

MODULE DESCRIPTION FORM

Module Information				
Module Title	General Biology		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	MPH103			
ECTS Credits	9			
SWL (hr/sem)	225			
Module Level	1	Semester of Delivery		
Administering Department	Medical Physics	College	College of Sciences	
Module Leader	Dhurgham Adel Obaid		e-mail	mailto:dirgham.ad@uowa.edu.iq
Module Leader's Acad. Title	Assist Lecturer		Module Leader's Qualification	MSc in Biology
Module Tutor	Dhurgham Adel Obaid		e-mail	dirgham.ad@uowa.edu.iq
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Scientific Committee Approval Date	2025-12-20		Version Number	V 1.0

Relation with other Modules			
Prerequisite module	None	Semester	/
Co-requisites module	None	Semester	/


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 ٢٠٢٥ - ٢٠٢٦




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Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. Understand the Fundamental Principles of Biology 2. Describe Cell Structure and Function 3. Explain the Structure and Function of the Cytoplasmic Membrane 4. Recognize the Role of Biological Molecules and Metabolism

	5. To provide students with a foundational understanding of the structure, types, and biological roles of nucleic acids (DNA and RNA) within cells. 6. Analyze Cell Division Processes: Mitosis and Meiosis 7. Explore Microorganisms: Bacteria, Viruses, and Fungi 8. Identify and Classify Animal Tissues 9. Apply Proper Laboratory Techniques and Safety Protocols Perform Core Microbiology and Histology Laboratory Procedures
Module Learning Outcomes	1. Define the basic concepts of biology and explain the characteristics of living organisms. 2. Describe the structure and function of prokaryotic and eukaryotic cells, including the cytoplasmic membrane and key organelles. 3. Identify the major biological macromolecules and explain their roles in cell structure and metabolic processes. 4. Explain the principles of enzyme activity, energy flow, and metabolic pathways in living systems. 5. Describe the structure, types, and functions of nucleic acids (DNA and RNA) in cells 6. Compare and contrast mitosis and meiosis, and explain their roles in growth, reproduction, and genetic variation. 7. Classify bacteria, viruses, and fungi based on structure and function, and describe common diseases associated with each. 8. Differentiate the major animal tissue types—epithelial, connective, nervous, and muscle—based on structure and function. 9. Demonstrate safe laboratory practices, including sterilization, microscope usage, and preparation of slides and culture media. Apply microbiological and histological techniques such as Gram staining, bacterial inoculation, and tissue identification under the microscope.
Indicative Contents	<u>Theory Lectures</u> Learning concepts of each theoretical lecture or

groups of lectures. [SSWL= 28 hrs. (Theory Lectures)+ 1hrs. Mid Exam)] [SSWL= 29 hrs.]

1. Introduction of Biology [2 hrs.]

- * Definition and branches of biology
- * Characteristics of living organisms
- * Levels of biological organization
- * Branches of biology

2. Chemistry of life and the nature of biological molecules [2 hrs.]

- * Elements essential to life

Macromolecules: carbohydrates, lipids, proteins, nucleic acids *

Structure and function of each macromolecule

3. Cell Structure [2 hrs.]

- * Definition and Characteristics of cell
- * Prokaryotic vs. eukaryotic cells
- * Structure and functions of organelles: nucleus, mitochondria, ER, Golgi, lysosomes, ribosomes, etc.
- * Cell aging and Stem cell

4. The Cytoplasmic Membrane [2 hrs.]

- * Structure: phospholipid bilayer, proteins, cholesterol
- * Fluid mosaic model
- * Functions of lipid and proteins in cell membrane
- * Functions of cell membrane

5. Nucleic Acids in Cells: Structure, Types, and Functions [2 hrs.]

*Structure of Nucleic Acids)DNA and RNA(

*The central dogma of biology

* Functions of DNA and RNA

6. The Cell Cycle and Cell Division [2 hrs.]

- * Phases of the cell cycle (G1, S, G2, M)
- * Mitosis stages and significance
- * Meiosis: stages and genetic significance
- * Cell cycle control and checkpoints
- * Overview of cancer as uncontrolled cell division

7. Midterm Exam [1 hrs.]

- * Covers content from Lectures 1–6
- * May include multiple-choice, short-answer, labeling diagrams, and practical lab components

8. Bacteria: Types and Structure [2 hrs.]

- * Classification by shape (cocci, bacilli, spirilla)

	* Gram-positive vs. Gram-negative bacteria * Bacterial structure: cell wall, capsule, pili, flagella * Bacterial reproduction (binary fission) * Beneficial and harmful bacteria	
	9. Viruses in humans: Types, Structure, and Diseases [2 hrs.]	
	* Structure: capsid, genetic material (DNA/RNA), envelope * Lytic vs. lysogenic cycles * Classification: DNA viruses, RNA viruses, retroviruses * Common viral diseases (HIV, influenza, hepatitis, COVID-19) * Vaccines and antiviral treatments	
	10. Fungi: Classification, Structure, and Diseases [2 hrs.]	
	* Characteristics and classification of fungi * Structure: hyphae, mycelium, spores * Modes of reproduction (sexual/asexual) * Useful fungi (e.g., antibiotics, fermentation) * Common fungal infections (e.g., athlete's foot, candidiasis)	
	11. Parasites: classification, structure and pathogenesis	
	* Introduction to Basic Concepts & Terminology * Classification of Medically Important Parasites	
	Transmission Dynamics & Life Cycles	
	12. Introduction to Animal Tissues and Epithelial Tissue [2 hrs.]	[2 hrs.]
	* Definition of tissue * Classification of animal tissues * Types of epithelial tissues: squamous, cuboidal, columnar * Structure, location, and function of each epithelial type	
	13. Nervous Tissue: Components and Functions [2 hrs.]	[2 hrs.]
	* Neurons: structure and types * Neuroglia: types and roles * Functions of nervous tissue * Signal transmission basics	
	14. Connective Tissue: Types and Functions [2 hrs.]	[2 hrs.]
	* Characteristics and components (cells, fibers, matrix) * Types: loose, dense, cartilage, bone, blood * Functions: support, transport, defense, storage * Specialized connective tissues	
	15. Muscle Tissue: Types and Work Mechanics [2 hrs.]	[2 hrs.]

- * Microscopic structure of muscle fibers
- * Mechanism of muscle contraction
- * Voluntary vs. involuntary muscle functions

Seminars

Learning concepts of each Seminars [SSWL=15 hrs.]

1. The Scope of Biology: Exploring Life and Its Branches [1 hrs.]
2. Inside the Cell: Comparing Prokaryotic and Eukaryotic Structures [1 hrs.]
3. The Cytoplasmic Membrane: Gateway to the Cell[1 hrs.]
4. The Chemistry of Life: Biological Molecules and Their Functions[1 hrs.]
5. Metabolism and Enzymes: Fueling Life's Processes[1 hrs.]
6. DNA and RNA: The Blueprint of Life[1 hrs.]
7. ATP: The Energy Currency of the Cell[1 hrs.] 8. Cell Cycle and Division: Life
9. through Mitosis and Meiosis [1 hrs.]
10. Understanding Bacteria: Structure, Types, and Benefits [1 hrs.]
11. Viruses: Tiny Invaders and Their Impact on Health[1 hrs.]
12. Fungi: Nature's Decomposers and Human Pathogens[1 hrs.]
13. Epithelial Tissues: The Body's Protective Layers[1 hrs.]
14. The Nervous System: Communication at the Cellular Level [1 hrs.]
15. Connective Tissues: Structure, Support, and Defense[1 hrs.]
16. Muscle Tissues: Mechanics of Movement and Force[1 hrs.]

Lab. Lectures

Learning concepts of each laboratory lecture or groups of lectures. [SSWL= 30 hrs.]

1. Orientation to the laboratory. Rules of conduct and general safety [2 hrs.]
- * Lab rules, safety symbols, emergency procedures

	Personal protective equipment (PPE) * Proper handling of biological materials and instruments
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Learning and Teaching Strategies	
Strategies	1-Lectures Deliver core theoretical concepts using visual aids (slides, videos) to build foundational knowledge. 2-Practical Labs Reinforce theoretical understanding through hands-on experiments (e.g., microscopy, staining, bacterial culture). 3-Tutorials Small-group sessions focused on problem-solving, Q&A, and clarifying difficult topics. 4-Seminars Student-led presentations and discussions to enhance research, communication, and critical thinking skills. 5-Problem-Based Learning (PBL) Use real-life biological scenarios to develop analytical and decision-making abilities in group settings.

Student Workload (SWL)			
Structured SWL (h/sem)	110	Structured SWL (h/w)	7.3
Unstructured SWL (h/sem)	115	Unstructured SWL (h/w)	7.6
Total SWL (h/sem)	222+ 3 final =225 hrs.		

Module Evaluation				
	Time/Number	Weight (Marks)	Week Due	Relevant Learning

		TH	LAB	TH	LAB		Outcome
Formative assessment	Quizzes	2	2	4	10	5 and 11	3,7
	Homework assignment	2	1	4	10	6and 13	1,8
	Onsite Assignments	-	-	-	-	Continuous	All
	Projects	1	7	2	10	14	All
Summative assessment	Midterm Exam	1		10		7	
	Final Exam	3hr		50		15	
Total assessment				100 Marks			

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Introduction of Biology
Week 2	Chemistry of life and the nature of biological molecules
Week 3	Cell structure
Week 4	Cytoplasmic membrane
Week 5	Nucleic Acids in Cells: Structure, Types, and Functions
Week 6	The Cell Cycle and Cell Division
Week 7	Mid. Exam
Week 8	Bacteria: Types and Structure
Week 9	Viruses in humans: types, structure, and diseases
Week 10	Fungi: Classification, Structure, and Diseases
Week 11	Parasites: classification, structure and pathogenesis
Week 12	Introduction to Animal Tissues and Epithelial Tissue
Week 13	Nervous tissue: components and functions
Week 14	Connective tissue: types and functions
Week 15	Muscle tissue, its types, composition, and work mechanics
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Orientation to the laboratory. Rules of conduct and general safety
Week 2	Sterilization Techniques in the Laboratory
Week 3	Microscope Types and Their Applications in Biology
Week 4	Examination of Epithelial Cell Structure and Cytoplasmic Membrane
Week 5	Mitosis and Meiosis
Week 6	Preparation of Culture Media for Bacterial Growth
Week 7	Collection of Bacterial Samples: Swabbing Techniques
Week 8	Techniques for Inoculation and Cultivation of Bacteria
Week 9	Purification of Bacterial Cultures: Isolation Methods
Week 10	Gram Staining: Procedure and Interpretation
Week 11	Preparation of Animal Tissue Slides: Techniques and Best Practices
Week 12	Identification of Epithelial Tissue Types Using Microscope Slides
Week 13	External appearance of nervous tissue
Week14	Examination of Connective Tissue Slides Under the Microscope
Week 15	Muscle tissue, external appearance and internal components

Learning and Teaching Resources		
	Text	Available in the Library?
Required Texts	Human Biology, 8th Edition,: 2004,McGraw-Hill. Stevens & Lowe's Human Histology: With STUDENT CONSULT Online Access,4th Edition, 2014,Elsevier Health Sciences Essential Cell Biology,5th International Student Edition,2018,W.W. Norton & Company	Yes
Recommended Texts	Jawetz, Melnick, & Adelberg's Medical Microbiology,25th Edition, 2012,McGraw-Hill	No

	Medica	
Websites	N/A	

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