abdomen, sex differentiation)		PowerPoint + L.C.D	
Fifth week	3h	Locust (thorax, abdomen, sex differentiation)		PowerPoint + L.C.D	
Sixth week:	3h	(American cockroaches) (Thorax appendages (legs and wings)		PowerPoint + L.C.D	written exam
Seventh week:	3h	Internal Anatomy : Respiratory and circulatory system, Alimentary canal, digestive glands (American cockroaches)		PowerPoint + L.C.D	
Eighth week	3h	Internal Anatomy : Reproductive system (American cockroaches)		PowerPoint + L.C.D	
Ninth week and Tenth week:	3h	Internal Anatomy : Reproductive and nervous system (American cockroaches)		PowerPoint + L.C.D	written exam
Eleventh week	3h	Types of mouth parts		PowerPoint + L.C.D	
Twelfth week thirteenth week	3h	Types of Antenna Type of the Legs		PowerPoint + L.C.D	written exam
Fourteenth week	3h	Types of wings, wings venation and wing –coupling apparatus			
fiftenth week	3h	Development and metamorphosis, embryology, development			

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	• Imms outlines of entomology , O.W Richards and R. G. Davies, chapman and hall , 1978 • Principle of insect morphology, E.J. Boell , R. E. Snodgrass 1935 New York and london • The insects structure and function.

Special requirements (include for example workshops, periodicals, IT software, websites)	Scholarly articles from journal of taxonomy and biosystematics
Community-based facilities (include for example, guest Lectures , internship , field studies)	(field studies from different environments)

13. Admissions	
Pre-requisites	Bachelor in Biology
Minimum number of students	
Maximum number of students	

Chapter One: Second Stage: Invertebrates

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the description of the programme.

University of Baghdad - College of Science	1. Educational institution
Department of Life Sciences	2. Scientific Department / Center
Invertebrate Science - Theoretical Section	3. Course Name/Code
Traditional lecture	4. Available Attendance Forms

First Semester/2022-2023	5. Semester / Year
4 hours	6. Number of Credit Hours (Total)
1/10/2022	7. The history of preparation of this description
8. Course Objectives	
A taxonomy, anatomical and physiological study of invertebrate animals that are free to live, starting from the lowest animal reefs gradually to the most developed	
Study of invertebrate animals widespread in terrestrial and aquatic nature	

9. Course Outcomes and Methods of Teaching, Learning and Assessment
A- Knowledge Objectives A1- Classification of invertebrate animals A2- Study of the characteristics of animal divisions belonging to invertebrates A3- Comparison between these animal populations A4- Phenotypic and anatomical study of invertebrate animals A5- A6-
B - Course skills objectives B1 – Diagnosis of invertebrate animals B2 – Classification of invertebrate animals B3 - B4-
Teaching and learning methods
Use presentations in each lecture and use multiple teaching methods (discussion, inquiry, brainstorming)

Support by displaying images of animal models and showing some videos of the movement and nutrition of some invertebrates
Give the student the opportunity to search for similar materials and discuss them in the next lesson.
Publish lectures on the website.

Evaluation methods

Daily exams
Semester Exams
Student activity through commitment to homework preparation
Take home exam
Use questions that provoke reflection and analysis and provide typical answers to periodic test questions.

C- Emotional and value goals

C1- Environmental Preservation
C2- Conservation of natural resources
C3- Identify the importance of invertebrate animals as part of the ecosystem
A4-

Teaching and learning methods

Use presentations in each lecture and use multiple teaching methods (discussion, inquiry, brainstorming)
Support by displaying images of animal models and showing some videos of the movement and nutrition of some invertebrates
Give the student the opportunity to search for similar materials and discuss them in the next lesson.
Publish lectures on the website.

Evaluation methods

Daily exams
Semester Exams
Student activity through commitment to homework preparation

d. General and rehabilitative skills transferred (other skills related to employability and personal development).

D1- The skill of diagnosing samples belonging to invertebrates
D2- The skill of choosing the appropriate tool for classifying invertebrate animals
D3- **The student's field of work and its relationship to the subject**

D2- Guiding the student and developing the desire to specialize in the field of biological laboratories
D3- Expanding the student's ability to distinguish between invertebrate animals
D4-

10. Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Daily exams	Use presentations in each lecture and use multiple teaching methods (discussion, inquiry, brainstorming) Reinforcement by viewing animal model images	Introduction and importance of invertebrates for diets + flagellates + ciliary	Primary invertebrates	12	1+2
Daily exams	Use presentations in each lecture and use multiple teaching methods (discussion, inquiry, brainstorming) Reinforcement by viewing animal model images	Sponges Division	Spongy invertebrates	6	3
Daily exams	Use presentations in each lecture and use multiple teaching methods (discussion, inquiry, brainstorming) Reinforcement by viewing animal model images	Stingrays Division	Aquatic invertebrates	12	4 + 5

Semester Exams	Use presentations in each lecture and use multiple teaching methods (discussion, inquiry, brainstorming) Reinforcement by viewing animal model images	Flatworms and nematodes	Vertebrates	12	6 + 7
Daily exams	Use presentations in each lecture and use multiple teaching methods (discussion, inquiry, brainstorming) Reinforcement by viewing animal model images	Arthropods Division	Arthropod invertebrates	12	8 + 9
Daily exams	Use presentations in each lecture and use multiple teaching methods (discussion, inquiry, brainstorming) Reinforcement by viewing animal model images	Nawaem Division	Aquatic invertebrates	12	10 + 11
Semester Exams	Use presentations in each lecture and use multiple teaching methods	Spinal division of the skin	Aquatic invertebrates	6	12

	(discussion, inquiry, brainstorming) Reinforcement by viewing animal model images				

11. Infrastructure	
Verma, P.S., 2001. *Invertibrate Zoology*. S. Chand Publishing Murad, Murad Baba (1979), Invertebrates, Baghdad University Press	1- Required textbooks
Verma, P.S., 2001. *Invertibrate Zoology*. S. Chand Publishing. Ruppert, E.E., Barnes, R.D. and Fox, R.S., 2004. *Invertebrate zoology: a functional evolutionary approach* (No. 592 RUPi).	2- Main references (sources)
Ruppert, E.E., Barnes, R.D. and Fox, R.S., 2004. *Invertebrate zoology: a functional evolutionary approach* (No. 592 RUPi).	A) Recommended books and references (scientific journals, reports, ...)
C) Australian Museum Online: Zoology Includes pages on many different groups of marine invertebrates. D) Biodiversity Information Serving Our Nation (BISON) BISON is an information system developed by the U.S. Geological Survey's Core Science Analytics and Synthesis Program that allows users to access, explore, and download U.S. species occurrence data from participating data providers. E) The Complete Works of Charles Darwin Online From University of Cambridge. F) Encyclopedia of Life Synthesizes biodiversity knowledge about all known species, including their taxonomy, geographic distribution, collections, genetics, evolutionary history, morphology, behavior, ecological relationships, and importance for human well being.	B) Electronic references, websites, ...

12. Course Development Plan

Provide a course description at the beginning of the academic year Using modern sources and teaching methods that depend in some of their joints on the student's endeavor to discuss some of the points raised in the lesson and adopting lectures based on support by displaying pictures of animal models and displaying some videos of the movement and nutrition of some invertebrates Giving the student an opportunity to search for similar materials and discuss them in the next lesson.

Chapter One: Second Stage: Computers

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

University of Baghdad - College of Science	13. Educational institution
Department of Life Sciences	14. Scientific Department / Center

Computer Science1	15. Course Name/Code
Traditional + electronic lecture	16. Available Attendance Forms
2022-2023 Chapter One	17. Semester / Year
18 Practical	18. Number of Credit Hours (Total)
1-10-2022	19. The history of preparation of this description
20. Course Objectives	
• The student learns problem-solving strategies in an advanced way	
Teach the student how to think and how to develop computerized solutions to the mathematical problems he faces, as well as teach him to commit and master to benefit from them in the fields of scientific and professional life.	

21. Course Outcomes and Methods of Teaching, Learning and Assessment
A- Knowledge Objectives A1- A1- The student should be able to benefit from programming to solve all types of mathematical equations computerically. A2. Mathematics is the basis of all science and programming helps in the process of solving mathematical problems related to gene programming and making complex statistical tables in a professional manner.
B - Course skills objectives B1 - Use legends and calculate the expected results on the board B2 – Implementation of programs on the computer and analysis of outputs B3 – Preparing reports on the subject

C- Thinking skills C1- Solving simple and complex equations C2 Identify the results of programs before their implementation C3- Developing the efficiency of working on the computer
Evaluation methods
Weekly - monthly and quarterly tests - preparation of reports
Teaching and learning methods
Implementing programs on the computer practically and comparing and analyzing the resulting outputs The use of illustrative means and modern sources of the information network. Using Data Show
Evaluation methods
Weekly - monthly and quarterly tests - preparation of reports
d. General and rehabilitative skills transferred (other skills related to employability and personal development). - General and transferable skills (other skills related to employability and personal development). D1- Directing the student on the importance of using computers in all fields of biological laboratories. D2- Directing the student to use the programming language to solve mathematical, statistical and chemical problems.

22. Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Weekly Exams	Data Show + Practical work on PC	Spread Sheets	Working with Spredsheets	18	1 + 2 + 3
			Entering spreadsheet data		4 + 5 + 6
			BUILDING **FORMULAS**		7 + 8 + 9
			Using spreadsheet functions		10 + 11 + 12

23. Infrastructure	
Lectures scheduled by the professor of the subject - course books + modern sources from the Internet. • "Computer Fundamentals and Office Applications" Part II approved by the Ministry of Higher Education and Scientific Research. • Microsoft Office Professional 2010 step by step 1st Edition, 2011. Computing Fundamentals: IC3 Edition, 2014.	3- Required textbooks
www.edx.org , www.microsoft.com	4- Main references (sources)
Computer Simulations of Imaging Astronomical Objects Through Kolmogorov Turbulence, 2017.	G) Recommended books and references (scientific journals, reports, ...)
Phased diploid genome assembly with single-molecule real-time sequencing, 2016	H) Electronic references, websites, ...

24. Course Development Plan
Google Sheets instead of Microsoft Excel

Chapter One: Second Stage: Plant Groups

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

University of Baghdad
Faculty of Science / Department o
Plant groups
Traditional lecture
First Semester / Second Year 202
Two hours of work
1/10/2022
32. Course Objectives
33. Course Objectives This course aims to:
- **Classification of algae**
- Study the characteristics of
- Algae microscopy
- Diagnosis of algae
- Know the characteristic of e

34. Course Outcomes and Methods of Teaching, Learning and Assessment
A- Knowledge Objectives A1- Isolation and distillation of algae A2- Classification of algae A3- Study of the properties of algae A4- Knowledge of distinctive qualities A5- Knowledge of the characteristics of plant groups A6-
B - Course skills objectives B1 – Know how to diagnose and purify algae B2 – Diagnosis of algae based on characteristic characteristics B3 – Study of the evolution of groups B4-
Teaching and learning methods
Relying on giving the student theoretical lectures and then training the student to conduct practical experiments related to theoretical lectures.
Evaluation methods
Student attendance, participation, daily and quarterly exams
d. General and rehabilitative skills transferred (other skills related to employability and personal development). D1- The student acquires the skill of predicting the future shape of plants based on microscopic traits D2- D3- D4-
C- Emotional and value goals C1- Algae isolation and purification C2Utilization of pure algae C3- Diagnostic ability C4- Know the distinctive characteristics of plant groups

35. Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Attendance and exam	Microscopy	Bluish-green algae	Diagnosis and study of characteristics	2	1
Attendance and exam	Microscopy	Green algae	Diagnosis and study of characteristics	2	2
Attendance and exam	Microscopy	Green algae	Diagnosis and study of characteristics	2	3
Attendance and exam	Microscopy	Green algae	Diagnosis and study of characteristics	2	4
Attendance and exam	Microscopy	Brown algae	Diagnosis and study of characteristics	2	5
Attendance and exam	Microscopy	Red algae	Diagnosis and study of characteristics	2	6
Attendance and exam	Microscopy	Moss	Diagnosis and study of characteristics	2	7

36. Infrastructure	
Practical plant groups	5- Required textbooks
Plant Physiology by L. Taiz and E. Zeiger (5th edition), (2010).	6- Main references (sources)
2- Introduction to Plant Physiology by W.G. Hopkins and N. P. A. Huner (2008).	I) Recommended books and references (scientific journals, reports, ...)
Plant Groups - H. Mukherji - Google Books	J) Electronic references, websites, ...

37. Course Development Plan

Isolation and purification of algae and diagnosis of various types of algae

Chapter One: Second Stage: English Language

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

University of Baghdad - College of Science - Department of Life Sciences	38. Educational institution
Department of Life Sciences	39. Scientific Department / Center
Headway Pre-intermediate English Course	40. Course Name/Code
Guiding students to learn and develop their basics in learning English	41. Available Attendance Forms
2022 – 2023	42. Semester / Year
Two hours a week	43. Number of Credit Hours (Total)
1\10\2022	44. The history of preparation of this description
45. Course Objectives	
1- Guiding students to understand and learn English instead of the traditional method used by reading examples in the methodological book	
2- Encourage students to talk about some daily activities in their lives using English	

3- The sources of teaching skills in the methodological book, which students are trained to use, are articles from newspapers, magazines, song clips, short stories, radio programs, and English and American sources.
4- Introducing students to how to deal in daily life, whether in markets, restaurants, university or in a government building in English-speaking countries
5- Developing students' ability to listen and understand English conversation by presenting some educational videos during the lecture and making a listening test during the semester exams

46. Course Outcomes and Methods of Teaching, Learning and Assessment
A- Knowledge Objectives A1- Students' knowledge of new English vocabulary that they did not learn in their previous years of study A2- Dealing in public places in English-speaking countries and providing an opportunity to learn about some of the culture of those countries A3- A4- A5- A6-
B - Course skills objectives B1 - Focus on understanding and developing English grammar skills B2 - Develop students' knowledge and understanding of reading skills and understanding of texts written in English B3 - How to make a panel discussion on a topic B4-
Teaching and learning methods
1- Use of electronic queuing technology Google Classroom 2- Use of devices Data show and Power point for the lecture. 3- Use of the blackboard 4- Reporting. 5- Homework
Evaluation methods
1- Ask questions on the electronic classes website and answer them online

2- Ask deductive questions during the lecture.
3- Written tests after the lecture.
4- Semester exams for a group of lectures.
5- Reporting
6- Homework

C- Emotional and value goals
C1- Oral and written deductive tests
C2- Reporting
A3-
A4-

d. General and rehabilitative skills transferred (other skills related to employability and personal development).
D1- The possibility of interpreting the results according to the scientific facts studied and learned by the student
D2- Applying the concepts and foundations received by the student in the practical side of life
D3-
D4-

47. Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Daily exam or brief report	Electronic lectures and educational videos	Getting to know you	A review of the use of tenses and how to formulate them and the use of some expressions in English	2	First
Daily exam or brief report	Electronic lectures and educational videos	The way we live	Using the Present Tense and Using the Expression Have and Have Got	2	Second
Daily exam or brief report	Electronic lectures and educational videos	It all went wrong	Using the past tense and expressing time	2	Third
Daily exam or brief report	Electronic lectures and educational videos	Let's go shopping	Use of tools to express quantity and number	2	Fourth
Daily exam or brief report	Electronic lectures and educational videos	What do you want to do	Use verb patterns and the formula of the future	2	V
Daily exam or brief report	Electronic lectures and educational videos	Tell me! What is it like	Using the term what is it like Recipes comparison and preference	2	Sixth
Daily exam or brief report	Electronic lectures and	Famous couples	Use the present perfect tense and use its	2	Seventh

	education al videos		complement since and for		
Daily exam or brief report	Electronic lectures and education al videos	Do's and don'ts	Use of the term have got to , must and should	2	Eighth
Daily exam or brief report	Electronic lectures and education al videos	Going places	Use time lines and conditional if	2	Ninth
Daily exam or brief report	Electronic lectures and education al videos	Scared to death	The use of verb patterns - part two - and how to use the term manage to and used	2	X

48. Infrastructure	
Headway Pre-intermediate	7- Required textbooks
Headway Pre-intermediate	8- Main references (sources)
Stories and books in English language	K) Recommended books and references (scientific journals, reports, ...)
YouTube teaching videos and https://www.dictionary.com/	L) Electronic references, websites, ...

49. Course Development Plan
Encouraging students to speak English by activating hearing and speaking in English and holding seminars to break the barrier of fear and speak English

Course Description

Chapter One / Third Stage: **Histology**

This course description provides a summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he has made the most of the available learning opportunities. It must be linked to the program description.

University of Baghdad - College of Science	50. Educational institution
Department of Life Sciences	51. University Department / Center
Practical tissues	52. Course Name/Code
Bachelor of Life Sciences	53. Programs in which he enters
Traditional lecture	54. Available Attendance Forms
2022-2023	55. Semester / Year
36 hours (12 working weeks (3 hours per week)	56. Number of Credit Hours (Total)
1\10\2022	57. The history of preparation of this description
58. Course Objectives	
Teach the student how to: 1- The student is introduced to the basic concepts in histology 2- The student learns about the exact structure of the body's systems 3- The student learns how to take and prepare the textile sections and dyes used in those sections	

59. Learning outcomes and teaching, learning and assessment methods

A. Knowledge and understanding A1- The student learns on the exact structure of the organs and systems of the body. A2- Comparison between tissue types and the characteristics of each type A3- How to prepare and examine the tissue sections of the human body organs.
B - Subject-specific skills B1 – The use of illustrations from atlases in addition to some animations. B2 – Presentation of the explanatory explanation of the sections examined by the student using the data show technology
Teaching and learning methods
1. Use Data show power point and 2- Using illustrative means and modern sources of the information network. 3- Presenting some pictures of textile sections and explaining their components.
Evaluation methods
Weekly - monthly tests - preparation of reports

60. Course Structure					
Evaluation method	Method of education	Name of the unit/course or topic	Required Learning Outcomes	Hours	The week
Weekly exams and oral questions	Data show	Epithelial and glandular tissue	**Epithelial tissue and Glands**	18	1+2+3
Weekly exams and oral questions	Data show	Bonding tissues	**Loose &dense connective tissue Cartilage & Bone Blood & Haemopoietic tissue**	18	4+5+6
Weekly exams and oral questions	Data show	Muscle tissue	**Muscles**	18	7+8+9
Weekly exams and oral questions	Data show	Nervous tissue	**Nerves**	18	10+11+12
			Exam		

61. Infrastructure	
Laboratories prescribed by the subject professor - course books (practical histology) **Reference:** **Basic Histology, Text and Atlas. Luiz Carlos Junqueira, 11th ed. McGrow-Hills, 2014.**	Required readings: ▪ Basic texts ▪ Course Books ▪ Other
1. Dongmei Cui et al., (2010). Atlas of Histology with Functional and Clinical Correlations. 2. Robert L. Sorenson (2008). Atlas of Human Histology	Special requirements (e.g. workshops, periodicals, software and websites)

62. Acceptance	
	Prerequisites
	Minimum number of students

	The largest number of students

Practical Tissue / Third Stage - First Semester

This course description provides a summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he has made the most of the available learning opportunities. It must be linked to the program description.

University of Baghdad - College of Science	63. Educational institution
Department of Life Sciences	64. University Department / Center
Practical tissues	65. Course Name/Code
Practical Lab	66. Available Attendance Forms
2022-2023	67. Semester / Year
36 hours (12 working weeks (3 hours per week)	68. Number of Credit Hours (Total)
1\10\2022	69. The history of preparation of this description
70. Course Objectives	
Teach the student how to: 3- The student is introduced to the basic concepts in histology 4- The student learns about the exact structure of the body's systems 3- The student learns how to take and prepare the textile sections and dyes used in those sections	

71. Learning outcomes and teaching, learning and assessment methods

A. Knowledge and understanding A1- The student learns on the exact structure of the organs and systems of the body. A2- Comparison between tissue types and the characteristics of each type A3- How to prepare and examine the tissue sections of the human body organs.
B - Subject-specific skills B1 – The use of illustrations from atlases in addition to someanimations. B2 – Presentation of the explanatory explanation of the sections examined by the student using the data show technology
Teaching and learning methods
1. Use Data show power point and 2- Using illustrative means and modern sources of the information network. 3- Presenting some pictures of textile sections and explaining their components.
Evaluation methods
Weekly - monthly tests - preparation of reports

72. Course Structure					
Evaluation method	Method of education	Name of the unit/course or topic	Required Learning Outcomes	Hours	The week
Weekly exams and oral questions	Data show	Epithelial and glandular tissue	**Epithelial tissue and Glands**	18	1+2+3
Weekly exams and oral questions	Data show	Bonding tissues	**Loose &dense connective tissue Cartilage & Bone Blood & Haemopoietic tissue**	18	4+5+6
Weekly exams and oral questions	Data show	Muscle tissue	**Muscles**	18	7+8+9
Weekly exams and oral questions	Data show	Nervous tissue	**Nerves**	18	10+11+12
			Exam		

73. Infrastructure	
Laboratories prescribed by the subject professor - course books (practical histology) **Reference:** **Basic Histology, Text and Atlas. Luiz Carlos Junqueira, 11th ed. McGrow-Hills, 2014.**	Required readings: ▪ Basic texts ▪ Course Books ▪ Other
3. Dongmei Cui et al., (2010). Atlas of Histology with Functional and Clinical Correlations. 4. Robert L. Sorenson (2008). Atlas of Human Histology	Special requirements (e.g. workshops, periodicals, software and websites)

74. Course Development Plan
Add up-to-date sources and explainer videos for some textile clips

Chapter One: Third Stage: Ecology

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the description of the programme.

University of Baghdad – College of Science	75. Educational institution
bioscience	76. Scientific Department / Center
Theoretical ecology	77. Course Name/Code
Traditional lecture	78. Available Attendance Forms
2022-2023	79. Semester / Year
12 hours	80. Number of Credit Hours (Total)
1/10/2022	81. The history of preparation of this description
82. Course Objectives	
1. The student is introduced to the basic concepts of ecology	
2. The importance of the environment in our lives	
3. The student learns the basic components of the environment in which he lives	
4. The student learns about how nutrients and energy circulate in ecosystems	

83. Course Outcomes and Methods of Teaching, Learning and Assessment
A- Knowledge Objectives A1- The student learns what the environment is mainly A2- The student learns how to balance ecosystems and how to deal with the components of the environment A3- A4- A5- A6-
B - Course skills objectives B1 – The student learns the skills of dealing with the environment B2 - B3 - B4-
Teaching and learning methods
1. Using the projector 2. Use drawings and diagrams on the board
Evaluation methods
Written tests Asking intellectual questions during the lecture
C- Emotional and value goals A1- A2- A3- A4-
Teaching and learning methods
1. Using the projector 2. Use drawings and diagrams on the board

Evaluation methods
Written and oral tests
d. General and rehabilitative skills transferred (other skills related to employability and personal development). D1- Guiding the student and developing his desire to specialize D2 - Expanding the student's ability to understand the environment and its basic components D3- D4-

2. Course Structure

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Daily tests	Traditional lecture and projector use	**Introduction to Ecology and Ecosystem**	General introduction to ecology and the development of this science historically and the general structure of environmental systems	2	First
Daily tests	Traditional lecture and projector use	**Ecosystem structure: A biotic environmental factors**	The student is introduced to the concept of determinants and their environmental laws	2	Second
Daily tests	Traditional lecture and projector use	**The physical factors as limiting factors And ecological rules**	In this lecture, the student learns about physical factors as determinants. and the concept of environmental rules	2	Third
Daily tests	Traditional lecture and projector use	**Light And Biological clocks**	This week, the student learns on light as a determining factor and on the concepts of navigation systems and biological	2	Fourth

			clocks in animals.		
Daily tests	Traditional lecture and projector use	**Water** **Biogenic salts** **The bio-indicators**	In this lecture, the student learns on the concepts of osmotic regulation, biogenerative salts and environmental reagents.	2	V
Daily tests and semester exams	Traditional lecture and projector use	**Biotic components of ecosystems**	In this lecture, the student learns about the vital components of the ecosystem and some characteristics of the population group.	2	Sixth
Daily tests	Traditional lecture and projector use	**Population growth models**	In this lecture, the student will learn about the patterns and models of growth of population groups	2	Seventh
Daily tests	Traditional lecture and projector use	**Biotic community**	The student is introduced to the concept of biological communities and the concept of environmental succession	2	Eighth

Daily tests	Traditional lecture and projector use	**Energy flow through ecosystem**	This week, the student will learn about how energy flows in the ecosystem	2	Ninth
Daily tests	Traditional lecture and projector use	**Ecosystem function– Biogeochemical cycles (cycling of nutrients in ecosystem)**	This week, the student will learn about the concepts of biogeochemical courses and nutrient circulation in environmental systems.	2	X
Daily tests	Traditional lecture and projector use	**Nitrogen cycle**	The student learns in a focused way how nitrogen circulates in the ecosystem	2	Eleventh
Daily tests	Traditional lecture and projector use	**Ecosystem diversity: Freshwater ecosystems**	This week, the student learns about the diversity of ecosystems with a look at the freshwater system	2	Twelfth

3. Infrastructure	
Lectures prepared by the professors of the subject	9- Required textbooks
The Foundations of Ecology by A.B. ODM	10- Main references (sources)
. 1. Bascompte, J. 2010. Structure and dynamics of ecological networks. *Science* 329:765-766.	M) Recommended books and references (scientific journals, reports, ...)

2. King, A. A., and W. C. Schaffer. 2001. The geometry of a population cycles: A mechanistic model of snowshoe demography. *Ecology* 82:814–830. 3. Dean Boer, P. 1981. On the survival of populations in a heterogeneous and variable environment. *Oecologia* 50:39–53 4. Assigning students to prepare reports on various environmental topics and issues	
1. https://byjus.com/biology/ecology/ 2. https://www.nationalgeographic.org/encyclopedia/ecology/ 3. https://plato.stanford.edu/entries/ecology/	N) Electronic references, websites, ...

5. Course Development Plan
Add any new or discovered information in the field of ecology to the lectures

Chapter One: Third Stage: Physiology of Microbiology

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the description of the programme.

University of Baghdad – College of Science	84. Educational institution
Department of Life Sciences	85. Scientific Department / Center
Practical microbiology physiology	86. Course Name/Code
Laboratory lecture	87. Available Attendance Forms
First Semester / 2022-2023	88. Semester / Year
Theoretical 4 hours per week + practical 8 hours per week (two hours per group)	89. Number of Credit Hours (Total)
1/10/2022	90. The history of preparation of this description
91. Course Objectives	
- Introducing students to the agricultural media for the development of microorganisms, their usefulness and how to prepare them practically	
- Addressing methods of measuring the growth of microorganisms theoretically and practically	
- Knowledge of the growth curve and growth phases and how to calculate growth mathematically and practically	

- How to estimate the outcome of microbial growth theoretically and practically
- The effect of physical and chemical factors, especially the effect of temperature as a growth factor for microorganisms theoretically and practically
- Addressing the use of heat as a destructive factor for microorganisms theoretically and practically **- Study of antimicrobial factors, the most important of which are detergents and knowledge of the mechanism of their work and their impact on microscopic cells theoretically and practically**

92. Course Outcomes and Methods of Teaching, Learning and Assessment
A- Knowledge Objectives A1- Introducing students to what happens during the growth of microbiological cells from a physiological point of view A2- Clarifying the sequence of phases that the microorganism passes through during the incubation period A3- Giving students an idea of how to calculate the growth during the incubation period through mathematical equations A4- Drawing growth curves graphically with logarithmic semi-papers A5- Clarifying how to take advantage of heat as a controlling factor on the growth of microorganisms and clarifying the practical methods used for this purpose A6- Explain how chemicals are used as agents against microbial and evaluate the action and efficiency of these substances in practice
B - Course skills objectives B1 - Practical experiments that clarify everything that matters to the physiological aspect of microbiology B2 – Graphs of growth curves and curves of destruction or resistance to microorganisms B3 – Evaluation of the efficiency of the work of any detergent in terms of cleaning or disinfection chemically and mechanically
Teaching and learning methods

Conducting scientific experiments that clarify the main objective of the scientific content given to students and extracting the results to clarify and deliver the scientific idea in a practical way
Evaluation methods
Students are evaluated through daily tests, monthly tests, technical tests in practical experiments and reports on scientific material
C- Emotional and value goals C1- Giving daily and monthly questions to know the extent to which students absorb the scientific material C2- Conducting practical experiments C3- Chart on semi-logarithmic papers C4- Weekly Reports
Teaching and learning methods
Involving students in scientific and practical experiments and guidance in mathematical calculations that benefit the scientific material and creating a discussion atmosphere about what is going on in the material to deliver the largest possible amount of scientific material, relying on methodological books and scientific research and using the Internet to benefit from modern scientific information
Evaluation methods
Evaluation by conducting semester and daily exams and practical reports, taking into account the student's activity during practical experiments and answering the questions posed during the presentation of the scientific material.

d. General and rehabilitative skills transferred (other skills related to employability and personal development).

D1- Employing the aforementioned skills and the possibility of developing them

D2- Benefiting from practical experiences and various laboratory experiments

D3-

93. Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Daily and quarterly tests and reports	Theoretical explanation and practical experiments	Preparation of planting media	Teaching students how to prepare agricultural media for the development of microorganisms	4	First
Daily and quarterly tests and reports	Theoretical explanation and practical experiments with illustrations	Bacterial growth	Study and define changes within the microbial cell from a physiological point of view	4	Second
Daily and quarterly tests and reports	Theoretical explanation and practical experiments with drawings and illustrations	Bacterial growth curve	Study and clarify the stages and phases that microbial cells go through during the incubation period	4	Third
Daily and quarterly tests and reports	Theoretical explanation and practical experiments with	Mathematical calculations of bacterial growth	Define how to calculate the number of microbial generations and the generation time of an organism	4	Fourth

	illustrations		during the growth period		
Daily and quarterly tests and reports	Theoretical explanation and practical experiments with illustrations and illustrations	Growth Outcome	Definition of bio-applications	4	V
Daily and quarterly tests and reports	Theoretical explanation and practical experiments with illustrations and illustrations	Factors affecting microbial growth	outline the effect of temperatures as a growth factor,	4	Sixth
Daily and quarterly tests and reports	Theoretical explanation and practical experiments with illustrations and illustrations	The effect of heat as an agent against microbial	The effect of heat on growth and its use as a deciding agent for microorganisms	4	Seventh
Daily and quarterly tests and reports	Theoretical explanation and practical	The effect of heat as an agent against microbial	The use of chemicals as sterilizers and detergents and the evaluation	4	Eighth

	experiments with illustrations		of their efficiency		

94. Infrastructure	
Methodological book Microbiology	11- Required textbooks
	12- Main references (sources)
*Microbial phsiology, Albert G. Moat, John W. Foster, Michael P. Spector. 4th.ed. * Brooks, G. F.; Butel, J. S. and Morse, S. A. (1998). Enteric Gram-Negative Rods (Enterobacteriaceae) , In : Jawetz , Melnick & Adelberg's Medical Microbiology , (21ed) Appleton & Lange , Stamford . pp.:218-230 . * Laboratory manual & workbook in microbiology application to patient care. 2006.	O) Recommended books and references (scientific journals, reports, ...)
	P) Electronic references, websites, ...

95. Course Development Plan
Adding new experiments that rely heavily on laboratory work

Chapter One/ Third Stage: Plant Physiology

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the

student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the description of the programme.

University of Baghdad	96. Educational institution
Faculty of Science / Department of Life Sciences	97. University Department / Center
Plant physiology	98. Course Name/Code
Theoretical lectures	99. Available Attendance Forms
First Semester / Third Year 2022- 2023	100. Semester / Year
Two theoretical hours and two practical hours (four hours).	101. Number of Credit Hours (Total)
1 / 10 / 2022	102. The history of preparation of this description
103. Course Objectives	
- Knowledge of the physiology of plant organs.	
- Linking environmental phenomena and their impact on plants.	
- To illustrate the effect of phytohormones on plant phenotypic changes.	
- Differentiate between genetic variants and environment in plants.	
- Addressing the role of mineral elements in plant metabolic processes.	

104. Learning outcomes and teaching, learning and assessment methods
A- Knowledge Objectives A1- The effect of lack of water on the plant. A2- Correcting the phenomenon of nutrient deficiency on plant growth. A3- The possibility of increasing plant productivity depending on feeding programs with mineral elements. A4- Understand the water balance within the plant. A5- Understand the change in plant functions as a result of environmental changes surrounding it. A6- Knowing the role of some pollutants on the plant.

B - Course skills objectives B1 - The student acquires a theoretical skill in how to interpret the phenotypic changes of the plant. B2 - The student acquires practical skills in measuring variables in plants. B3 –
Teaching and learning methods
Relying on giving the student theoretical lectures and then training the student to conduct practical experiments related to theoretical lectures.
Evaluation methods
Relying on the student's attendance and interaction with the lecture. Theoretical monthly and semester exams. Daily, monthly and quarterly practical exams.
C- Thinking skills C1- The student acquires the skill of predicting the future shape of plants based on environmental variables. A2-
Teaching and learning methods
Using some theoretical hypothetical problems to find out how the plant responds to them with some practical experiments on plants in controlled laboratory conditions to match their results with the results of theoretical hypothetical problems
Evaluation methods
Theoretical evaluation of the results of solving arithmetic problems, in addition to the practical evaluation of experiments based on the results of the statements used in them
d. General and transferable skills (other skills related to employability and personal development). D1- The student acquires some skills in determining the appropriate amount of water in irrigating plants. D2- How to remedy the impact of high temperatures on some plant species. D3- Measuring the extent to which the plant is affected by water salinity. D4-

105.Course Structure

Evaluation method	Method of education	Name of the unit/course or topic	Required Learning Outcomes	Hours	The week
Daily test	Data show	Types of solutions and concentrations plant physiology	Water, Solutions, Suspensions and Colloidal Systems	2 theoretical + 2 practical	The first
Daily test	Data show	Pigment separation	Diffusion, Osmosis and Imbibition	2 theoretical + 2 practical	Second
Daily test	Data show	Hill reaction	Absorption of water and Minerals	2 theoretical + 2 practical	Third
Daily test	Data show	Water relationships	Transpiration and Guttation and Ascent of Sap	2 theoretical + 2 practical	Fourth
Monthly theoretical and practical test	-	Theory test	Practical test	My work hour and my theoretical hour	V
Daily test	Data show	Transpiration	Photosynthesis and Respiration	2 theoretical + 2 practical	Sixth
Daily test	Data show	plant hormones	Growth Hormones	2 theoretical + 2 practical	Seventh
Daily test	Data show	Proteins and enzymes	**Photoperiodism**	2 theoretical + 2 practical	Eighth
Monthly theoretical and practical test	Data show	Theory test	Practical test	My work hour and my theoretical hour	Ninth
Semester theoretical and practical test	Data show	Theory test	**Practical test**	Three hours	X

106. Infrastructure

- Plant Physiology by L. Taiz and E. Zeiger (5th edition), (2010).	1. Required textbooks
	2. Main references (sources)
- Introduction to Plant Physiology by W.G. Hopkins and N. P. A. Huner (2008).	a) Recommended books and references (scientific journals, reports, ...)
Journal of Plant Physiology https://www.journals.elsevier.com/journal-of-plant-physiology#:~:text=%2C%20transport...-,The%20Journal%20of%20Plant%20Physiology%20is%20a%20broad%2Dspectrum%20journal,photosynthesis%20and%20respiration%2C%20transport%20and	b) Electronic references, websites, ...

107. Course Development Plan
1. Periodic review of the latest developments in plant physiology and try to include them in the form of extracurricular activities 2. Using the Internet to obtain the latest publications of references Plant Physiology and update the course with new information 3. Use modern methods and means to deliver the correct information and skill to the student by providing students with video clip links that illustrate the conduct of laboratory practical experiments and then apply what can be applied in the laboratory

Chapter One: Third Stage: Antibiotics

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the description of the programme.

College of Science / University of Baghdad	108. Educational institution
Department of Life Sciences	109. Scientific Department / Center
Theoretical antibiotics	110. Course Name/Code

Traditional lecture	111. Available Attendance Forms
2022-2023	112. Semester / Year
Two hours a week theoretical + two hours a week practical	113. Number of Credit Hours (Total)
1/10/2022	114. The history of preparation of this description
115. Course Objectives	
1- The student should be acquainted with the natural and synthetic antimicrobial materials and the mechanisms of their action against pathological microorganisms.	
2- Identify the bases of classification of antibiotics and therapeutic chemicals into groups that share certain characteristics.	
3- The student should be able to scientifically link diseases and their causes (pathogenic microorganisms) and chemicals appropriate for their treatment.	
4- Enabling the student to identify how to deal positively with disinfectants and sterilizers in the fields of public health.	
5- Identify the role of sensitive microorganisms resistant to antibiotics and their applications in treatment.	

116. Course Outcomes and Methods of Teaching, Learning and Assessment

A- Knowledge Objectives

A1- To be able to distinguish and classify antibiotics according to the correct scientific foundations.

A2- To be able to deal with these therapeutic materials and conduct their own laboratory experiments.

A3- To be able to understand the role of each therapeutic substance in killing or inhibiting the growth of a pathogenic microorganism.

A4- To be able to identify the suitability of each antidote to the pathogen, as some antibiotics work on one organism without another

B - Course skills objectives

B1 - Identify the composition and classification of antibiotics.

B2 – Identify the mechanisms of antibody action in the pathogen

B3 – Identify the mechanisms of resistance to microorganisms to antibiotics

B4- Identify the non-therapeutic properties of antibiotics and their practical applications in different fields

Teaching and learning methods

1- E-learning / View recording lectures in the form of Power Point and explain them directly to students through Google meeting
2- Use the Data Show display
3- Reporting
4- Summer training in the educational laboratories of the Ministry of Health
Homework

Evaluation methods

1- Ask deductive questions during the lecture.

2- Written tests after the lecture.

3- Semester exams for a group of lectures.

4- Reporting

Homework

C- Emotional and value goals

C1- Deductive oral and written tests

C2- Preparation of reports

Teaching and learning methods
The use of illustrative means in explaining the theoretical part and the use of a number of diagnostic media from implants, microorganisms and various antibiotics in the laboratory with the presentation of scientific films using the data show device
Evaluation methods
The student's activity in the classroom and his ability to answer deductive questions and answer oral and written questions and discuss the results within the reports prepared by him for the purpose of identifying the student's ability to deductive thinking and thus the possibility of putting forward new ideas that contribute to constructive scientific criticism and provide him with mental skills.
d. General and rehabilitative skills transferred (other skills related to employability and personal development). D1- The possibility of interpreting the results according to the scientific facts studied and learned by the student D2- Applying the concepts and foundations received by the student in the practical side of life D3- Developing the student's potential towards deductive thinking

117. Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Daily and quarterly tests, reports and homework	Electronic lectures + educational films	- Introduction and definition of antibiotics - Penicillins and cephalosporins - Tetracyclines - Amino Glycoside - Macrolids - Cleopeptide and polypeptide - Insamycinate - Sporadic antagonists -Medicines - Mechanism of action of antidotes - Bacterial wall inhibition - Inhibition of protein synthesis - Inhibition of DNA synthesis - Inhibition of cytoplasmic		4	12 weeks

		membrane synthesis - Inhibition of folic acid production and other metabolic pathways -The role of antibiotics in eliminating fungal infections - Non-therapeutic use of antibiotics in nutrition, agriculture and industry			

118. Infrastructure	
- General Microbiology Written by a group of professors of the Department of Life Sciences 1991 Traditional lectures + lectures from the Internet	13- Required textbooks
- Principles of pharmacology by linkott(2012) - Antibiotics essentials - Antimicrobial Guide 2016-2017	14- Main references (sources)

– To the basic texts and textbooks	Q) Recommended books and references (scientific journals, reports, ...)
https://bpac.org.nz/antibiotics/guide.aspx https://pocketdentistry.com/38-principles-of-antibiotic-therapy/ https://pocketdentistry.com/tag/pharmacology-and-therapeutics-for-dentistry-6e/ http://infuvn.lf1.cuni.cz/file/75/principles-of-antibiotic-use.pdf	R) Electronic references, websites, ...

119. Course Development Plan
The increasing use of modern scientific sources that provide the student with important information in antibiotics to keep pace with the great development in the world in the field of medicine and medicines

Chapter One: Third Stage: Immunology

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

Ministry of Higher Education and Scientific Research / University of Baghdad - College of Science	120. Educational institution

Department of Life Sciences	121. University Department / Center
Immunology - the theoretical part	122. Course Name/Code
Microbiology	123. Programs in which he enters
Traditional Lecture / Power Point	124. Available Attendance Forms
First Semester 2022-2023	125. Semester / Year
8 hours per week	126. Number of Credit Hours (Total)
1-10-2022	127. The history of preparation of this description

128. Course Objectives
1- The student should be introduced to the term immunology and the mechanisms of defense of the body, including autoimmunity and acquired immunity
2- The student should know the term phagocytosis and its mechanisms as a means of defense against nurses
3- The student should recognize the term foreign body and the antibodies formed when the body is exposed to it, their structures and types
4- Enabling the student to identify the ways in which antibodies are used as diagnostic methods to identify the pathogen
5- Introduce the student to the term histocompatibility antigens and their relationship to autoimmune diseases
6- Identify the term hypersensitivity and the types of allergies formed

129. Learning outcomes and teaching, learning and assessment methods
A. Knowledge and understanding A1- To be able to identify the types of immune diseases and distinguish them from other diseases A2- Study of the host's immune status through the use of immune parameters A3- Diagnosis of diseases in which the cause is difficult to isolate using diagnostic kit, including specific antigen or specific antigen A4-

A5-
A6-

B. Subject-specific objectives and skills
B1 – Development of the host's immune status after exposure to the cause
B2 – Identify the shapes and characteristics of immune cells
B3 – Diseases and abortions affecting newborns and the role of immunity in them
B4-

Teaching and learning methods

5- Use of graphics on the board
6- Use the Data Show display
7- Linking the theoretical material with the practical part and applying it
8-
9-

Evaluation methods

5- Ask deductive questions during the lecture
6- Written tests after the end of each lecture
7- Semester exams for a group of lectures
8-
9-

C- Thinking skills
C1- Oral and written deductive tests and giving homework to discuss the scientific topics and terms addressed in the lecture
A2-
A3-
A4-

Teaching and learning methods

Using illustrative means to explain the theoretical part with the presentation of scientific films using the data show device

Evaluation methods
The student's activity within the lecture and his ability to answer deductive questions and answer oral and written questions and discuss the questions posed for the purpose of identifying the student's ability to deductive thinking and thus the possibility of putting forward new ideas that contribute to constructive scientific criticism.
d. General and transferable skills (other skills related to employability and personal development). D1- The possibility of interpreting the results according to the scientific facts studied and learned by the student D2- Applying the concepts and scientific foundations received by the student and benefiting from them in life D3- Developing the student's potential towards deductive thinking D4-

130. Course Structure					
Evaluation method	Method of education	Name of the unit/course or topic	Required Learning Outcomes	Hours	The week
Daily and quarterly tests and homework	Lectures + data show + educational films	Immunology / Theoretical Part	Identify the term immunology and immune and defense cells of the body and identify the first line of defense of the body, identify the term foreign body, antibodies formed and immunological diagnostic methods	4 hours per week	10 weeks

131. Infrastructure	
Immunology by Dr. Maha Raouf Al-Saad (1989) Microbiology 3rd edited by Nester, Anderson, Roberts, Pearsall and Nester (2001) Male.D, Brostoff . J, Roth. D.B., Roitt.I. 2008. Immunology. Seventh edition (International edition.). ELSEVIER.	Required readings : ▪ Basic texts ▪ Course Books ▪ Other
Holding courses in the summer holidays, including immunological applications and techniques	Special requirements (including e.g. workshops, periodicals, software, websites)

	Social services (e.g. guest lectures, vocational training and field studies)

132. Admission	is centralized
Middle School	Prerequisites
----------	Minimum number of students
----------	The largest number of students

Molecular Biology / Stage IV / First Semester

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the

student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

University of Baghdad - College of Science	133. Educational institution
bioscience	134. Scientific Department / Center
Molecular biology and bacterial genetics	135. Course Name/Code
Traditional lecture	136. Available Attendance Forms
First Semester 2022-2023	137. Semester / Year
4 hours theoretical per week + 6 hours practical per week	138. Number of Credit Hours (Total)
1-10-2022	139. The history of preparation of this description
140. Course Objectives	
141. Molecular biology aims to study prokaryotic and eukaryotic organisms at the molecular level by studying the various interrelationships between all systems.	

142. Course Outcomes and Methods of Teaching, Learning and Assessment

A- Knowledge Objectives

A1- The student should know the structural basis of the basic molecules that make up the genetic material

A2- Introducing the student to the term central dogma of life by defining the most important processes that take place on the genetic material of replication, cloning and translation in both primitive and eukaryotic organisms.

A3- The study of gene expression in both primitive and eukaryotic organisms and the mechanism of its organization.

A4- The study of epigenetic variations in both primitive and eukaryotic organisms.

A5- Identify the most important techniques used in the field of molecular biology.

B - Course skills objectives B1 - Take advantage of the websites with direct application and other sites available free of charge on the Internet. B2 - B3 - B4-
Teaching and learning methods
1. Use the Data show and the Power Point view. 2. Students' participation in some practical topics and discussion.
Evaluation methods
1.By tests 2. Through the deductive questions raised in the lecture 3. Through class assignment on the electronic class
C- Emotional and value goals C1- The student's commitment to attend C2- The student's interaction with the professor during the explanation of the material C3- Increasing the student's knowledge of the subject by expanding access to the scientific resources of the course.
Teaching and learning methods
Encourage the student to participate in discussions and conclusions
Evaluation methods
By tests 2. Through the deductive questions raised in the lecture 3. Through class assignment on the electronic class

d. General and rehabilitative skills transferred (other skills related to employability and personal development). D1- Training students to think and conduct dialogue for the purpose of knowing the extent of their response to the material and responding to it.

143. Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
• Definition of molecular biology • The Structure of DNA and RNA Classic Experiments to improve DNA as a Genetic Material rather than Proteins			**Introduction to Molecular biology**	4 hours theoretical + 6 hours practical	Week 1
• Meselson and Stahl experiment • Replication in prokaryotes			**DNA Replication I**	4 hours theoretical + 6 hours practical	Week 2
• Chromosomes Structure The Replication of DNA in eukaryotes			**DNA Replication II**	4 hours theoretical + 6 hours practical	Week 3
• Topoiomerase I and II • Telomerase Telomerase and Cellular Senescence			**DNA Replication III**	4 hours theoretical + 6 hours practical	Week 4
• Telomerase and Cellular Senescence • Bacterial DNA Mutations & Antibiotic resistance • Cancer Mutation			**Mutations in DNA**	4 hours theoretical + 6 hours practical	Week 5
• Proofreading • Mismatch Repair • Direct Reversal of DNA damage • Excision repair Double-stranded break repair			**DNA repair**	4 hours theoretical + 6 hours practical	Week 6
			Exam	4 hours theoretic	Week 7

		al + 6 hours practical	
• Transcription in prokaryotes • Type of RNA RNA polymerase	**Transcription** I	4 hours theoretical + 6 hours practical	Week 8
• Promoter recognition Transcription process	**Transcription** II	4 hours theoretical + 6 hours practical	Week 9
• Translation in prokaryotes • Genetic code • Wobble hypothesis Translation process	**Translation**	4 hours theoretical + 6 hours practical	Week 10
• Regulation of gene in prokaryotes • The operon • Negative and positive regulation	**Regulation of the gene expression I**	4 hours theoretical + 6 hours practical	Week 11
• Lac operon • Trp operon	**Regulation of the gene expression I I**	4 hours theoretical + 6 hours practical	Week 12
• Type of gene transfer in bacteria • Conjugation • Plasmid • Types of conjugation	**Gene Transfer in Bacteria I**	4 hours theoretical + 6 hours practical	Week 13
• Bacterial transformation • Natural and artificial competence • Transduction • Generalized and specialized transduction	**Gene Transfer in Bacteria II**	4 hours theoretical + 6 hours practical	Week 14
	Exam	4 hours theoretical + 6 hours practical	Week 15

144. Infrastructure

-	15- Required textbooks
R o b e r t F. Here's a v e r (2012). Molecular Biology. Fifth edition, USA.	16- Main references (sources)
JAMES D. WATSON (2013). Molecular Biology of the Gene. Seventh edition.	S) Recommended books and references (scientific journals, reports, ...)
1.https://www.researchgate.net/publication/331302105_DNA_Replication 2.https://www.researchgate.net/publication/325827703_Transcription_and_translation	T) Electronic references, websites, ...

145. Course Development Plan
Developing the course through the annual update of the information on the curriculum and the use of modern technologies to deliver the information.

Practical Molecular Biology / Chapter I / Fourth Stage

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

University of Baghdad - College of Science	146. Educational institution
Department of Life Sciences	147. Scientific Department / Center
Molecular biology and genetics of bacteria	148. Course Name/Code
Traditional lecture	149. Available Attendance Forms

2023/2022	150. Semester / Year
12 hours per week per week (2 hours per cherub) for the morning meal and 12 hours per week per week (two hours per cherub) for the evening meal	151. Number of Credit Hours (Total)
1-10-2022	152. The history of preparation of this description

153. Course Objectives:(**Bacterial Genetics**) **Identify the genetic content of bacteria and how to estimate it, study the types of mutations and how to isolate them using different methods and clarify the conjugation and transformation processes in bacteria**

Molecular biology (introducing the student to the constituent parts of the genetic component in living organisms, how to prepare the epiphrates, molecular calculations of the genetic material , extracting the genetic material from different organisms, extracting plasmids from different bacterial species, and the electrical relay of the genetic material.

9.Learning outcomes and methods of teaching, learning and assessment

A- Knowledge and Understanding

A-1 The student should know the genetic material of biology and how to extract and purify it

A2- How material multiplies genetic material.

A3- To identify the different methods of transmitting genetic material and how to use it.

A4- To identify the different ways to isolate mutations.

B - Subject-specific skills

B1 – The use of different solutions for the methods of extraction and purification of DNA and RNA material from multiple cells.

Electric Relay Device – Centrifuge -Spectrometer B2 – Use

B3 – Using different culture media to develop bacteria and study mutations B4- Study of some mutations, isolation of plasmids, characterization of some proteins, as well as the transformation process
Teaching and learning methods
1. Use. Data show and lab power point presentation 2. Preparing reports by students for each laboratory. 3. Students' participation in some practical topics and their discussion
Evaluation Methods
C- Thinking skills c. 1- Weekly and monthly tests. C2- Preparing and discussing reports. C 3- Oral tests during the lesson
Teaching and learning methods
Encourage the student to participate in discussions and conclusions of the laboratory results
Evaluation Methods
Direct by tests Indirect by inferential questions raised during the laboratory
d . General and transferable skills (other skills related to employability and personal development). D1- Training students to think and conduct dialogue for the purpose of knowing the extent of their response to the material and responding to it

10Course structure

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Conducting tests and theoretical questions And some of it is oral	practical	Molecular biology		12 hours	practical

D2- Conducting field practical experiments to benefit from them in the future in medical laboratories and research centers.

9. Course Development Plan
Developing the course through the annual update of the information of the curriculum and the use of modern technologies to deliver the information.

Chapter One: Stage Four: **Helminthics**

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the description of the programme.

	Infrastructure 1- Required textbooks
Molecular cloning, A Laboratory Manual. J. Sambrook et al. (Third edition). • Essential Molecular Biology, A Practical Approach. T. A. Brown (1991). • General Microbiology. R. Y. Stanier et al. (Fifth edition). • Sambrooke, J and Russell, D (2001) Preparation of plasmid DNA by alkaline lysis with SDS (protocol -1) ,Molecular cloning Laboratory manual . 11.32 • Suindhu Balan (2003) Metal chelate affinity precipitation of RNA and purification of plasmid DNA. Biotechnology letters, 25: 1111-1116. • Molecular Cloning.Vol.I, Joseph Sambrook and David W. Russell, T. Maniatis. • Dustin Brisson, The directed mutation controversy in an evolutionary context; Critical review in microbiology	17- Main references (sources)
-	U) Recommended books and references (scientific journals, reports, ...)
Internet pages and other websites	V) Electronic references, websites, ...

College of Science / University of Baghdad	154. Educational institution
Department of Life Sciences	155. University Department / Center
Helminthology	156. Course Name/Code
Theoretical lecture	157. Available Attendance Forms
First Semester / 2022-2023	158. Semester / Year
4 theoretical per week	159. Number of Credit Hours (Total)
1-10-2022	160. The history of preparation of this description

161. Course Objectives

1- Identify helminths of medical importance
2- recognize the life cycles of these worms
3- Identify the methods of infection, prevention and treatments used against it

9. Course Outcomes and Methods of Teaching, Learning and Assessment

A- Knowledge Objectives

A1- **The student should know the science of helminthiasis**

A2- **The student should have sufficient health education to avoid infection with these worms**

A5- **The student should be able to distinguish the pathological types of them**

A6- **Directing the student to spread health culture in his home and family**

B - Course skills objectives

He is preparing research on one of the parasitic worms

Teaching and learning methods

Use show Data to display the material as a Power Point
Online lectures on YouTube
Interact with students on Google Classroom

Evaluation methods

1- Daily, weekly, and monthly tests
2-Oral tests
3- Online tests on the Google Classroom platform by Google form quiz
4- Preparing a theoretical report on one of the worms

C- Emotional and value goals

C1- Developing the student's skills in e-learning and searching for information online using educational platforms
C2- **The student's ability to think deductively regarding the diagnosis of worms**
C3- Communication on putting forward new ideas and constructive scientific criticism
C4- Directing the student to focus on the type of symptoms caused by different injuries

Teaching and learning methods

Online lectures on YouTube
Interact with students on Google Classroom

Evaluation methods

Direct through weekly and monthly tests
Indirectly through oral questions and ongoing discussions

d. General and qualifying skills transferred (other skills related to employability and personal development).

Developing the student's skill using the correct methods in the accurate medical diagnosis of these parasites
Which contribute to the possibility of working in the medical field

10.Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Power Point	Theoretical lectures	Introduction, Helminthes classification Phylum Platyhelminthes	General characteristics, Main classes, and main Sub Classes and Orders, Morphological physiological adaptations.	2	1
		Fasciola hepatica (as a main example of liver flukes in Platyhelminthes), *Clonorchis sinensis, Dicrocoelium dendriticum*	Body wall, Structure, Digestive system, Excretory system, Nervous system, Reproductive system, Treatment and control, Parasitic adaptation, disease, life cycle, diagnosis, symptoms	2	2
		Intestinal flukes *Fasciolopsis buski* *Heterophyes heterophyes* *Echinostoma* *Paramphistomium* Lung flukes *Paragonimus westermani*	Treatment and control, parasitic adaptation, disease, life cycle, diagnosis, symptoms	2	3
		Blood flukes *Schistosoma mansoni* *S. Haematobium* *S. Japonicum*	Treatment and control, parasitic adaptation, disease, life cycle, diagnosis, symptoms	2	4
		Class Cestoda Comparison between the main Sub Classes (Cestodaria and Eucestoda Comparison between the main Orders Order Pseudophyllidae *Diphyllobothrium latum* Order Cyclophyllidae *Taenia saginata* *Taenia solium*	Treatment and control, parasitic adaptation, disease, life cycle, diagnosis, symptoms	2	5

		Echinococcus			
		Phylum Aschelminthes Classification Egg shell formation Hatching & Molting	General characteristics Cuticle, Excretory system, Digestive system, Nervous system, Reproductive system	2	6
		Aphasmidia: *Trichuris trichiura* Phasmidia: *Ascaris lumbricoides* + *Enterobius vermicularis*	Treatment and control, parasitic adaptation, disease, life cycle, diagnosis, symptoms	2	7
		Hookworm: (Necator americanus, *Ancylostoma duodenale,* *Haemonchus contortus)* *Strongyloides stercoralis*	Treatment and control, Parasitic adaptation, disease, life cycle, diagnosis, symptoms	2	8
		Blood and tissue Nematodes: *Wucheraria bancrofti,* *Loa loa,* *Onchocerca volvulus* *Dracunculus medinensis*	Treatment and control, parasitic adaptation, disease, life cycle, diagnosis, symptoms	2	9
		Trichinella spiralis *Capillaria hepatica* *Dioctophyme renale* *Toxocariasis*	Treatment and control, parasitic adaptation, disease, life cycle, diagnosis, symptoms	2	10

11.Infrastructure	
Lectures scheduled by the professors of the subject Availability of the methodological book (helminthology) and various foreign books on the science of worms	1- Textbooks
Epidemiology of Some Parasitic Helminthes in Iraq from 2011 until 2015 Entsar J. Saheb, Sinan Ghazi Mahdi, Israa S. Mosa, Muthana Ibrahim Abdul-Karim2and Adnan Nawar. *Iraqi Journal of Science, 2017, 58, .2B, pp: 789-796*	2- Main references (sources)

Incidence of helminthiasis in humans in Iraq Israa S. Musa Karbala International Journal of Modern Science Volume 3, Issue 4, 2017, Pages 267-271 Text book (Modern Parasitology)	W) Recommended books and references (scientific journals, reports, ...)
https://ia802700.us.archive.org/6/items/b21996763/b21996763.pdf https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/health_science_students/MedicalParasitology.pdf https://www.slideshare.net/meducationdotnet/parasitology-lecture-series	X) Electronic references, websites, ...

12.Course Development Plan **Using electronic platforms for blended learning between students' attendance in the regular class and electronic classes, as well as training the student on the electronic search for the information required to study in the theoretical and practical part of medical worms.**

Practical helminthology - fourth stage / first semester

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the description of the programme.

College of Science / University of Baghdad	**162. Educational institution**
Department of Life Sciences	**163. University Department / Center**
Helminthology	**164. Course Name/Code**
Traditional lecture	**165. Available Attendance Forms**
First Semester/ 2022/2023	**166. Semester / Year**
12 hours per week	**167. Number of Credit Hours (Total)**

1/10/2022	**168. The history of preparation of this description**
169. Course Objectives	
4- Identify helminths of medical and economic importance	
5- Learn about the life cycles of these worms and their hosts	
6- Identify the methods of infection with pathogenic worms , methods of prevention and treatments used	

10. Learning outcomes and methods of teaching, learning and assessment
A. Knowledge and understanding **A1- The student should be able to diagnose helminths at the level of adult worm and larval phases** **A2- The student should distinguish the diagnostic characteristics of each parasitic worm** **A3- The student should be able to distinguish the pathological types of them**
B – Subject-specific skills **B1 – The student diagnoses the worm at different stages of its life, under the microscope** **B2 – The student draws the adult worm and its larval phases with the marking** **B3 – Study of histological pathogenicity caused by worms, under the microscope** **B4- Preparing a research on one of the parasitic worms**
Teaching and learning methods
- **Use the Data show to display the material as a power point** - **Preparing reports and research prepared by regular groups of students** - **Summer training in medical centers and laboratories develops students' experiences**
Evaluation methods
- **Daily, weekly, and monthly tests** - **Oral tests** - **Preparation of research** - **Using local and international statistics on the prevalence of injuries**

C- Thinking skills **C1- The student's ability to think deductively regarding the diagnosis of worms and to identify the different stages of life and pathological symptoms for each type** **C2- Communication on putting forward new ideas and constructive scientific criticism**
Evaluation methods
Direct through weekly and monthly tests **Indirectly through oral questions and ongoing discussions**
d. General and qualifying skills transferred (other skills related to employability and personal development). **Developing the student's skill using the correct methods in the accurate medical diagnosis of these parasites** **Which contribute to the possibility of working in the medical field**

11.Course Structure					
Evaluation method	**Method of education**	**Name of the unit/course or topic**	**Required Learning Outcomes**	**Hours**	**The week**
Data Show + Microscope	**Lab lecture + slides examined under a microscope**	**Introduction, Helminthes classification Phylum Platyhelminthes:**	**General characteristics, Main classes, and main Sub Classes and Orders, Morphological physiological adaptations.**	**2**	**1**
Data Show + Microscope	**Lab lecture + slides examined under a microscope**	**Fasciola hepatica (as a main example of liver flukes in Platyhelminthes)**	**Body wall, Structure, Digestive system, Excretory system, Nervous system, Reproductive system, Life history, Effect of parasite on host, Treatment and control, Parasitic adaptation**	**2**	**2**
Data Show + Microscope	**Lab lecture + slides examined under a microscope**	**Other liver flukes: Fasciola gigantica Clonorchis sinensis Opisthorchis viverrini O. felineus Dicrocoelium dendriticum**	**Geographic distribution, disease, life cycle, diagnosis, symptoms, treatment.**	**2**	**3**
Data Show + Microscope	**Lab lecture +**	**Intestinal flukes Fasciolopsis buski**	**The same**	**2**	**4**

	slides examined under a micro scope	Heterophyes heterophyes Metagonimus yokogawai Paramphistomum cervi Echinostoma ilocanum.			
Data Show + Microscope	Lab lecture + slides examined under a micro scope	Lung flukes Paragonimus westermani Blood flukes Schistosoma mansoni S. Haematobium S. Intercalatum S. Japonicum & S. dermatitis		2	5
Data Show + Microscope	Lab lecture + slides examined under a micro scope	Class Cestoda Comparison between the main Sub Classes (Cestodaria and Eu cestoda) Comparison between the main Orders (Pseudophyllidae and Cyclophyllida)	Body wall, Structure, Digestive system, Excretory system, Nervous system, Reproductive system, Life cycle	2	6
Data Show + Microscope	Lab lecture + slides examined under a micro scope	Order Pseudophyllidae Diphyllobothrium latum Spirometra mansonoides (human Sparganosis) Order Cyclophyllidae Taenia saginata Taenia solium Cysticercosis		2	7

Data Show + Microscope	**Lab lecture + slides examined under a microscope**	**Taenia multiceps Echinococcus granulosus Hydatid cyst Echinococcus multilocularis E. Vogeli E. Oligarthus.**		**2**	**8**
Data Show + Microscope	**Lab lecture + slides examined under a microscope**	**Dipylidium caninum Moniezia expansa Hymenolepis Nana Hymenolepis diminuta H. carioca**		**2**	**9**
Data Show + Microscope	**Lab lecture + slides examined under a microscope**	**Phylum Aschelminthes , Classification Egg shell formation Hatching & Molting.**	**General characteristics Cuticle, Excretory system, Digestive system, Nervous system, Reproductive system**	**2**	**10**
Data Show + Microscope	**Lab lecture + slides examined under a microscope**	**Trichinella spiralis Capillaria hepatica C. philippinensis Dioctophyma renale Enterobius vermicularis Syphacia spp.**		**2**	**11**
Data Show + Microscope	**Lab lecture +**	**Toxocara canis visceral larva migrans))**		**2**	**12**

	slides examined under a microscope	T. Kati Toxascaris leonine Lagochilascaris minor Anisakis spp.			
Data Show + Microscope	Lab lecture + slides examined under a microscope	Ancylostoma deudenale Necator americanus Ancylostoma caninum (cutaneous larva migrans) Oesophagostomum Ternidens		2	13
Data Show + Microscope	Lab lecture + slides examined under a microscope	Mammomonogamus syngamiasis Trichostrongylus Haemonchus contortus Angiostrongylus		2	14

12.Infrastructure	
Lectures scheduled by the professors of the subject Availability of methodological book (helminthology) and various foreign books on medical helminthology Using research and recent reports on the Internet Up-to-date sources of the Internet	Required readings: ▪ Basic texts ▪ Course Books ▪ Other
Epidemiology of Some Parasitic Helminthes in Iraq from 2011 until 2015 Entsar J. Saheb, Sinan Ghazi Mahdi, Israa S. Mosa, Muthana Ibrahim Abdul-Karim2and Adnan Nawar.	Special requirements (e.g. workshops, periodicals, software and websites)

Iraqi Journal of Science, 2017, 58, .2B, pp: 789-796 Incidence of helminthiasis in humans in Iraq **Israa S.Musa** Karbala International Journal of Modern Science **Volume 3, Issue 4, December 2017, Pages 267-271** **The increasing use of information technology or Internet references, and changes in content as a result of keeping pace with the great development in the world of technology and information**	
Conducting pathological analysis courses by laboratory staff	**Social services (e.g. guest lectures, vocational training and field studies)**

170. Acceptance	
100	Prerequisites
100	Minimum number of students
150	The largest number of students

Course Description Form

Chapter One: Fourth Stage: Food Microbiology

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

University of Baghdad	171. Educational institution

Department of Life Sciences	172. University Department / Center
Food microbiology	173. Course Name/Code
Traditional lecture, and electronic lectures	174. Available Attendance Forms
First Semester 2022-2023	175. Semester / Year
Two theoretical hours + two practical hours/week	176. Number of Credit Hours (Total)
1\10\2022	177. The history of preparation of this description

178. Course Objectives

- Study of the relationship of microorganisms with food
- Study of microbial contamination of food, knowledge of sources of contamination and microbial evidence of contamination
- Identify the manifestations of microbial spoilage in food and distinguish types of damage
- Factors affecting the types of damage
- Study of foodborne diseases and food poisoning
- Study of the principles and methods of food preservation using heat, radiation and chemicals

179. Course Outcomes and Methods of Teaching, Learning and Assessment

A- Knowledge Objectives

A1- The student should be able to identify the beneficial and harmful aspects of microbiology in food.

A2- To be able to distinguish between the types of microbial damage to food and the causes of this damage

A3- The student should be familiar with the sources of food contamination and thus find ways to control them

A4- To learn the factors affecting the type and speed of microbial spoilage of food and how to choose the method of preservation A5- A6-
B - Marathi Objectives B1 - Knowing the relationship of microorganisms with food and how to infer microbial contamination of food B2 - Identify the types of foodborne diseases and their causes and how to investigate them in cases of epidemics in order to reduce them B3 - Knowledge of the importance of therapeutic foods Probiotic and vital enhancers B4-
Teaching and learning methods
1 - Electronic classes and scientific participation arena 2- Use the Data show display 3 - Conducting scientific experiments inside the laboratory 4 - Use drawings on the board 5 - Use illustrative means such as posters
Evaluation methods
Written Tests, Quarterly Reports Open discussions during lectures Deductive questions
C- Emotional and value goals C1- Deductive questions C2- Oral and written tests A3- A4-
Teaching and learning methods
Use modern illustrative means such as display, graphics on the board and posters
Evaluation methods
The student's participation in open discussions and his answer to oral and written questions to identify the extent to which the student benefits from the scientific material and how to employ it in practical life

d. General and rehabilitative skills transferred (other skills related to employability and personal development).

D1- Applying the concepts received by the student in the scientific side of life

D2- The possibility of identifying damaged foodstuffs harmful to health by identifying signs of damage

D3- Developing the student's capabilities to guess the type of food poisoning related to eating a particular meal

D4- Knowing the possibility of benefiting from food microbiology in food preservation

180. Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Questions	Video lecture and discussion	A brief history of the relationship between microorganisms and food	Identify the beginning of the discovery of microorganisms in food and the role of the most prominent scientists	2	First
Questions	Video lecture and discussion	Foodborne diseases	The role of food in carrying diseases to humans	2	Second
report	Video lecture and discussion	Food microbial contamination and contamination evidence	Identify the sources of food contamination and how to infer microbial contamination of food	2	Third
Questions	Video lecture and discussion	Standard specifications and microbial spoilage of food	Know the importance and types of standard specifications and the most important international and local organizations that issue them and know the types of microbial damage to food and its causes	2	Fourth
Questions	Video lecture and discussion	Factors affecting microbial damage to food - the mechanism of investigating epidemics	Learn the factors affecting the type and speed of microbial spoilage of food and how to investigate them in epidemic situations for the purpose of reducing them	2	V
Written exam	Video lecture and discussion	Foodborne Illness / Food Injuries and Poisoning	Identify the types of foodborne diseases and their causes	2	Sixth
Questions	Video lecture and discussion	Listeriosis and mycosis	Knowing the importance of poisoning with listeria and mycotoxins and their most famous types	2	Seventh

Questions	Video lecture and discussion	General principles of food preservation	Learn how to choose a memorization method	2	Eighth
Questions	Video lecture and discussion	High Temperature Food Protection	The importance of heat as a physical factor to control the growth of microbes in food	2	Ninth
Questions	Video lecture and discussion	Use of chemicals for food preservation	To control the growth of microbes in food using chemicals	2	X
Written exam	Video lecture and discussion	The use of irradiation for food preservation	To control the growth of microbes in food using irradiation	2	Eleventh

181. Infrastructure

Rashid Mahjoub Al-Musleh -1990-Microbiology in Food-Baghdad University Press Jay, M. J., Loessner, M. J., and Golden, D. A. 2005. Modern Food Microbiology. 7 th Ed. Springer. U.S.A.	1- Required textbooks
- Zadernowska , A. Wierzchowska, W. & Trokenheim , L. (2014) Yersinia enterocolitica: A Dangerous, But Often Ignored, Foodborne Pathogen, Food Reviews International, 30:1, 53-70. -Carrasco, E.; Morales-Rueda, A.; García-Gimeno, R.M. (2015). Cross-contamination and recontamination by *Salmonella* in foods: A review. Food Res. Int., *45*, 545–556. - Linscott, A. J. (2011). Food-Borne Illnesses. *Clinical Microbiology Newsletter*, *33*(6), 41-45.	2- Main references (sources)
Lectures approved by the professors of the subject - methodological books WHO Reports Updated versions of Iraqi Food Standards	A- Recommended books and references (scientific journals, reports, ...)
ResearchGate Google scholar	B - Electronic references, websites

182. Course Development Plan

Updating lectures in terms of updateable materials such as foodborne emergency epidemics and reclassified microorganisms

Chapter One/Fourth Stage: Pathogenic Bacteria

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

University of Baghdad – College of Science	183. Educational institution
Department of Life Sciences	184. Scientific Department / Center
Pathogenic bacteria	185. Course Name/Code
Traditional lecture	186. Available Attendance Forms
First Semester 2022-2023 Fourth Stage	187. Semester / Year

75 hours	188. Number of Credit Hours (Total)
1/ 10/ 2022	189. The history of preparation of this description
190. Course Objectives	
Study the different bacterial species and identify their general characteristics	
Study of pathogenesis	
Identify methods for diagnosing pathogenic bacterial species	
Learn about treatment methods	

191. Course Outcomes and Methods of Teaching, Learning and Assessment
A- Knowledge Objectives A1- Addressing the most important bacterial diseases, especially those that affect Iraqi society A2- The student should understand how to diagnose bacterial diseases. A3- The student should learn what its treatment is A4- A5- A6-
B - Course skills objectives B1 – The use of biochemical tests in the diagnosis of pathological bacteria B2 – Distinguish between pathogenic bacterial species B3 – Prevention of pathogenic bacteria B4-
Teaching and learning methods
1. Use the Data show to view the topic 2. Showing films related to the symptoms and signs of diseases caused by bacterial infections. 3. Google classrooms 4. YouTube app

Evaluation methods
Semester and final exams as well as short daily exams.
C- Emotional and value goals A1- A2- A3- A4-
Teaching and learning methods
Discussion & Analysis
Evaluation methods
Semester and final exams as well as short daily exams.
d. General and rehabilitative skills transferred (other skills related to employability and personal development). D1- Preparing reports on bacterial diseases and methods of detecting them D2- D3- D4-

192. Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
	Traditional lecture	**The specialized relationship between humans and germs**	**Recognize the relationship of germs to humans**	2 Theoretical+ 3 Practical	First
	Traditional lecture	**Bacterial diseases**	**Epidemiology, adhesion, penetration and transmission**	2 Theoretical+ 3 Practical	Second
	Traditional lecture	**Staph**	**Identify their characteristics, diagnose and treat them**	2 Theoretical+ 3 Practical	Third
	Traditional lecture	**Streptococci**	**Identify their characteristics, diagnose and treat them**	2 Theoretical+ 3 Practical	Fourth
		examination		2 Theoretical+ 3 Practical	V
	Traditional lecture	**Aerobic bacteria that make up blackboards**	**Identify their characteristics, diagnose and treat them**	2 Theoretical+ 3 Practical	Sixth
	Traditional lecture	**Anaerobic bacteria that make up blackboards**	**Identify their characteristics, diagnose and treat them**	2 Theoretical+ 3 Practical	Seventh
	Traditional lecture	**Escherichia coli, Salmonella**	**Identify their characteristics, diagnose and treat them**	2 Theoretical+ 3 Practical	Eighth
	Traditional lecture	**Shigella diasontry, Vibrio cholera**	**Identify their characteristics, diagnose and treat them**	2 Theoretical+ 3 Practical	Ninth
	Traditional lecture	**Brucellosis, appendages, plague bacteria, volatile**	**Identify their characteristics, diagnose and treat them**	2 Theoretical+ 3 Practical	X
	Traditional lecture	**Klebsilla, hemophilis, pertussis bacteria**	**Identify their characteristics, diagnose and treat them**	2 Theoretical+ 3 Practical	Eleventh
	Traditional lecture	**Mycobacterium, rickettsia**	**Identify their characteristics, diagnose and treat them**	2 Theoretical+ 3 Practical	Twelfth
	Traditional lecture	**Mycoplasma and spirochetes**	**Identify their characteristics, diagnose and treat them**	2 Theoretical+ 3 Practical	Thirteenth
	Traditional lecture	**The effect of antiseptics on bacteria**	**Recognize the effect of disinfectants in bacteria**	2 Theoretical+ 3 Practical	Fourteenth

	Traditional lecture	**Hospital-acquired diseases**	**Identifying nosocomial infections**	2 Theoretical+ 3 Practical	Fifteenth

193. Infrastructure	
Medical microbiology by Riedel et al., 2019.	18- Required textbooks
1- Irving et al. 2005. Medical Microbiology. 2- Gellispie and Hausky. 2006. Principle of practical and clinical bacteriology 2nd.	19- Main references (sources)
	Y) Recommended books and references (scientific journals, reports, ...)
	Z) Electronic references, websites, ...

194. Course Development Plan
Follow up on the latest developments in the classification of pathological bacteria, for example, the intestinal family Adding and updating virulence factors, especially in staphylococcus bacteria Add other information about chlamydia and rickettsia

Chapter One: Stage Four: Embryology

University of Baghdad – College of Science	195. Educational institution
Department of Life Sciences	196. Scientific Department / Center
Embryology	197. Course Name/Code
Traditional lecture	198. Available Attendance Forms
First Semester 2022-2023 Fourth Stage	199. Semester / Year
75 hours	200. Number of Credit Hours (Total)

1/10/2022	201. The history of preparation of this description
202. Course Objectives	
1. Study the sequence of embryonic development stages of different animal models, starting from primitive models to humans	
2. Study the difference between the concept of evolution and embryonic formation	

203. Course Outcomes and Methods of Teaching, Learning and Assessment
A- Knowledge Objectives A1- Study the difference between the concept of evolution and embryonic formation A2- Study of the stages of cell division during the embryonic stages A3- Studying the sequence of embryonic development stages for different animal models, starting from primitive models to humans. A4- Study of environmental and pathological factors that have a role in causing damage to the embryonic composition of the organism A5- A6-
B - Course skills objectives B1 - Study of the processes of division of animal cells and sections prepared or prepared under the microscope B2 - Marking of important parts B3 -

B4-

Teaching and learning methods

- Preparing a paper lecture to be delivered to students based on basic and modern sources
- Hand drawing of the diagrams of the stages of growth and embryogenesis on the white board
- The use of modern sources of the information network to obtain accurate graphics

Evaluation methods

Tests – weekly – monthly

Oral tests – preparation of reports

C- Emotional and value goals

C1- Weekly tests on the topic of the previous lecture by asking students directly as a classroom activity

C2- Comprehensive semester exam

A3-

A4-

Teaching and learning methods

The student's ability to think deductively and differentiate between the stages of embryonic development in different types and groups of animals and understand the concept of evolution

Evaluation methods

Direct - Semester Exam

Indirect – Surprise oral or written tests

d. General and rehabilitative skills transferred (other skills related to employability and personal development).

D1- The student's field of work and its relationship to the subject

D2- Student orientation and development of the desire to specialize in the field of biological laboratories

D3- Expanding the student's ability to use his imagination and sensory perception in analyzing some developmental information

D4-

204. Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Oral or written test	Preparing a Power Point lecture and using the data show	Introduction to embryology - the stages of the embryogenesis of the animal specie - Branches of Embryology	- A simplified introduction to embryology and identification of the stages of embryonic development in the organism	2 Theoretical	1
Oral or written test	Preparing a Power Point lecture and using the data show	Cell cycle and Chromosomes -Regulation of cell cycle - Role of chromosomes in cell division -Structure of chromosome	Cell cycle study - Mechanism of cell cycle regulation - The role of chromosomes in cell division - Chromosome structure	2 Theoretical	2
Oral or written test	Preparing a Power Point lecture and using the data show	Cell Division - nuclear division: 1- mitosis (steps of mitosis) 2- meiosis (stages of meiosis) Gametogenesis: - Spermatogenesis Spermatocytogenesis Spermiogenesis	Cell division study - Study of types of nuclear division -Understand the mechanism of reproductive cell formation in males	2 Theoretical	3
Oral or written test	Preparing a Power Point lecture and using	Gametogenesis: - Oogenesis Phases of Oogenesis Classification of eggs	They are how female reproductive cells are formed. Types of eggs	2 Theoretical	4

	the data show	- Based on the amount of the yolk - Based on the distribution of the yolk - Formation of egg membranes - classification of egg membranes	Depending on the amount of yolk and on the distribution of the erased substance - Study of the formation of egg membranes and types of membranes		
Oral or written test	Preparing a Power Point lecture and using the data show	The ovarian cycle - Types of follicles: 1- Primary follicle 2- Secondary follicle 3- graafian follicle - Phases of the ovarian cycle	Study of the ovarian cycle and knowledge of the types of ovarian follicles - Ovarian cycle phases	2 Theoretical	5
Oral or written test	Preparing a Power Point lecture and using the data show	- Ovulation - Corpus luteum and Corpus albicans - Oocyte transport	- The study of embryonic development starting from the stage of ovulation - The composition of the corpus luteum and the white body - Transfer of the fertilized egg to the uterus	2 Theoretical	6
Oral or written test	Preparing a Power Point lecture and using the data show	- Fertilization Spermatozoa undergo two processes: 1- Capacitation 2- Acrosome reaction - The phases of fertilization	- Study the process of fertilization in vertebrates and the processes that occur to the neighborhood to	2 Theoretical	7

			facilitate the process of fertilization - Stages of fertilization		
Oral or written test	Preparing a Power Point lecture and using the data show	- Cleavage - Product of cleavage (morula versus blastula) (Plastula versus blastocyst) - Types of cleavage - Planes of Cleavage - Blastocyst formation	- Definition of cleavage - Falfalaj products and comparisons between them Types of cleavage - Cleavage paths - The composition of blastocyst	2 Theoretical	8
Oral or written test	Preparing a Power Point lecture and using the data show	- Uterus at time of implantation Second week of human embryonicdevelopment: Bilaminar germ discGastrulation: Types of morphogenetic movements that occur during gastrulation:	- A brief summary of the layers of the uterus in vertebrates when the fertilized egg is implanted in the uterus - Study of embryonic development in humans in the second week of pregnancy - The process of the demonstrator and the mechanism of its formation	2 Theoretical	9
Oral or written test	Preparing a Power Point lecture and using the data show	Third week of human development: Trilaminar germ disc - End product during gastrulation in vertebrate: - Fate map established during gastrulation	The third week of embryonic development in humans	2theoretical	10

		- Formation of the notochord - Neurulation - Organogenesis	- Final output during gastric formation in vertebrates - The fateful map during the formation of the teaching assistant - Dorsal cord formation - Neural tube composition - Composition of members		

205. Infrastructure	
Embryology (Dr. Kawakeb Abdel Qader and Dr. Amal Al-Khatib)	20- Required textbooks
Medical embryology (T.w. sadler) Human biology (Sylvia S. Mader)	21- Main references (sources)
American journal of obstetric and gynecology academic.oup.com embryo.asu.edu	AA) Recommended books and references (scientific journals, reports, ...)
www.embryology.com www.embryology.ch www.nature.com	BB) Electronic references, websites, ...

206. Course Development Plan
The curriculum is developed at the beginning of the course based on solid sources and approved websites.

207. Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week

Chapter Two / First Stage: Computer Science

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the description of the programme.

University of Baghdad - College of Science	1. Educational institution
Department of Life Sciences	2. Scientific Department / Center
Calculators2	3. Course Name / Code

Traditional lecture due to the electronic corona pandemic	4. Available Attendance Forms
2022-2023	5. Semester / Year
12 Practical	6. Number of Credit Hours (Total)
1/10/2022	7. The history of preparation of this description
8. Course Objectives	
Teach the student how to: 5- Microsoft Word 2010 6- Microsoft Power Point 2010 To benefit from it in the fields of scientific and professional life.	

9. Course Outcomes and Methods of Teaching, Learning and Assessment
A- Knowledge Objectives A1- The student should be able to learn how to use Word, Power Point programs. A2- Learn about some concepts of the information network. A3- A4- A5- A6-
B - Course skills objectives B1 – Study office programs for word processing, arithmetic operations and make presentations. B2 – Preparing reports on the subject
Teaching and learning methods
Use the Data show

The use of illustrative means and modern sources of the information network. Due to the Corona pandemic, electronic classes (Google classroom) were used to give the material by uploading pdf files for lectures and explaining videos.
Evaluation methods
Weekly - monthly tests - preparation of reports Due to the Corona pandemic, electronic classes (Google classroom) were used for daily and quarterly exams and homework.
C- Emotional and value goals C1- Learn how to edit text in Word 2010 C2- Learn how to work with slides and presentations in Power Point 2010. A3-
Teaching and learning methods
The student's ability to identify dealing with office programs (word, power point) Due to the Corona pandemic, electronic classes (Google classroom) were used to give the material by uploading pdf files for lectures and explanation videos.
Evaluation methods
Weekly tests In addition to the semester exam due to the Corona pandemic, electronic classes (Google classroom) were used for daily and quarterly exams and homework.
d . General and rehabilitative skills transferred (other skills related to employability and personal development). D1- Directing the student on the importance of using library programs in all areas of biological laboratories in terms of printing and editing texts, analyzing data and the way it is presented. D2- D3-

10. Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week

Weekly Exams	Data show	Word 2010	Principles of typography in Word 2010 How to open and store a document, deal with the list (file) and control texts Formatting and arranging texts How to specify font size and color, add effects and spacing, and add bullets and numbering Images and shapes How to deal with pictures and shapes, add a cover and a number to the page, add symbols and equations	18	1+2+3
Weekly Exams	Data show	Word 2010	Page layout How to plan, organize and prepare pages and add a frame, background, columns and page breaks View Page Organize document view, add notes, zoom in and out of the document, and open a new window Add tables in Word How to work with and control tables	18	4+5+6
Weekly Exams	Data show	Power point 2010	Principles of presentations in Power Point 2010 and slideshow How to add slides, write to slides and slide shows	18	7+8+9

			Slide layout, slide repeat, and text formatting.		
Weekly Exams	Data show	Power point 2010	Move between slides and add timing and effect to slides Add animations to slides and objects and control slide animation Add fees to slides	18	10+11+ 12

11. Infrastructure	
"Computer Fundamentals and Office Applications" Part II approved by the Ministry of Higher Education and Scientific Research.	1- Required textbooks
• Microsoft Office Professional 2010 step by step 1st Edition, 2011. • Computing Fundamentals: IC3 Edition, 2014.	2- Main references (sources)
• Computer Basic Skills Microsoft Windows PCs	• Recommended books and references (scientific journals, reports, ...)
• A fast and improved Image Compression technique using Huffman coding, 2016. • Image compression based upon Wavelet Transform and a statistical threshold, 2016. • Efficient Deep Neural Network for Digital Image Compression Employing Rectified Linear Neurons, 2016. • https://www.microsoft.com/ar-iq/ • https://www.netliteracy.org/	• Electronic references, websites, ...

12. Course Development Plan
Developing the course based on a modern curriculum in the field of computers and the latest technologies used

Chapter Two: Phase One: Biosecurity

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

University of Baghdad – College of Science	208. Educational institution
Department of Life Sciences	209. University Department / Center
Theoretical biosecurity	210. Course Name/Code
	211. Programs in which he enters
Traditional lecture	212. Available Attendance Forms
2021-2020	213. Semester / Year
2 hours per week	214. Number of Credit Hours (Total)
2020	215. The history of preparation of this description
216. Course Objectives	
1. Introduce the student to the basic concepts of biosecurity	
2. The student learns how to deal with laboratory materials, devices and biological equipment	
3. The student learns how infection and pathogens are transmitted and how to deal with them with caution 4. The student learns how to protect himself and his colleagues by following international guidelines for biosecurity 5. Teaching the student the ethics of scientific research and not to disclose important information	

217. Learning outcomes and teaching, learning and assessment methods
A. Knowledge and understanding A1- The student learns what biosecurity is A2- The student learns how to use and protect himself by following the guidelines A3- Handling biological materials professionally, safely and ethically A4- Not to deal with any party outside the laboratory or scientific institution A5- A6-
B - Subject-specific skills B1 – Identify local and international guidelines and how to apply them cautiously B2 - B3 - B4-
Teaching and learning methods
1. Using the projector 2. Use drawings and diagrams on the board
Evaluation methods
Written tests Asking intellectual questions during the lecture
C- Thinking skills C1- Intellectual questions A2- A3-

A4-
Teaching and learning methods
The use of modern projectors and movies
Evaluation methods
Written and oral tests
d. General and transferable skills (other skills related to employability and personal development). D1- Guiding the student and developing his desire to specialize D2- Expanding the student's ability to understand the laws of biosafety and biosecurity D3- D4-

218. Course Structure					
Evaluation method	Method of education	Name of the unit/course or topic	Required Learning Outcomes	Hours	The week
Daily tests	Monitor	**What is Biosecurity**	**What is Biosecurity, History of Biosecurity, Differentiating between biosafety and biosecurity**	2	1
Daily tests	Monitor	**Goals of Biosecurity**	**Goals of Biosecurity, Some factors influencing biosecurity, What are the Biosecurity hazards?**	2	2
Daily tests	Monitor	**Biosecurity**	**Biosecurity in laboratorie, Laboratory Risks, Biosecurity risks, Categories Definition**	2	3
Semester exam	Monitor	**Laboratory biosecurity program**	**Laboratory biosecurity program Responsibility for VBM (Valuable Biological Material) , Elements of a Strong Biosecurity Program**	2	4
Daily tests	Monitor	**The Virtual Biosecurity Center**	**The Virtual Biosecurity Center (VBC), Participating Organizations**	2	5
Daily tests	Monitor	**Participating Organizatio**	**Participating Organizatio, Developing a Biosecurity Program**	2	6
Daily tests	Monitor	**Biosecurity Risk**	**Biosecurity Risk Assessment and Management Process,**	4	7+8

			risk management program		

219. Infrastructure	
Lectures prepared by the professors of the subject	Required readings: ▪ Basic texts ▪ Course Books ▪ Other
Harding, A.L., and Brandt Byers, K. Epidemiology of laboratory-associated infections . In: Fleming, D.O., and Hunt, D.L. Biological safety: principles and practices. Washington, DC: ASM Press, 2000; 35-54 **Salerno, R.M and Gaudioso, J. Laboratory Biosecurity Handbook , CRC Press. 2007**	Special requirements (e.g. workshops, periodicals, software and websites)
	Social services (e.g. guest lectures, vocational training and field studies)

220. Acceptance	
	Prerequisites
	Minimum number of students
	The largest number of students

Chapter Two: General Bacteria

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the description of the programme.

University of Baghdad - College of Science - Department of Life Sciences	221. Educational institution
Pastor Alqaq Department of Life Sciences	222. University Department / Center
General bacteriology	223. Course Name/Code
Traditional lecture	224. Available Attendance Forms
Second Semester 2022-2023	225. Semester / Year
Two hours a week theoretical + two hours a week practical	226. Number of Credit Hours (Total)
1/10/2022	227. The history of preparation of this description
228. Course Objectives	
The student was introduced to the components of bacteria, the structure of the cell wall of bacteria, the growth and multiplication of bacteria, the factors affecting the growth of bacteria, the nutritional types of bacteria, the metabolism of bacteria and their genetic components, and physical methods of controlling bacteria.	

229. Course Outcomes and Methods of Teaching, Learning and Assessment

A- Knowledge Objectives

A1- The student should be able to identify bacteria and install their wall and components.

A2- The student should be able to know the growth and multiplication of bacteria.

A3- To be able to understand the effect of factors on bacterial growth and nutritional patterns of bacteria

A4- Knowledge of bacterial metabolism, genetic factors and how to control the growth of bacteria chemical and physical methods

B - Skills objectives related to the subject

B1 Identify the types of bacteria and differentiate between species

B2 – Identify the methods of growing bacteria and how to calculate the bacterial number

B3- Identify the standard pattern of bacterial growth

B4- Identify the cellular structure of the wall and other cellular components .

Teaching and learning methods

1- E-Classes
2- Use of graphics on the board
3- Use data show and Power point devices for lectures.
4- Reporting.
5- Video Screening
6- Homework

Evaluation methods

10- Ask deductive questions during the lecture.
11- Written tests after the lecture.
12- Semester exams for a group of lectures.
13- Reporting
14- Homework

C- Emotional and value goals

C1- Enhancing the student's self-confidence through the development of thinking skills

C2 - Oral and written deductive tests

C3- Reporting

Teaching and learning methods

The use of illustrative means in explaining the theoretical part and the use of a number of diagnostic media from agricultural media, microbiology and various

experiments in the laboratory with the presentation of scientific films using the data show device.
Evaluation methods
The student's activity in the classroom and his ability to answer deductive questions and answer oral and written questions and discuss the results within the reports prepared by him for the purpose of identifying the student's ability to deductive thinking and thus the possibility of putting forward new ideas that contribute to constructive scientific criticism.
d. General and rehabilitative skills transferred (other skills related to employability and personal development). D1- The possibility of interpreting the results according to the scientific facts studied and learned by the student D2- Applying the concepts and foundations received by the student in the practical side of life D3- Developing the student's potential towards deductive thinking

10 Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Daily and quarterly exam	Traditional lecture	A brief history of microbiology and the structure of bacteria	recognize the beginning of the detection of bacteria, cell wall components, and cellular components of bacteria,	12	1+2+3
Daily and quarterly exam	Traditional lecture	Growth and multiplication of bacteria Factors affecting bacterial growth	Identify the stages of growth of bacteria, the standard curve of growth, and the physical factors affecting growth,	12	4+5+6
Daily and quarterly exam	Traditional lecture	Feeding bacteria Bacterial metabolism	Identify the nutritional patterns of bacteria and their metabolism	12	7+8+9

Daily and quarterly exam	Traditio nal lecture	Control of bacterial growth by physical and chemical methods	Learn how to inhibit or kill bacterial growth using chemical and physical agents.	12	10+11+ 12

11- Infrastructure	
– Course Books General Microbiology Books: Written by a group of professors of the Department of Life Sciences 1991	1- Required textbooks
Adaptation of Escherichia coli to long-term batch culture in various rich media Available online 15 February 2018 Characterization of the role of global regulator FliA in the pathophysiology of Pseudomonas aeruginosa infection Available online 10 February 2018 A halotolerant Enterobacter sp. displaying ACC deaminase activity promotes rice seedling growth under salt stress January 2018	2- Main references (sources)
Lectures scheduled by the professors of the subject WHO Reports	A- Recommended books and references (scientific journals, reports, ...)
ResearchGate Google scholar	B- Electronic References, Websites

12- Course Development Plan Training students on bacterial culture techniques with video lectures

Chapter Two: Computers 2

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

University of Baghdad - College of Science	230. Educational institution
Department of Life Sciences	231. Scientific Department / Center
Computer Science 2	232. Course Name/Code
Traditional + electronic lecture	233. Available Attendance Forms
2022-2023 Chapter Two	234. Semester / Year
18 Practical	235. Number of Credit Hours (Total)

1-10-2022	236. The history of preparation of this description
237. Course Objectives	
• The student learns problem-solving strategies in an advanced way	
Teach the student how to think and how to develop computerized solutions to the mathematical problems he faces, as well as teach him to commit and master to benefit from them in the fields of scientific and professional life.	

238. Course Outcomes and Methods of Teaching, Learning and Assessment
A- Knowledge Objectives A1- A1- The student should be able to benefit from programming to solve all types of mathematical equations computerically. A2. Mathematics is the basis of all science and programming helps in the process of solving mathematical problems related to gene programming and making complex statistical tables in a professional manner.
B - Course skills objectives B1 - Use legends and calculate the expected results on the board B2 – Implementation of programs on the computer and analysis of outputs B3 – Preparing reports on the subject
C- Thinking skills C1- Solving simple and complex equations C2 Identify the results of programs before their implementation C3- Developing the efficiency of working on the computer

Evaluation methods
Weekly - monthly and quarterly tests - preparation of reports
Teaching and learning methods
Implementing programs on the computer practically and comparing and analyzing the resulting outputs The use of illustrative means and modern sources of the information network. Using Data Show
Evaluation methods
Weekly - monthly and quarterly tests - preparation of reports
d. General and rehabilitative skills transferred (other skills related to employability and personal development). - General and transferable skills (other skills related to employability and personal development). D1- Directing the student on the importance of using computers in all fields of biological laboratories. D2- Directing the student to use the programming language to solve mathematical, statistical and chemical problems.

239. Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Weekly exams	Data Show + Practical work on PC	Excel VBA	Introduction to VBA	18	1 + 2 + 3
			Identify simple and complex sequences and sequences		4 + 5 + 6
			Examples of matrices as well as example of converting two-dimensional array elements to one-dimensional matrix in VBA Arrays and Matrix in Excel VBA		7 + 8 + 9
			Sord and Search Data in Excel and in Excel VBA		10 + 11 + 12

240. Infrastructure	
Lectures scheduled by the professor of the subject - course books + modern sources from the Internet. • "Computer Fundamentals and Office Applications" Part II approved by the Ministry of Higher Education and Scientific Research. • Microsoft Office Professional 2010 step by step 1st Edition, 2011.	22- Required textbooks
www.edx.org , www.microsoft.com	23- Main references (sources)
Lectures scheduled by the professor of the subject - course books + modern sources from the Internet.	CC) Recommended books and references (scientific journals, reports, ...)

• "Computer Fundamentals and Office Applications" Part II approved by the Ministry of Higher Education and Scientific Research. Computing Fundamentals: IC3 Edition, 2014.	
• www.edx.org • www.python.org • https://www.codecademy.com • www.biopython.org • www.microsoft.com	DD) Electronic references, websites, ...
• Third-generation sequencing and the future of genomics, 2016. • Complex rearrangements and oncogene amplifications revealed by long-read DNA and RNA sequencing of a breast cancer cell line,.	EE)

241. Course Development Plan
Google App Script

Chapter Two: Classification of my life

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Baghdad/college of science
2. University Department/Centre	Department of Biology

3. Course title/code	**Biosystematics**
4. Programme(s) to which it contributes	Bachelor in Biology
5. Modes of Attendance offered	Teaching Lecture
6. Semester/Year	2023- 2022
7. Number of hours tuition (total)	15 weeks
8. Date of production/revision of this specification	1/10/ 2022

9. Aims of the Course

Study of the diversification of living forms in Animals and plants , both past and present, and the relationships among living things through time. Relationships are visualized as evolutionary trees Phylogenies have two components: branching order (showing group relationships) and branch length (showing amount of evolution)

.

10· Learning Outcomes, Teaching ,Learning and Assessment Methode

C- **Knowledge and Understanding**:

A1- is the field that provides scientific names for organisms describes them, preserves collections of them.

A2- provides classifications for the organisms, keys for their identification.

A3- investigates their evolutionary histories, and considers their environmental adaptations.

A4- classifications of evolutionary and organism histories.

B. Subject-specific skills:

B1. Including the scientific names of organisms, species descriptions and overviews, taxonomic orders, and classifications of evolutionary and organism histories

B2. Studying the diversity of organisms and the differentiation between extinct and living creatures. Biologists study the well-understood relationships by making many different diagrams and "trees" (cladograms, phylogenetic trees, phylogenies, etc.).

B3. Explaining the biodiversity of the planet and its organisms. The systematic study is that of conservation

Teaching and Learning Methods

Preparation of PowerPoint lectures and the use of the presentation screen, using charts of the most prominent information from modern sources

Assessment methods

Weekly, monthly and quarterly tests with reports on related topics

C. Thinking Skills:

C1- Developing the student's ability to learn about the diagnosis of living organisms in his environment

C2- prepare the student in a way that qualifies him to deal with living organisms in his environment

Teaching and Learning Methods

By lecturing using the latest methods used in the rugged universities

Assessment methods

1- Directly: the quarterly and monthly written exams2. Indirect: oral tests

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First week	5h	Introduction: the different between systematics & Biosystematics In plants The important ranks of taxonomic hierarchy Concept of numerical taxonomy	Introduction: the different between systematics & Biosystematics In plants	PowerPoint + L.C.D	
second week	5h	Sources of the evidence & relationship between systematics and other sciences in plants	relationship between systematics and other sciences in plants	PowerPoint + L.C.D	written exam
Third week	5h	Biosystematics & modern plant taxonomy Mechanics of evolution Mondalism concepts Mutation Hybridization	Biosystematics & modern plants taxonomy	PowerPoint + L.C.D	
Fourth week	5h	The concept of the species & speciation (in plant Taxonomy) Isolation Mechanism of isolation Types of isolation	species & speciation (in plants Taxonomy)	PowerPoint + L.C.D	
Fifth week	5h	Variation & Evolution in plant Taxonomy Sources of Variation	Variation in plant Taxonomy	PowerPoint + L.C.D	
Sixth week:	5h	Reproductive (Breeding) system in flowering plants Sexual Reproduction (Amphimixis) out-breeding Heteromorphic self-incompatibility Homomorphic self-incompatibility	Reproductive in plant Taxonomy	PowerPoint + L.C.D	written exam
Seventh week:	5h	Introductory remarks (Definition of Biosystematics) systematics characters, Levels of Taxonomy, classification definitions, Binomial Nomenclature,	Definition of Biosystematics (in zoology)	PowerPoint + L.C.D	
Eighth week	5h	Species Concepts, Types of Speciation,	Species Concepts (in zoology)	PowerPoint + L.C.D	

Ninth week and Tenth week:	10 h	Reproductive isolations: Prezygotic reproductive isolation ❖ habitat isolation ❖ temporal Isolation, ❖ gametic Isolation, postzygotic reproductive isolation ❖ hybrid breakdown ❖ reduced hybrid fertility	Reproductive isolations (in zoology)	PowerPoint + L.C.D	written exam
Eleventh week	5h	Types in Zoology, Kinds of Types, Taxonomic keys	Types (in zoology)	PowerPoint + L.C.D	
Twelfth week and thirteenth week	10 h	Variation in Taxonomic and Systematic Characters 1-Geographic,2-Sexual, 3-Individual Variation, I. Age variation II. Social Variations III. Ecological Variations IV. Traumatic Variations Genetic Variation	Variation in Taxonomy (in zoology)	PowerPoint + L.C.D	written exam

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1- Principles of Animal Taxonomy by George Gaylord Simpson. 2- Principles of Systematic Zoology. Ernst Meyer. 3- Methods and Principles of Systematic Zoology. Ernst Mayer 4- Plant Taxonomy and Biosystematics by Clive A. Stace 5-Introduction to the Principles of Plant Taxonomy 2nd Edition by V. V. Sivarajan , &N. K. P. Robson
Special requirements (include for example workshops, periodicals, IT software, websites)	Scholarly articles from journal of taxonomy and biosystematics
Community-based facilities (include for example, guest Lectures , internship , field studies)	(field studies from different environments)

13. Admissions

Pre-requisites	Bachelor in Biology
Minimum number of students	
Maximum number of students	

Chapter Two: Classification of my life is my work

COURSE SPECIFICATION
Biosystematics laboratory / Undergraduate Students
2022-2023

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Baghdad/college of science
2. University Department/Centre	Department of Biology
3. Course title/code	**Biosystematics laboratory**
4. Programme(s) to which it contributes	Bachelor in Biology
5. Modes of Attendance offered	Teaching Lecture
6. Semester/Year	2022-2023
7. Number of hours tuition (total)	15 weeks
8. Date of production/revision of this specification	1/10/2022
9. Aims of the Course	
Study of the diversification of living forms in Animals and plants , both past and present, and the relationships among living things through time. Relationships are visualized as evolutionary trees Phylogenies have two components: branching order (showing group relationships) and branch length (showing amount of evolution) .	

10· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- **Knowledge and Understanding**:

A1- is the field that provides scientific names for organisms describes them, preserves collections of them.

A2- provides classifications for the organisms, keys for their identification.

A3- investigates their evolutionary histories, and considers their environmental adaptations.

A4- classifications of evolutionary and organism histories.

B. Subject-specific skills:

B1. Including the scientific names of organisms, species descriptions and overviews, taxonomic orders, and classifications of evolutionary and organism histories

B2. Studying the diversity of organisms and the differentiation between extinct and living creatures. Biologists study the well-understood relationships by making many different diagrams and "trees" (cladograms, phylogenetic trees, phylogenies, etc.).

B3. Explaining the biodiversity of the planet and its organisms. The systematic study is that of conservation

Teaching and Learning Methods

Preparation of PowerPoint lectures and the use of the presentation screen, using charts of the most prominent information from modern sources

Assessment methods

Weekly, monthly and quarterly tests with reports on related topics

C. Thinking Skills:

C1- Developing the student's ability to learn about the diagnosis of living organisms in his environment

C2- prepare the student in a way that qualifies him to deal with living organisms in his environment

Teaching and Learning Methods

By lecturing using the latest methods used in the rugged universities

Assessment methods

1- Directly: the quarterly and monthly written exams2. Indirect: oral tests

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
First week	3h	Types: Stems and leaves of plants		PowerPoint + L.C.D	
second week	3h	Types: Flowers of plants		PowerPoint + L.C.D	written exam
Third week	3h	flowering inflorescences		PowerPoint + L.C.D	
Fourth week	3h	Types: fruits of plants		PowerPoint + L.C.D	
Fifth week	3h	Plants Taxonomical keys		PowerPoint + L.C.D	
Sixth week:	3h	flowering families		PowerPoint + L.C.D	written exam
Seventh week:	3h	Animal Taxonomical key		PowerPoint + L.C.D	
Eighth week	3h	Immature Stage Of Insects & Development And Metamorphic		PowerPoint + L.C.D	
Ninth week and Tenth week:	3h	Insect Orders Subclass: Apterygota 1-Order : Thysanura 2-Order: Collembola *Subclass:Pterygota Division: Exopterygota , Division: Endopterygota:		PowerPoint + L.C.D	written exam
Eleventh week	3h	Orders : Odonatam, Orthoptera & Dictyptera		PowerPoint + L.C.D	
Twelfth week thirteenth week	3h	Orders : Anopleura & Mallophaga		PowerPoint + L.C.D	written exam
Fourteenth week	3h	Orders: Lepidoptera & Diptera			
fiftenth week	3h	Orders: Hymenoptera & Coleoptera			

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1- Principles of Animal Taxonomy by George Gaylord Simpson. 2- Principles of Systematic Zoology. Ernst Meyer. 3- Methods and Principles of Systematic Zoology. Ernst Mayer 4- Plant Taxonomy and Biosystematics by Clive A. Stace 5-Introduction to the Principles of Plant Taxonomy 2nd Edition by V. V. Sivarajan , &N. K. P. Robson
Special requirements (include for example workshops, periodicals, IT software, websites)	Scholarly articles from journal of taxonomy and biosystematics
Community-based facilities (include for example, guest Lectures , internship , field studies)	(field studies from different environments)

13. Admissions	
Pre-requisites	Bachelor in Biology
Minimum number of students	
Maximum number of students	

Chapter Two: Parasites

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

College of Science / University of Baghdad	242. Educational institution
Department of Life Sciences	243. Scientific Department / Center
Primary parasitology	244. Course Name/Code
Theoretical lecture PowerPoint presentation online due to the pandemic	245. Available Attendance Forms
2022-2023	246. Semester / Year
4 hours theoretical per week	247. Number of Credit Hours (Total)
1/10/2022	248. The history of preparation of this description
249. Course Objectives	
7- Study of parasitic primaries of medical and economic importance	
8- Study the life cycles of these primary schools and identify their hosts and life cycles	
9- Study of parasite infection methods, methods of diagnosis and prevention and treatments used	

250. Course Outcomes and Methods of Teaching, Learning and Assessment
A- Knowledge Objectives A1- **The student should be acquainted with the science of primary parasitology spread locally and globally** **A2- The student should know how to diagnose primary nurses and ways to prevent them** **A3- The student should be able to distinguish the pathological types of them** **A4- Directing the student to spread health culture in his home and family**
B - Course skills objectives B1 - Diagnosis of pathogenic parasites circulating in Iraq B2 - Preparing a research on one of the parasitic primaries B3 - B4-
Teaching and learning methods
Powerpoint presentation Online lectures on YouTube Interact with students on Google Classroom
Evaluation methods
Online quizzes on Google Classroom by Google form quiz Preparing a theoretical report on one of the parasites
C- Emotional and value goals C1- Developing the student's skills in e-learning and searching for information online using educational platforms C2 The student's ability to think deductively regarding the diagnosis of the parasite 32- Communication to put forward new ideas and constructive scientific criticism 43- Directing the student to focus on the type of symptoms caused by different injuries
Teaching and learning methods
Online lectures on YouTube Interact with students on Google Classroom

Evaluation methods
Online quizzes on Google Classroom by Google form quiz Preparing a theoretical report on one of the parasites
d. General and rehabilitative skills transferred (other skills related to employability and personal development). D1- **Developing the student's skill using the correct methods in the accurate medical diagnosis of these parasites** **Which contribute to the possibility of working in the medical field** D2- D3- D4-

251. Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Online by Google Classroom	Video theoretical lectures	Introduction to Protozoan Parasitology	Definition of Parasites, Types of parasitic symbiosis, Types of hosts, Modes of parasitic infection, General terminology, protozoa classification &reproduction.	**2**	**1**
Online by Google Classroom	Video theoretical lectures	Sub-phylum: Sarcodina, *Entamoeba histolytica, E. dispar, E. hartmani, E. coli, Endolimax nanus*, *Iodaoeba butschlii*, *Entamoeba gingivalis,*	Morphology, Life cycle, Pathogenicity, Diagnosis, treatment and prevention.	**2**	**2**
Online by Google Classroom	Video theoretical lectures	*Naegleria fowleri, Acanthamoeba.* Subphylum: Ciliata *Balantidium coli* Subphylum: Flagellata *Dientamoeba fragilis, Giardia lamblia,*	Morphology, Life cycle, Pathogenicity, Diagnosis, treatment and prevention.	**2**	**3**
Online by Google Classroom	Video theoretical lectures	*Chilomastix mesnili, Trichomonas vaginalis, T. tenax, T. hominis,*	Morphology, Life cycle, Pathogenicity, Diagnosis, treatment and prevention.	**2**	**4**
Online by Google Classroom	Video theoretical lectures	*Leishmania* forms: Amastigotes and Promastigotes, Old world and New-World leishmaniasis, *Leishmania tropica, L. major, L.*	Morphology, Life cycle, Pathogenicity, Diagnosis, treatment and prevention. New and Old world leishmaniasis.	**2**	**5**

		donovani, L. infantum, L. braziliensis.			
Online by Google Classroom	Video theoretical lectures	Exam		**2**	**6**
Online by Google Classroom	Video theoretical lectures	*Trypanosoma* forms: Epimastigotes and Trypamastigotes. *Trypanosoma brucei gambiense, T.b. rhodesiense, T. cruzi.*	Morphology, Life cycle, Pathogenicity, Diagnosis, treatment and prevention.	**2**	**7**
Online by Google Classroom	Video theoretical lectures	Sub-phylum: Sprozoa. *Plasmodium falciparum, P. vivax, P. ovale, P. malariae.*	Morphology, Erythrocytic and Exoerythrocytic Life cycle, Pathogenicity, Diagnosis, treatment and prevention.	**2**	**8**
Online by Google Classroom	Video theoretical lectures	Apicocomplexa, *Toxoplasma gondii, Cryptosporidium*	Morphology, Life cycle, Pathogenicity, Diagnosis, treatment and prevention.	**2**	**9**
Online by Google Classroom	Video theoretical lectures	*Sarcocysts, Isospora belli, Cyclospora cayetanesis,*	Morphology, Life cycle, Pathogenicity, Diagnosis, treatment and prevention.	**2**	**10**
Online by Google Classroom	Video theoretical lectures	Exam		**2**	**11**

252. Infrastructure	
Lectures scheduled by the professors of the subject **Availability of the textbook methodology (parasitology)**	24- Required textbooks

Scientific book specialized in parasitology - Baghdad University Press	
Ridley, John, W. (2012). Parasitology for medical and clinical laboratory professionals. Delmar Cengage Learning, USA.	25- Main references (sources)
The increasing use of information technology or Internet references, and changes in content as a result of keeping pace with the development in the world of technology and information using educational electronic platforms due to the pandemic	FF) Recommended books and references (scientific journals, reports, ...)
NCBI and Pubmed website for medical research related to the curriculum	GG) Electronic references, websites, ...

253. Course Development Plan
The use of electronic platforms for blended learning between the attendance of students in the regular class and electronic classes, as well as training the student to search electronically for the information required to study in the theoretical and practical part of primary parasites.

Chapter Two: Biological Diversity

This course description provides a brief summary of the most important course characteristics and the expected learning outcomes of
The student achieved them by proving whether he or she made the most of the available learning opportunities. It must be linked to the program description.

University of Baghdad - College of Science	254. Educational institution
Department of Life Sciences	255. University Department / Center
Theoretical biodiversity	256. Course Name/Code
Study the environment and composition of organisms in the universe	257. Programs in which he enters
Traditional lecture	258. Available Attendance Forms
Second Semester / 2022- 2023	259. Semester / Year
Theoretical 4 hours per week + practical 8 hours per week	260. Number of Credit Hours (Total)
1/10/2022	261. The history of preparation of this description
262. Course Objectives	
1- Study of biodiversity and the factors affecting it	
2- Knowing the habitats of neighborhoods and the division of environmental habitats	
3- Know the importance of diversity and ways to preserve it	

263. Learning outcomes and teaching, learning and assessment methods
A. Knowledge and understanding A1- Know the importance of biodiversity A2- Understand the methods of separation between environmental organisms A3- Know how to form a new ecosystem A4- A5- A6-
B - Subject-specific skills B1 – The student learns what diversity is, its causes and the factors affecting extinction B2 – Also learns levels of biodiversity B3 – Also learns about threats to biodiversity B4-
C- Thinking skills C1- Knowledge of nature reserves and national parks C2- Depletion of environmental resources A3- A4-
d. General and transferable skills (other skills related to employability and personal development). D1- Employing and developing the aforementioned skills A, B and C D2- D3- D4-
Teaching and learning methods
1- Giving a lecture in the form of a datashow 2- Teaching the student the correct technique 3- Use illustrations

Evaluation methods
1- Surprise exams (Kozat) 2- Semester Exams 3- Final Exam

264. Course Structure

Evaluation method	Method of education	Name of the unit/course or topic	Required Learning Outcomes	Hours
Surprise exams + monthly exam	Lecture in the form of Datacho	Genetic ecological and species diversity	biodiversity	4
		Macroevolution and microevolution	Evolution	4
		In animals and birds for example	Forming of species	4
		Aquatic and terrestrial biomes	Biomes	4
		Mass, pseudoextinction and coextinction	Extinction	4
		Species , genus and another rank	Taxonomic rank	4
		History of classification	Taxonomy and classification	4
		Linnaean system of classification	Taxonomic Linnaean hierarchy	4

265. Infrastructure

• Lectures of the subject professors • Evolution; the triumph of an idea – cari zimmer, harper Collins 2006 • What evolution is? Ernst Meyer. Basic book , 2001 • Speciation . jerry A, coyne and H. allen Orr sinauer assocates , 2004	Required readings: ▪ Basic texts ▪ Course Books ▪ Other
• www.bio.org • www.khanacademy.org • www.nature.com	Special requirements (e.g. workshops, periodicals, software and websites)

Conservation biology. Harlow, Essex, England: Longman. Yom-Tov, Y. (1988). The Zoogeography of the birds and mammals of Israel. In: Y. Yom - Tov and E. Tchernov (Eds.), *The zoogeography of :Israel* *The distribution and abundance at a zoogeographical crossroad*. Dordrecht: Dr. • W. Junk Publishers.	Social services (e.g. guest lectures, vocational training and field studies)

266. Acceptance	
	Prerequisites
	Minimum number of students
	The largest number of students

Adding new or discovered information in biodiversity	14. Course Development Plan

Chapter Two: Stage Three: Animal Physiology

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

Ministry of Higher Education and Scientific Research – University of Baghdad	267. Educational institution
bioscience	268. Scientific Department / Center

Animal Physiology (Theoretical) Bachelor	269. Course Name/Code
Traditional lecture + video lecture on the electronic classroom	270. Available Attendance Forms
2022/2023 Second Semester	271. Semester / Year
2 Theoretical	272. Number of Credit Hours (Total)
1-10-2022	273. The history of preparation of this description
274. Course Objectives	
The article aims to describe the physiological activities inside the body and clarify the mechanism and work of all organs within the body, as well as describe the pathological conditions that accompany the work of these organs, as well as clarify the process of balance between the work of the organs combined for the purpose of performing basic functions	

275. Course Outcomes and Methods of Teaching, Learning and Assessment
A. Knowledge and understanding A1- Introducing the student to the subject in general A2- Introducing the student to each organ in the body A3- Introducing the student to the function of each organ in the body A4- Introducing the student to how to agree between members in order to accomplish the functions of the body A5- Introducing the student to the diseases resulting from a defect in the work of a particular member A6-
B - Subject-specific skills B1 – Identify the functions of the members B2 – Identify the factors affecting the work of members B3 – Identify the mechanisms of action and biobalance B4
Teaching and learning methods
1- Explanation of the material through lectures in the electronic classroom 2- Scientific activities by providing research and scientific articles related to the course methodology
Evaluation methods

By quarterly and daily tests By following up the students' attendance and active participation in the electronic classroom
C- Emotional and value goals C1-Community Service C2- Raising community awareness of the symptoms of diseases
d. General and rehabilitative skills transferred (other skills related to employability and personal development). C1- Participation in discussions during the presentation of the scientific material C2- Continuous communication with the update of scientific information

276. Course Structure					
Evaluation method	Method of education	Name of the unit/course or topic	Required Learning Outcomes	Hours	The week
Daily electronic exams	Video lecture in the electronic classroom	Animal physiology	General introduction to the concept of animal physiology	2	The first
Daily electronic exams	Video lecture in the electronic classroom	Animal physiology	The effect of temperature on the body and the adaptation mechanisms of animals	2	Second
Daily electronic exams	Video lecture in the electronic classroom	Animal physiology	Structure and components of the nervous system	2	Third
Daily electronic exams	Video lecture in the electronic classroom	Animal physiology	Physiology of the nervous system	2	Fourth
Daily electronic exams	Video lecture in the electronic classroom	Animal physiology	Composition and components of the digestive system	2	V
Electronic Semester Exam	Video lecture in the electronic classroom	Animal physiology	Physiology and digestion mechanism	2	Sixth
Electronic Semester Exams		Animal physiology		2	First semester exam

Daily electronic exams	Video lecture in the electronic classroom	Animal physiology	Study of the mechanism and functions of the circulatory system	2	Seventh
Daily electronic exams	Video lecture in the electronic classroom	Animal physiology	Study of the mechanism and functions of the respiratory system	2	Eighth
Daily electronic exams	Video lecture in the electronic classroom	Animal physiology	Study of the mechanism and functions of the lymphatic system	2	Ninth
Daily electronic exams	Video lecture in the electronic classroom	Animal physiology	Study of the mechanism and functions of the urinary system	2	X
Daily electronic exams	Video lecture in the electronic classroom	Animal physiology	Study of the mechanism and functions of the muscular system	2	Eleventh

277. Infrastructure	
Human Physiology	26- Required textbooks
Medical Physiology	27- Main references (sources)
From internet	HH) Recommended books and references (scientific journals, reports, ...)
From internet	II) Electronic references, websites, ...

278. Course Development Plan
Adding modern topics and new vocabulary and showing explanatory videos and modern sources

Third Stage / Chapter Two: Practical Animal Physiology

The course description provides the most important learning on how to perform the most important physiological tests related to blood and others and their importance in the diagnostic aspect.

Ministry of Higher Education - University of Baghdad / College of Science	279. Educational institution
Department of Life Sciences	280. Scientific Department / Center
Animal physiology Practical	281. Course Name/Code
Traditional lectures + electronic lecture	282. Available Attendance Forms
2022-2023 Chapter Two	283. Semester / Year
16 hours	284. Number of Credit Hours (Total)
1-10-2022	285. The history of preparation of this description
286. Course Objectives	
Identify the components of blood and how to separate blood components Introduce the student to blood clotting contraindication	
Introducing the student to the complete blood picture tests	
Training the student on blood cell counts and differential counting of white blood cells	
Calculation of bleeding and clotting time	
The student takes the test blood groups	
Introducing the student to the osmotic relations in the blood	

Frog-related experiments to study cardiac physiology and capillary circulation

287. Course Outcomes and Methods of Teaching, Learning and Assessment

A- Knowledge Objectives
A1- Study of blood components
A2- Performing various blood tests
A3- Study of frog anatomy

B - Course skills objectives
B1 - The student learned how to draw blood skillfully
B2 – Benefit from various blood tests in the early diagnosis of some diseases
B3 -
B4-

Teaching and learning methods

1- Preparing a Power Point lecture and using data show in its presentation.
2- Use modern sources from the computer network to obtain illustrative images of the internal anatomy of the frog.

Evaluation methods

Daily - weekly - quarterly tests and reports

C- Emotional and value goals
C1- Teaching the student the importance of blood test tests
C2- Introducing the student to the most important laboratory devices and tools
C3- Parts of the tests themselves
C4- Read the results

Teaching and learning methods

1- Preparing a lecture Power Point and the use of data show in its width.
2- Using up-to-date sources from the computer network to obtain illustrative images of the frog's internal anatomy

Evaluation methods
Weekly cups - monthly exams - preparation of reports
d. General and rehabilitative skills transferred (other skills related to employability and personal development). D1- Teaching the student the importance of blood test tests 2 - Introducing the student to the most important laboratory devices and tools 3- Parts of the tests themselves 4- Read the results D4-

288. Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Preview and editorial questions	Using the display screen and teaching how to draw blood	Hematology	Identify the components of blood and the mechanism of action of anticoagulants	2	First + Second
Report on experience and editorial questions	Using the display screen, Sahli device and microcentrifuge	Hematology	Measurement of hemoglobin and the volume of blood cells compressed	2	Third
Written questions and laboratory reports	Using the display	Hematology	Measurement of erythrocyte sedimentation rate	2	Fourth
Editorial questions and reports	Using the display	Hematology	Counting and differential counting of red blood cells and white blood cells	2	V + VI
Editorial questions and reports	Using the display	Hematology	Platelet count	2	Seventh
Editorial questions and reports	Using the display	Hematology	Calculation of bleeding and clotting time	2	Eighth
Editorial questions and reports	Using the display	Hematology	Red cell constants	2	Ninth
Editorial questions	Using the display	Hematology	Determination of blood groups	2	X

and reports			and blood pressure measurement		
Editorial questions and reports	Using the display	Hematology	Osmotic relations and hematology screening	2	Eleventh
Editorial questions and reports	Using the frog model and the compound microscope	Frog Experiments	Capillary rotation in the peritoneum of the frog	2	Twelfth
Editorial questions and reports	Using the frog model	Anatomy of the frog	Study of some concepts of capillary rotation in the frog	2	Thirteenth
Editorial questions and reports	Use a thermometer, heater and thread	The student is the focus of the experience	Some experiments on thermal equilibrium among students	2	Fourteenth
Editorial questions and reports	Anatomy of the frog	Frog's heart	Frog's heart physiology and scoring blows	2	Fifteenth

289. Infrastructure	
Guyton and Hall. (2011). Guyton and Hall Text book of medical physiology. McGraw Hill Companies	28- Required textbooks
Whoa, whoa, who Human physiology.com	29- Main references (sources)
Guyton and Hall. (2011). Guyton and Hall Text book of medical physiology. McGraw Hill Companies	JJ) Recommended books and references (scientific journals, reports, ...)
	KK) Electronic references, websites, ...

290. Course Development Plan

The use of all the necessary materials and devices to perform various tests and even blood pressure meters have been prepared in the laboratory. Teach the student to conduct all the tests themselves, starting from drawing blood to measuring blood pressure, conducting all tests themselves and understanding the results. Teach the student to use the microscope to examine all samples and conduct the test with their hands. Record all the results to remain in the student's mind

Chapter Two: Phase Three: Pollution

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

University of Baghdad – College of Science	291. Educational institution
Department of Life Sciences	292. University Department / Center
Theoretical environmental pollution	293. Course Name/Code

Bachelor of Life Sciences	294. Programs in which he enters
Traditional lecture	295. Available Attendance Forms
2022-2023	296. Semester / Year
12 hours a week	297. Number of Credit Hours (Total)
1/10/2022	298. The history of preparation of this description
299. Course Objectives	
1. The student is introduced to the concept of pollution	
2. Sources of major pollutants and their various effects - humans and the environment	
3. Also learn how to deal with these pollutants by controlling them	

300. Learning outcomes and teaching, learning and assessment methods
A. Knowledge and understanding A1- Understanding pollution and why it occurs A2- Learn the most important effects of environmental pollution, especially on humans A3- A4- A5- A6-
B - Subject-specific skills B1 – Teaching the student how to protect his environment from pollution B2 - B3 - B4-
Teaching and learning methods
1. Using the projector 2. Use drawings and diagrams on the board
Evaluation methods

Written tests Oral tests and daily exams
C- Thinking skills C1- Ask intellectual questions during the lecture A2- A3- A4-
Teaching and learning methods
The use of modern projectors and movies
Evaluation methods
Written and oral tests
d. General and transferable skills (other skills related to employability and personal development). D1- Guiding the student and developing his desire to specialize D2- Expanding the student's ability to understand pollution and major pollutants D3- D4-

301. Course Structure					
Evaluation method	Method of education	Name of the unit/course or topic	Required Learning Outcomes	Hours	The week
Daily tests	Monitor	Introduction to pollution	Definition of environmental pollution and the characteristics of pollutants, air pollution and the most important air pollutants	18	1+2+3
Daily tests	Monitor	Air-related pollutants	Identify environmental problems of a global nature such as global warming, ozone hole, radioactive pollution and the most important types of ionizing radiation	18	4+5+6
Daily tests	Monitor	Water pollution	Identify the sources of water pollution and the types of water pollutants and metal pollution	18	7+8+9
Semester exam	Monitor	soil pollution	Identify the sources of soil pollution and the most important soil pollutants, as well as identify the importance	18	10+11+12

			of fertilizers and pesticides, their types and environmental effects		

302. Infrastructure	
Lectures prepared by the professors of the subject Environmental Pollution Book	Required readings: ▪ Basic texts ▪ Course Books ▪ Other
1. Warneck, P., *Chemistry of the Natural Atmosphere*, International Geophysics Series. Vol. 41, Academic Press, San Diego, 1988. 2. Owa, F.W. Water pollution: sources, effects, control and management. *International Letters of Natural Sciences*, 2014. 3. Teh SJ, Adams SM, and Hinton DE. Histopathological biomarkers in feral freshwater fish populations exposed to different types of contaminant stress. Aquatic Toxicology, 37:51–70, 1997.	Special requirements (e.g. workshops, periodicals, software and websites)
	Social services (e.g. guest lectures, vocational training and field studies)

303. Acceptance	
	Prerequisites
	Minimum number of students
	The largest number of students

Chapter Two: Third Stage: Fungicides

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

University of Baghdad / College of Science	304. Educational institution
bioscience	305. Scientific Department / Center
Mycology	306. Course Name/Code
Traditional and electronic video lecture (Google Class Room)	307. Available Attendance Forms
Second / Third Phase 2022-2023	308. Semester / Year
3 hours per week theoretical + 2 hours per week practical	309. Number of Credit Hours (Total)
1/ 10/ 2022	310. The history of preparation of this description
311. Course Objectives	
1- Introduce the student to how to classify and diagnose fungi	
2- Study of its epidemiology and different methods of control and control	
3- Recognize the life cycle of fungi	
4- Study of some human pathogenic fungi that have medical importance	

312. Course Outcomes and Methods of Teaching, Learning and Assessment

A- Cognitive Objectives

A1- Classification of plant and human pathogenic fungi and methods of diagnosis

A2- Introducing them to the life cycles of each mushroom

A3- Study of the pathogenicity and damage caused by the fungus

A4- Study of treatment methods

A5- Avoiding losses at the level of agricultural crops and ways of prevention

B - Course skills objectives

B1 – Phenotypic diagnosis of fungus

B2 – Phenotypic and anatomical drawing of the fungus

B3 – Drawing the life cycle of each fungus and marking the task procedure

Teaching and learning methods

1- Preparing lectures in the Power Point program **and presenting them using (** Google Class Room) as well as using the social networking program Telegram

2- Using modern sources of the information network to obtain accurate graphics and explanatory videos

Evaluation methods

1- Attendance and presence on the (**Google Class Room**) platform during the lecture and interaction

2- Tests - Weekly - Monthly

3- Reporting

C- Emotional and value goals

C1- Weekly tests on the topic of the previous lecture

C2- Comprehensive semester exam

C3- Urging students to be informed of all that is new regarding mycology

C4- Giving questions to students during the lecture to be solved in the lecture itself or to be solved in the lecture

Subsequent and open the door for discussion by asking questions

d. General and rehabilitative skills transferred (other skills related to employability and personal development).

D1- Guiding the student and developing the desire to specialize in the field of biological laboratories

D2- Expanding the student's ability to distinguish between pathogenic and non-pathogenic fungi

D3- Expanding the student's ability to extract secondary metabolic compounds from fungi that are considered as antibodies

Life

313. Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Daily exam	**Google Class Room Power Point**	**General introduction to mycology**	**Definition of fungi, types of reproduction, fungal tissues, nutrition, benefits and harms and culture media for fungi**	**9**	**1+2+3**
Daily exam	**=**	**Unreal fungi Myxomycetes**	**Classification of low fungi Myxomycota**	**3**	**4**
Daily exam	**=**	**Chytridiomycetes**	**Classification of true fungi Eumycota**	**3**	**5**
Daily exam	**=**	**Oomycetes oomycetes**	**=**	**3**	**6**
Monthly exam			**=**	**3**	**7**
Daily exam	**=**	**Zygomycetes**	**=**	**3**	**8**
Daily exam	**=**	**Discoid fungus Ascomycotina**	**=**	**6**	**9+10**
Daily exam	**=**	**Basidiomycotina fungus**	**=**	**6**	**11+12**
Daily exam	**=**	**Deutromycotina deficiency fungus**	**=**	**6**	**13+14**
Monthly exam			**=**	**3**	**15**

314. Infrastructure	
1996.Introductory Mycology, Alexopoulos, C. J., C. W. Mims, and M. Blackwell. 4th ed. John Wiley and Sons, Inc.,New York	30- Required textbooks
Introduction to fungi (2007)3 rd. ed. John Webster and Roland weber. Cambridge.	31- Main references (sources)
1. Mycology journal (https://www.tandfonline.com/toc/tmyc/current) 2. /	LL) Recommended books and references (scientific journals, reports, ...)

1. https://drfungus.org	MM) Electronic references, websites, ...

315. Course Development Plan
1. Periodic review of the latest developments in mycology and try to include them in the form of extracurricular activities 2. Using the World Wide Web to obtain the latest versions of references with fungi and updating the course with new information 3. Use modern methods and means to deliver the correct information and skill to the student by providing students with video clip links that explain the mechanisms of the emergence of fungi and how they are diagnosed in the laboratory and then apply what can be applied in the laboratory

Chapter Two/ Third Stage: Medicinal Plants

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

University of Baghdad	316. Educational institution
Faculty of Science / Department of Life Sciences	317. University Department / Center
Medicinal plants	318. Course Name/Code
Electronic video lectures	319. Available Attendance Forms
Second Semester / 2022-2023	320. Semester / Year

Two hours theoretical	321. Number of Credit Hours (Total)
1/10/2022	322. The history of preparation of this description
323. Course Objectives This course aims to:	
- Identify Iraqi medicinal plants	
- The role of medicinal plants and their impact on folk medicine	
- Active ingredients and their locations in for medicinal plants.	
- Detection of active substances and their effectiveness against certain microorganisms.	
- How to use medicinal plants in various treatments.	

324. Learning outcomes and teaching, learning and assessment methods
A. Knowledge and understanding A1- The role of medicinal plants in the development of chemical drugs. A2- The effectiveness of medicinal plants against some pathogens. A3- The student's knowledge of poisonous plants and the components in them. A4- The use of medicinal plants in the treatment of some diseases.
B - Subject-specific skills B1 - Extraction of active substances from medicinal plants and testing their effectiveness against some bacterial species. B2 - The student acquires practical skills in preparing some therapeutic recipes from medicinal plants. B3 – B4-
Teaching and learning methods
5. Use the Data show to view the topic 6. Showing films related to photosynthesis, respiration and electron transport chain in plants. 7. Upload lectures in pdf format in the electronic classroom 4. Download video lectures in the electronic classroom
Evaluation methods

Relying on the student's attendance and interaction with the lecture (daily test). Theoretical monthly and quarterly exams. Daily, monthly and quarterly practical exams.
C- Thinking skills C1- The student acquires the skill of distinguishing between poisonous plants and medicinal plants. C2- The student acquires the skill of extracting active substances from medicinal plants. A3- A4-
Teaching and learning methods
Using some theoretical hypothetical problems to find out how the plant responds to them with some practical experiments on plants in controlled laboratory conditions to match their results with the results of theoretical hypothetical problems
Evaluation methods
Semester and final exams as well as short daily exams. Conducting weekly and quarterly exams on the class website Download weekly assignments on the classroom website
d. General and transferable skills (other skills related to employability and personal development). D1- The student acquires some skills in identifying the active substances in medicinal plants. D2- The student acquires some skills to know some types of medicinal plants. D3- The student acquires some skills in preparing some therapeutic mixtures of medicinal plants. D4-

325.Course Structure					
Evaluation method	Method of education	Name of the unit/course or topic	Required Learning Outcomes	Hours	The week
Daily test	Theoretical and practical	Medicinal plants collection and drying	collection and drying Medicinal plants	2 theoretical + 4 practical	The first
Daily test	Theoretical and practical	Identification of medicina plants	Identification	2 theoretical + 4 practical	Second
Daily test	Theoretical and practical	Glands and Excretory tissues and their roles in storage and excrete the active constitutes in medicinal plants.	Glands and secretary tissues	2 theoretical + 4 practical	Third
Daily test	Theoretical and practical	Essential oil extraction	Terpenes and Alkaloids Phenols	2 theoretical + 4 practical	Fourth
Monthly theoretical and practical test	Theoretical and practical	Theory test	Practical test	My work hour and my theoretical hour	V
Daily test	Theoretical and practical	Poisonous plants	Poisons plants	2 theoretical + 4 practical	Sixth
Daily test	Theoretical and practical	Methods of Preparing Herbal Remedies	Biological activity of medicinal plants	2 theoretical + 4 practical	Seventh
Daily test	Theoretical and practical	Biological activity evaluation of plant extract	Food supplements	2 theoretical + 4 practical	Eighth
Monthly theoretical and practical test	Theoretical and practical	Theory test	Practical test	My work hour and my theoretical hour	Ninth
Semester theoretical and practical test	Theoretical and practical	Theory test	**Practical test**	Three hours	X

326. Infrastructure

1- .And the mother encyclopedia of herbal remedies and medicinal plants 2- Bartram T *Encyclopedia of Herbal Medicine* Grace Publishers 1995. 3- British Herbal Medicine Association *British Herbal Pharmacopoeia 1990 Volume 1* BHMA 1990. 4- Chevalier A *The Encyclopedia of Medicinal Plants* Dorling Kindersley 1996.	Required readings: ▪ Basic texts ▪ Course Books ▪ Other
Visit the Botanical Garden in the Department of Life Sciences and attend relevant scientific conferences.	Special requirements (e.g. workshops, periodicals, software and websites)
See scientific gardens, botanical exhibitions and herbariums containing medicinal plants.	Social services (e.g. guest lectures, vocational training and field studies)

327. Acceptance	
	Prerequisites
70 students (morning hours only)	Minimum number of students
220 students (morning and evening shift)	The largest number of students

Chapter II / Phase III - Serum and Vaccines Theoretical

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

College of Science / University of Baghdad	328. Educational institution
Department of Life Sciences	329. Scientific Department / Center
Serology and Vaccines - Theoretical Part	330. Course Name/Code

Classic lecture using datashow and electronic classes	331. Available Attendance Forms
2022-2023	332. Semester / Year
4 hours theoretical and 8 hours of work per week	333. Number of Credit Hours (Total)
1/10/2022	334. The history of preparation of this description
335. Course Objectives	
The course aims to identify the vaccines used in the world and used in Iraq, the ages in which they are given, how to prepare vaccines and immune serums, their uses to reduce infections, improve the immune response, and how to manufacture new vaccines for other germs and conduct tests on them.	

336. Course Outcomes and Methods of Teaching, Learning and Assessment
A- Knowledge Objectives A1. Identify the types of immunization and the importance of each type A2- Use of dilution A3- How to prepare vaccines and immunosuppressive antibodies and methods of administering them A4-How to prepare monoclonal antibodies A5- Learning about immunotherapy A6- How to use vaccines and serums to reduce dangerous epidemics and eliminate diseases
B - Course skills objectives B1 – Identify diagnostic methods and the different types of vaccines and know the scientific basis for preparing the vaccine B2 – The use of monoclonal antibodies in the diagnostic kit B3 – Knowledge of the vaccines currently used, methods of administration and appropriate ages for administration.
Teaching and learning methods

Lectures using presentation and Microsoft office PowerPoint, as well as showing some scientific films
Evaluation methods
Weekly and quarterly tests, follow-up laboratory experiments, and evaluation of students with oral questions
C- Emotional and value goals C1- Reports on the types of vaccines and a description of treatment methods for immunological diseases at present for which it is difficult to prepare a vaccine C2- Opening new horizons to think about how to prepare vaccines and vaccines for new diseases, especially for diseases that cause epidemics
Teaching and learning methods
The student's ability to think deductively regarding the material as well as to come up with new ideas and constructive scientific criticism and how to realize that every nurse is the appropriate way to prepare a vaccine against him
Evaluation methods
Live (semester and weekly exams and exams) Indirect (conclusions and thinking skills)
d. General and rehabilitative skills transferred (other skills related to employability and personal development). D1- How to communicate the idea to the student to employ this science in how to treat and reduce some diseases D2- Eliminating and reducing epidemics that threaten the lives of thousands of people3- D4-

337. Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Weekly and monthly exams, preparation of reports and oral evaluations, and dialogue on the experiences held	Lectures offered Data show and showing scientific films	Serology and Vaccines	Introduction to vaccines and serums, history of manufacture and use	4 hours per week	10 weeks
Weekly and monthly exams, preparation of reports and oral evaluations, and dialogue on the experiences held	Lectures offered Data show and showing scientific films		Definition of the vaccination process, the immunization process, its importance, and the types of vaccines	4 hours	
Weekly and monthly exams, preparation of reports and oral evaluations, and dialogue on the experiences held	Lectures offered Data show and showing scientific films		Vaccine manufacturing and recipes	4 hours	
Weekly and monthly exams, preparation of reports and oral evaluations, and dialogue on the experiences held	Lectures offered Data show and showing scientific films		The schedule of vaccines in Iraq and its difference from the world and the ages at which vaccines are given	4 hours	
			Semester exam		
Weekly and monthly exams, preparation of reports and oral evaluations, and dialogue on the experiences held	Lectures offered Data show and showing scientific films		Definition of immunotherapy and its applications	4 hours	

Weekly and monthly exams, preparation of reports and oral evaluations, and dialogue on the experiences held	Lectures offered Data show and showing scientific films		Types of passive immunization and its role in protecting against diseases	4 hours	
Weekly and monthly exams, preparation of reports and oral evaluations, and dialogue on the experiences held	Lectures offered Data show and showing scientific films		The different ways to prepare the immune serum and how to use it to get rid of diseases	4 hours	
			Semester exam		
Weekly and monthly exams, preparation of reports and oral evaluations, and dialogue on the experiences held	Lectures offered Data show and showing scientific films		Modern methods of manufacturing vaccines	4 hours	

338. Infrastructure	
Immunology Dr. Maha Raouf Al-Saad 1989 Clinical Immunology and Serology: A Laboratory Perspective 4th Edition edited by Stevens and Miller (2016) Textbook of Diagnostic Microbiology, 5e (Mahon, Textbook of Diagnostic Microbiology) 5th Edition edited by Mahon, Lehman, Manuselis (2014)) Vaccines a tool uses to prevent and treat human diseases. edited by Mohammed Al-Araji (2011)	32- Required textbooks
	33- Main references (sources)
	NN) Recommended books and references (scientific journals, reports, ...)

All pages about the topic	OO) Electronic references, websites, ...

339. Course Development Plan
The course develops with an annual update of vaccines and modern immunotherapeutic methods used

Chapter II / Phase III - Serum and vaccines practical

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

College of Science / University of Baghdad	340. Educational institution
Department of Life Sciences	341. Scientific Department / Center
Serums and vaccines Practical	342. Course Name/Code
Practical experiments in the laboratory and lectures in electronic classes	343. Available Attendance Forms
Second Semester / 2022-2023	344. Semester / Year
Theoretical 4 hours and practical 8 hours per week	345. Number of Credit Hours (Total)
1/10/2022	346. The history of preparation of this description
347. Course Objectives	

The course aims to identify the types of vaccines, types of antigens and serums, methods of use, how to manufacture them, access to immunotherapy and prevention of diseases that were killing humans.

348. Course Outcomes and Methods of Teaching, Learning and Assessment
A- Knowledge Objectives A1- Identify the types of vaccines and how to prepare them A2- Identify passive immunization, its uses and how to manufacture it A3- How to prepare monoclonal antibodies A4- Learn about immunotherapies A5- Knowing the schedule of vaccines allowed to be given and at what age stage in our country A6-
B - Course skills objectives B1 – Identify diagnostic methods and the different types of vaccines and know the scientific basis for preparing the vaccine B2 – Preparation of diagnostic kits B3 – Immunization of laboratory animals and the use of immune vaccines for diagnostic purposes and various techniques B4- Methods of measuring antibodies and their concentrations in the laboratory -
Teaching and learning methods
Use the presentation and Microsoft Office PowerPoint Giving lectures in a casual format And teach the student the correct scientific technique
Evaluation methods
Weekly and quarterly tests and follow-up laboratory experiments Preparing reports and evaluating students with oral questions during the laboratory
C- Emotional and value goals C1- Reports on the types of vaccines and a description of treatment methods for immune diseases at present for which it is difficult to prepare a vaccine C2- Analyzing the results of each laboratory to reach deductive thinking about the importance of the laboratory

A3-
A4-

Teaching and learning methods

The student's ability to think deductively regarding the material as well as to come up with new ideas and constructive scientific criticism and how to realize that each nurse has an appropriate way, especially to prepare a vaccine against him

Evaluation methods

Live (tests)
Indirect (conclusions and thinking skills)

d. General and rehabilitative skills transferred (other skills related to employability and personal development).

D1- How to communicate the idea to the student to employ this science in how to treat and reduce some diseases D2-
D3-
D4-

349. Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Weekly and monthly exams, preparation of reports and oral evaluations, and dialogue on the experiences held	Data show lectures and practical experiences	Serology and vaccines study	Introduction to vaccines and serums	8 hours per week	10 weeks
			Adjuvants		
			Preparation of antibodies		
			Extraction of LPS from bacteria		
			Types of antibodies and methods of injection		
			BCG tuberculosis vaccine		
			Dog bite vaccine		
					Rabies
			Methods that measure antibodies in the blood, including RID		
			GOD WILLING		
			Bayorite method		
			Make a report about a specific		

			vaccine for each student		

350. Infrastructure	
▯ Clinical Immunology and Serology: A Laboratory Perspective 4th Edition edited by Stevens and Miller (2016) ▯ Vaccines a tool uses to prevent and treat human diseases. edited by Mohammed Al-Araji (2011)	34- Required textbooks
	35- Main references (sources)
All about the material	PP) Recommended books and references (scientific journals, reports, ...)
All material pages	QQ) Electronic references, websites, ...

351. Course Development Plan
By introducing modern experiments

Chapter Two: Fourth Stage: Pathological Analysis

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

University of Baghdad - College of Science - Department of Biological Sciences	352. Educational institution
Department of Biological Sciences	353. Scientific Department / Center
Clinical analysis Pathological analysis	354. Course Name/Code
Traditional lecture + video lectures	355. Available Attendance Forms
Second Semester 2022-2023	356. Semester / Year
Two hours a week theoretical + two hours a week practical	357. Number of Credit Hours (Total)
1/10/2022	358. The history of preparation of this description
359. Course Objectives	
1- The student should be familiar with diseases and the mechanisms of their action against the body and cellular tissue.	
2- Identifying the foundations and mechanisms of disease occurrence and the stages of disease development and classification	
3- The student should be able to scientifically link diseases and their causes from microbiology .	
4- Studying clinical examinations for various diseases caused by microorganisms .	
Microbiology analysis in various clinical samples (blood, production, discharge, tissue biopsy,.....etc) and treatment applications .	

360. Course Outcomes and Methods of Teaching, Learning and Assessment
A- Knowledge Objectives A1- The student should be able to distinguish and classify diseases according to the correct scientific foundations A2- It can deal with various immunological and histological tests and perform them according to their sample. A3- To be able to understand the role of each laboratory analysis in the diagnosis of the microorganism causing the disease. A4-

A5-
A6-

B - Course skills objectives

B1 - Identify the classification of diseases (acute or chronic,.....etc

B2 - Identify the mechanisms of occurrence of the disease.

B3- Identify the mechanisms and mechanics of conducting laboratory examination.

B4- Identify the devices for each test and their practical applications in different fields.

Teaching and learning methods

1- Use of drawings on the board
2- Use the data show and Power point devices for the lecture.
3- Preparing reports.
- Summer training in the educational laboratories of the Ministry of Health.
- Homework

Evaluation methods

1- Ask deductive questions during the lecture.
2- Editing tests after the lecture.
3- Semester exams for a group of lectures.
- Preparation of reports
- Homework

C- Emotional and value goals

C1- Oral and written deductive tests

C2- Preparation of reports

A3-

A4-

361. Course Structure

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week

Exams + Weekly reports + exam Monthly + Final Exam	Lecture in a way Datacho + Discussions	Diagnosis of Respiratory Tract(RT) Infections Diagnosis of Gastrointestinal Tract infections	DIAGNOSIS OF INFECTIOUS DISEASES	2 n + 2 p	1
		Diagnosis of Urinary tract infections Laboratory Diagnosis of Sexually Transmitted Infections (STDs) Genital infections and STDs in women	DIAGNOSIS OF INFECTIOUS DISEASES	2 n + 2 p	2
		Genital infections in men SYPHILIS	DIAGNOSIS OF INFECTIOUS DISEASES	2 n + 2 p	3
		Leptospirosis Skin ,Wound and Soft tissue Infections	DIAGNOSIS OF INFECTIONS	2 n + 2 p	4
		Meningitis Mycology	DIAGNOSIS OF INFECTIONS	2 n + 2 p	5
		Cell injury	Clinical Pathology	2 n + 2 p	6
		Acute infammation	Clinical Pathology	2 n + 2 p	7
		Chronic inflammation	Clinical Pathology	2 n + 2 p	8
		Introduction to serology Serological tests	Serology	2 n + 2 p	9

		Serological tests of some Infectious & autoimmune diseases	Serology	2 n + 2 p	10

Teaching and learning methods

1- The use of illustrative means in explaining the theoretical part and the use of a number of diagnostics from agricultural and biological circles

2- Microscopic and various experiments in the laboratory with the presentation of scientific films using the data show device.

Evaluation methods

The student's activity in the classroom and his ability to answer deductive questions and answer oral and editorial questions and discuss the results within the reports prepared by him for the purpose of identifying the student's ability to deductive thinking and thus the possibility of putting forward new ideas that contribute to constructive scientific criticism.

d. General and rehabilitative skills transferred (other skills related to employability and personal development).

D1- The possibility of interpreting the results according to the scientific facts that the student studies and learns

D2- Applying the concepts and foundations received by the student in the practical side of life

D3- Developing the student's potential towards deductive thinking

D4-

362. Infrastructure

Methods and Applications of Statistics in Clinical Trials, Volume 2: Planning, Analysis, and Inferential The Infectious Disease Diagnosis	36- Required textbooks

A Case Approach Editors: David, Michael, Benoit, Jean-Luc (Eds.)	
Current Diagnosis & Treatment in Infectious Diseases (LANGE CURRENT Series) 2nd Edition by Walter Wilson (Author), Merle Sande (Author) LABORATORY MEDICINE BASIC SEROLOGICAL TESTING	37- Main references (sources)
The Journal of Infectious Diseases - IDSA Clinical infectious diseases	RR) Recommended books and references (scientific journals, reports, ...)
www.idsociety.org/journals--publications/the-journal-of-infectious-diseases	SS) Electronic references, websites, ...

363. Course Development Plan
The increasing use of information technology or Internet references, and changes in content as a result of keeping pace with the great development in the world of technology and information

Chapter Two: Fourth Stage: Biotechnology

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

University of Baghdad - College of Science	364. Educational institution
Department of Life Sciences	365. Scientific Department / Center
Biotechnology Theory / BBI 439	366. Course Name/Code
E-Lecture	367. Available Attendance Forms
2022-2023	368. Semester / Year
Theoretical 4 hours per week + practical 8 hours per week	369. Number of Credit Hours (Total)
1/10/2022	370. The history of preparation of this description

371. Course Objectives

4- Understand biotechnology as a term and application

5- Identify the stages of development of biotechnologies and the most important achievements in their various fields

6- Learn about the most important technologies used to develop and improve products from living organisms

7- Linking the theoretical information that the student has already learned in the previous stages with the applications of biotechnology

372. Course Outcomes and Methods of Teaching, Learning and Assessment

A- Knowledge Objectives

A1- Familiarity with the basics of biotechnology

A2-Understand the fermentation process and how to develop it

A3- Benefiting from theoretical information in the production and development of products

B - Course skills objectives

B1 - Trying to design a production line starting from the isolation of the microorganism until obtaining the required product

B2 – The use of various technologies in order to develop and improve production

C- Emotional and value goals C1- Recall the information and try to link it to reach the desired result C2- Obtaining a product at the lowest cost and the best quality
d. General and rehabilitative skills transferred (other skills related to employability and personal development). D1- Employing and developing the aforementioned skills A, B and C D2- D3- D4-
Teaching and learning methods
4- Giving a lecture 5- Video presentation of lectures 6- Show educational films 7- Ask and discuss questions about the topic
Evaluation methods
4- Surprise exams (Kozat) 5- Student Seminars 6- Homework reports and assignments 7- Final Exam

373. Course Structure

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Surprise exams + seminars + reports and assignments	Traditional lecture + video electronic lecture + datashow + educational films	Introduction to Biotechnology	Identify the nature of biotechnology, its importance and its various applications	4	1
		Red and Gold Biotechnologies	Identify the most important applications of biotechnology in the fields of nanotechnology and public health	4	2
		Fermentation using microbiology	Identify what fermentation is, how it is and the reasons for choosing microorganisms	4	3
		Types of fermentation	Identify the types of fermentation and the importance of each type	4	4
		Fermentation Products	Learn about the most important fermentation products	4	5
		Separation of products	Know the most important methods in separating and purifying products	4	6
		Enzyme Technology	Identify the most important enzymes used in biotechnology	4	7
		Restriction	Knowledge of restriction and its importance to increase productivity	4	8
		Biosensors	Identify the nature of the biosensitizer and its various applications	4	9
		Plant Biotechnology	Learn about plant tissue culture technology and its most important applications	4	10
		Animal Biotechnology	Identify the technique of animal tissue culture and its most important applications	4	11

374. Infrastructure

• Lectures of the subject professors • Biotechnology 5th.ed. (2009) John E. Smith. • Microbial Biotechnology: Fundamentals of Applied Microbiology, 2nd. ed. (2007) Alexander N. Glazer & Hiroshi Nikaido / Cambridge University Press , UK • Medical biochemistry and biotechnology (2011) Dr. Mohammed Amanullah, New central book agency, London. • Evan Fraser et al., (2016)Biotechnology or organic? Extensive or intensive? Global or local? A critical review of potential pathways to resolve the global food crisis. Trends in Food Science & Technology. 48 , 78-87. • Jyoti P. Tamang et al., (2016) Review: Diversity of Microorganisms in Global Fermented Foods and Beverages. Frontiers in Microbiology. 7:377-404. • Mallavarapu Megharaj and Ravi Naidu (2017) Soil and brownfield bioremediation. Microbial Biotechnology. 10(5), 1244–1249 • www.bio.org • www.khanacademy.org • www.nature.com	38- Required textbooks 39- Main references (sources) TT) Recommended books and references (scientific journals, reports, ...) UU) Electronic references, websites, ...

375. Course Development Plan
• Introducing the latest developments in biotechnology with reference to the challenges facing the world with regard to epidemics and vaccine development. • Introducing the latest technologies in separation, extraction and purification of biological products and the possibility of their future use. • Continuous updating of the concept of biotechnologies and their applications in various fields to keep the student informed in this field.

Chapter Two: Stage Four: Comparative Anatomy

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the description of the programme.

College of Science / University of Baghdad	1. Educational institution
Department of Life Sciences	2. Scientific Department / Center
Theoretical comparative anatomy	3. Course Name / Code
Traditional lecture	4. Available Attendance Forms
2022- 2023	5. Semester / Year
Two theoretical hours + two practical hours	6. Number of Credit Hours (Total)
1/10/2022	7. The history of preparation of this description

8. Course objectives: Identify the types of rope and vertebrate organisms, know the distinctive characteristics of them, and take several examples to identify the most important classifications.

9. Course Structure

Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Editorial questions and verbal and discussing	Data show and lectures Video Addendum to Videos and data show shows from YouTube	1. Introduction and Concepts 2. Methods of Comparative Biology and Vertebrate Diversity	The main characters of vertebrate	2	First
Editorial questions and verbal and discussing	Data show and lectures Video Addendum to Videos and data show shows from YouTube	The Vertebrate Axis -- Vertebral Column	The main characters of vertebrate	2	Second
Editorial questions and verbal and discussing	Data show and lectures Video Addendum to Videos and data show shows from YouTube	The skin and their derivatives Scale Hair Hoof Nail Horn Edwards	The skin	2	Third

Editorial questions and verbal and discussing	Data show and lectures Video Addendum to Videos and data show shows from YouTube	The glands of skin	The skin	2	Fourth
Editorial questions and verbal and discussing	Data show and lectures Video Addendum to Videos and data show shows from YouTube	Hot Vein Arteries Capillaries Differences between the classes of vertebrate	Circulatory system	2	V
Editorial questions and verbal and discussing	Data show and lectures Video Addendum to Videos and data show shows from YouTube	Anatomical Differences between the classes of vertebrate	Urogenital System	2	Sixth
Editorial questions and verbal and discussing	Data show and lectures	Buccal cavity Esophagus Stomach Intestine	Digestive system	2	Seventh

	Video Addendum to Videos and data show shows from YouTube	Anatomical Differences between the classes of vertebrate			

10. Infrastructure	
Binding theoretical comparative anatomy prepared by the professors of the subject according to the vocabulary of the curriculum adopted in the college and using solid scientific sources	1- Required textbooks
Kardong, Kenneth, V. 2005. Vertebrates. Comparative anatomy, function, and evolution. 4th Edition. Wm C. Brown/McGraw-Hill Publ. Note this is the New Edition	2- Main references (sources)
Hood, Craig S. 2007. Comparative Vertebrate Anatomy Laboratory Manual.	1) Recommended books and references (scientific journals, reports, ...)
https://www.britannica.com/science/comparative-anatomy https://www.longdom.org/scholarly/comparative-anatomy-journals-articles-ppts-list-1698.html http://people.eku.edu/ritchisong/342notes10.html	2) Electronic references, websites, ...

11. Course Development Plan
The educational vocabulary is developed by reviewing what is in force in the departments synonymous with our department locally and globally, through the Internet, electronic correspondence, updating the scientific material according to what is available globally from books, references and periodicals, and using effective teaching methods electronically and in person.

12. Course Outcomes and Methods of Teaching, Learning and Assessment

A- Knowledge Objectives

A1- Identify the different species and genera and the characteristics of each type and sex and know the anatomical differences between the devices and the different taxonomic orders of vertebrate animals

A2- The student learns how to differentiate between different rope varieties

A3- Study examples of each item

A4- Study of the characteristics of the animal segmentation of each category such as bony and cartilaginous fish, amphibians, reptiles, birds and mammals

B - Skills objectives of the course :

B1 With the help of the theoretical part, the student's information in comparative anatomy is developed and his information is enriched in this aspect.

B2 Teaching the student the skill of determining the animal's class and its taxonomic location

B3 The student learns how to differentiate between groups of vertebrate animals and their advantages in the practical part of the course.

Teaching and learning methods

• Adopt video lectures to clarify the theoretical part of each lecture

• Conducting discussions, asking questions and answering them within the lecture to develop and enrich students' information in

The subject of comparative anatomy .

Evaluation methods

Weekly oral and written tests in attendance in addition to live discussion with students within the time

Laboratory and evaluation of their information

• Monthly in-person tests .

• Assigning the student to prepare a laboratory notebook that contains drawing animals and allocating part of the quest grade

To urge the student to pay attention to drawing and how to mark the important parts

C- Emotional and value goals

Through effective learning, the student will be able to set goals and self-learning, and generate the highest template analysis and evaluation .

d . General and rehabilitative skills transferred (other skills related to employability and personal development).

D1- Skills of using and dealing with microscope

D2- Skills to be able to kill and stabilize animals in a compassionate way

D3- Skills of anatomy of animals in a correct scientific way

D4- The skill of identifying each of the body systems and its constituent organs .

Chapter Two: Fourth Stage: Viruses

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the description of the programme.

University of Baghdad - College of Science - Department of Life Sciences	376. Educational institution
Department of Life Sciences	377. University Department / Center
Practical Virology Viruses	378. Course Name/Code
Microbiology	379. Programs in which he enters
Traditional lecture Power Point + Data Show + Video lecture	380. Available Attendance Forms
2022- 23 20 Second Semester	381. Semester / Year
Two hours a week theoretical + two hours a week practical	382. Number of Credit Hours (Total)
1/10/2022	383. The history of preparation of this description
384. Course Objectives	

1- The student should learn about viruses, their types, the diseases they cause and the mechanisms of their action against the body and cellular tissue
2- Identify the foundations and mechanisms of the occurrence of viral diseases and the stages of disease development.
3- The student should be able to scientifically link diseases and their causes of viruses.
4- Studying clinical examinations for various diseases caused by viruses.
5- Detection of viral infections in various clinical samples (blood, urine, discharge, tissue biopsy,..... etc) and treatment applications.

385. Learning outcomes and teaching, learning and assessment methods
B - Subject-specific skills B1 - Identify the types and levels of laboratories used in dealing with viruses B2 – Identify sterilization methods for living and non-living surfaces to get rid of viruses B3 – Identify the mechanisms and methods of planting and multiplying viruses B4- Identify the techniques and tests used for the purpose of quantitative and qualitative assessment of viruses
Teaching and learning methods
7- Use of graphics on the board 8- Use data show and Power point devices for lectures. 9- Reporting. 10- Summer training in the educational laboratories of the Ministry of Health. 11- Practical explanation
Evaluation methods
15- Ask deductive questions during the lecture. 16- Weekly oral tests 17- Quarterly and daily exams. 18- Homework

C- Thinking skills

C1--- Oral and written deductive tests

C2- Reporting

Teaching and learning methods

Using illustrative means to explain the theoretical part and using diagnostic tools and various experiments in the laboratory with the presentation of scientific films using a data show device.

Evaluation methods

The student's activity in the classroom and his ability to answer deductive questions and answer oral and written questions and discuss the results within the reports prepared by him for the purpose of identifying the student's ability to deductive thinking and thus the possibility of putting forward new ideas that contribute to constructive scientific criticism.

d. General and transferable skills (other skills related to employability and personal development).

D1- The possibility of interpreting the results according to the scientific facts studied and learned by the student

D2- Applying the concepts and foundations received by the student in the practical side of life

D3- Developing the student's potential towards deductive thinking

Evaluation method	Method of education		**The week**	**The week**
Daily and quarterly exam	Power Point + Data Show Lecture + Video		**1**	**1**
Daily and quarterly exam	Power Point + Data Show Lecture + Video		**3+4**	**3+4**
Daily and semester exam	Power Point + Data Lecture show+ Video		**5+6**	**5+6**
Daily and quarterly exam	Power Point + Data Show Lecture + Video		**8+7**	**8+7**
Daily and quarterly exam	Power Point + Data Show Lecture + Video		**9+10**	**9+10**

386.Acceptance	
Methodology books General Microbiology, Virology _ recent lectures from the Internet	Prerequisites
80	Minimum number of students
120	The largest number of students

Chapter Two: Fourth Stage: Soil and Water

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the

student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

University of Baghdad – College of Science	387. Educational institution
Department of Life Sciences	388. Scientific Department / Center
Soil and water microbiology	389. Course Name/Code
Traditional lecture	390. Available Attendance Forms
Second Semester 2022-2023	391. Semester / Year
Theoretical 4 hours per week + practical 8 hours per week (two hours per group)	392. Number of Credit Hours (Total)
1/10/2022	393. The history of preparation of this description
394. Course Objectives	
1- Knowing the types of soils and how to take samples from the soil and measuring the water content of different soils by drying method	
2- Isolate and count microorganisms in the soil in different ways	
3- Identify the role of microorganisms in the rotation of elements in nature	
4- Identify how to take different water samples and investigate evidence of pollution in different sources of water	
5- Investigation of water pollution with *Clostidium bacteria*	
6- Investigation of water contamination with fecal rosary bacteria	
7- Investigation of contamination of water samples with pathogenic bacteria that cause diarrhea	

395. Course Outcomes and Methods of Teaching, Learning and Assessment

A- Knowledge Objectives

A. Knowledge and understanding

A1- Know the most important ways to isolate, prepare and diagnose microorganisms from soil and water

A2- Clarifying the role of microorganisms in the recycling of elements such as carbon and nitrogen in nature and how to detect them.

A3- Explain how to know the suitability of water for human consumption and compare it with standard tables

A4- Clarifying the evidence of pollution in water and how to detect it

A5- Investigation of fecal pollution in water and its causes

A6- Investigation of pathological bacteria in water and how to detect and develop them

B - Course skills objectives

– Teaching students methods of taking soil and water samples and how to deal with them in the laboratory

B2 – Teaching students methods of isolating and counting microorganisms in soil and water samples

B3 – Application of methods of detection and investigation of some pollutants in water

B4- Teaching students the role of microbiology in the analysis of materials and how to investigate and detect the rotation of elements in nature and the production of enzymes necessary to complete the process

Teaching and learning methods

- Give a simple explanation of the scientific material with clarification through the use of the data show

2- Conducting practical experiments for students and teaching them the correct methods in dealing with samples in the laboratory in terms of transplantation and incubation and reading the results

3- Using illustrations and illustrations to deliver the scientific material in the simplest form and the richest scientific and practical content

Evaluation methods

Students are evaluated through daily and monthly tests and request reports of laboratory procedures for practical groups to know the extent of comprehension of the scientific material in addition to questions and scientific discussions during the presentation of the material

C- Emotional and value goals

Involving students through practical groups with scientific and practical experiments, guidance in mathematical calculations that benefit the scientific material, and creating a spirit of cooperation between groups through the exchange of work results and opening discussions in the approved scientific material from methodological books and scientific research related to the material and taken from the Internet to benefit from modern information in comparing the results

Evaluation methods

Evaluating students by conducting daily and quarterly exams and practical reports, taking into account the student's activity during practical experiments, and answering the questions posed during the presentation of the daily material

d. General and rehabilitative skills transferred (other skills related to employability and personal development).

D1- Benefiting from various scientific and research experiences and expertise

D2- Employing and developing the aforementioned skills

396. Course Structure					
Evaluation method	Method of education	Unit / Subject Name	Required Learning Outcomes	Hours	The week
Daily and quarterly tests and practical reports	Presenting the scientific material on the data show with practical experiments	Study of some soil traits	Introduction to soil and soil types How to take soil samples and measure the water content of different soils by drying method	4	First
Daily and quarterly tests and practical reports	Presenting the scientific material on the data show with practical experiments	Counting soil microbiology	Counting microorganisms in the soil in several ways such as: direct counting method, live counting method, pouring dishes and counting the most likely	4	Second
Daily and quarterly tests and practical reports	Presenting the scientific material on the data show with practical experiments	Soil microbiology insulation	Isolation of different microorganisms such as: bacteria, fungi and filamentous bacteria on the appropriate media of different soils and comparison of the microbial content of these soils	4	Third
Daily and quarterly tests and practical reports	Presenting the scientific material on the data show with practical experiments	Soil microbiology cycle in element/carbon cycles	Identify the role of microorganisms in the recycling of elements in nature, specifically the element of carbon by detecting the presence of carbon-decomposed microorganisms in the soil using salt media containing cellulose, pectin	4	Fourth

			and starch as sources of carbon		
Daily and quarterly tests and practical reports	Presenting the scientific material on the data show with practical experiments	The nitrogen cycle and the role of microorganisms in nitrogen fixation	Identify the role of microorganisms Decompose nitrogen sources and isolate protein-decomposing microorganisms and microorganisms that have the ability to carry out the process of chiropo, nitrification and reverse nitrification, in addition to identifying microorganisms that fix nitrogen in a symbiotic and non-symbiotic manner	4	V
Daily and quarterly tests and practical reports	Presenting the scientific material on the data show with practical experiments	Total bacterial count and investigation of fecal contamination in water / isolation and promise of coliform bacteria	Introduction to water and how to take water samples and investigate evidence of contamination and the presence of coliform bacteria and fecal coliform bacteria in various water samples by conducting hypothetical, confirmatory and supplementary examination	4	Sixth
Daily and quarterly tests and practical reports	Presenting the scientific material on the data show with practical experiments	Isolation of *Clostidium bacteria*	Investigation of water contamination with *Clostidium bacteria* And knowing the type of pollution, old or new, in water samples by conducting hypothetical and confirmatory examination	4	Seventh

397. Infrastructure

Methodological book Microbiology of soil and water (practical part)	40- Required textbooks
	41- Main references (sources)
Microbiological application laboratory* * Laboratory manual & workbook in microbiology application to patient care. 2006. * Brooks, G. F.; Butel, J. S. and Morse, S. A. (1998). Enteric Gram-Negative Rods (Enterobacteriaceae) , In : Jawetz , Melnick & Adelberg's Medical Microbiology , (21ed) Appleton & Lange , Stamford . pp.:218-230	VV) Recommended books and references (scientific journals, reports, ...)
E-Classes	WW) Electronic references, websites, ...

398. Course Development Plan
Trying to conduct field visits to drinking water purification plants as one of the vocabulary of the water microbes lesson

Chapter Two: Stage Four: Genetic Engineering

This course description provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the

student to achieve, proving whether he or she has made the most of the available learning opportunities. It must be linked to the program description.

University of Baghdad - College of Science	399. Educational institution
Department of Life Sciences	400. University Department / Center
Genetic Engineering	401. Course Name/Code
Microbiology – Animal – Plant	402. Programs in which he enters
Traditional lecture	403. Available Attendance Forms
Second Semester 2022-2023	404. Semester / Year
8 hours a week	405. Number of Credit Hours (Total)
1-10-2022	406. The history of preparation of this description

9. Course Objectives

Genetic engineering Introducing the student to the genetic material responsible for the transfer of traits and the possibility of using these materials to improve traits in living organisms.

Study the most important techniques used to transfer genetic traits.

10. Learning outcomes, teaching methods and assessment

A- Knowledge and understanding

1- The student should know the genetic material of biology and how to extract and purify it
2- How genetic material multiplies and how to use it.
3- Learn about the different ways of transmitting genetic material and how to use it.
4- Learn about the different ways to isolate mutations.

B- Subject-specific skills

1- Using different solutions for extraction and purification methods of DNA and RNA from multiple cells.
2- Using a spectrophotometer – centrifuge – electric relay device
3- The use of different culture media to develop bacteria and study mutations
4- Study of some mutations and isolation of plasmids and characterization of some proteins as well as the process of bacterial slenderness.

C- Thinking skills

C1- Weekly and monthly tests
C2- Preparing and discussing reports
C3-Oral tests

d. General and transferable skills (other skills related to employability and personal development).

D1- Training students followed by thinking and conducting dialogue for the purpose of knowing the extent of their response to the material and experiments.
D2- Conducting field scientific experiments to benefit from them in the future in medical laboratories and research centers

Teaching and learning methods

8- Use of solutions Data show and power point tester presentation .
9- Preparing reports by students for each laboratory.
10- Students' participation in some topics of scientific topics and their discussion.

- Encourage the student to participate in discussions and conclusions of the results of the laboratory

Evaluation methods

Live by tests
Indirectly through inferential questions raised during the laboratory

11-Course Structure

Evaluation method	Method of education	Name of the unit/course or topic	Required Learning Outcomes	Hours	The week
Conduct tests and theoretical questions, some of which are oral	practical	Genetic Engineering		12 hours	1
					2
					3
					4
					5
					6
					7
					8

407. Infrastructure

• Lectures of the subject professors • Course Books Molecular cloning, A Laboratory Manual. J. Sambrook et al. (Third edition). □ Primrose, S.B. and Twyman, R.M. Principles of gene manipulation and genomics. (2006). 7th edition. UK □ Verma, P.S. and Aggarwal, V.K. Genetics (2007). India □ Reece R.J. Analysis of Gene and genome. (2004). USA. 3- Internet pages and websites (other)	Required readings: ▪ Basic texts ▪ Course Books ▪ Other
•	Special requirements (e.g. workshops, periodicals, software and websites)
•	Social services (e.g. guest lectures, vocational training and field studies)

12. Course Development Plan

Developing the course through the annual update of information on the curriculum and the use of modern technologies to deliver information