MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Cell and Tissue Biology			**Module Delivery**	
Module Type	C			**Theory** *** Lecture** *** Lab** **Tutorial** **Practical** *** Seminar**	
Module Code	MPHY3101				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		3101	**Semester of Delivery**		2
Administering Department		1	**College**	8	
Module Leader	Maytham Abdulkahdim dragh Zainab Ali		**e-mail**	maytham.abdulkahdim@nahrainuniv.edu.iq	
Module Leader's Acad. Title		Master:Zainab Ali	**Module Leader's Qualification**		
Module Tutor	Non		**e-mail**		
Peer Reviewer Name		Non	**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Provide students with fundamental knowledge of cell structure, function, and molecular organization. 2. Develop an understanding of the structural and functional characteristics of the four basic tissue types: epithelial, connective, muscular, and nervous tissues. 3. Enable students to correlate normal cell and tissue structures with their physiological roles in the human body. 4. Introduce histological techniques and microscopic analysis for the study of cells and tissues. 5. Encourage critical thinking by comparing normal and pathological tissue changes. 6. Prepare students with essential background knowledge for advanced courses in pathology, physiology, and related biomedical sciences.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Describe the structural organization and functions of prokaryotic and eukaryotic cells. 2. Identify cellular organelles and explain their roles in maintaining cell physiology. 3. Differentiate between the four basic tissue types (epithelial, connective, muscular, nervous) based on structure and function. 4. Correlate microscopic features of normal tissues with their physiological roles in the human body. 5. Apply histological techniques and use light microscopy to examine cells and tissues. 6. Compare normal and pathological alterations in selected tissues. 7. Demonstrate scientific communication skills in reporting observations and interpretations. 8. Integrate knowledge of cell and tissue biology as a foundation for advanced courses in pathology and biomedical sciences.
Indicative Contents المحتويات الإرشادية	Describe the structural organization and functions of prokaryotic and eukaryotic cells. Identify cellular organelles and explain their roles in maintaining cell physiology. Differentiate between the four basic tissue types (epithelial, connective, muscular, nervous) based on structure and function. Correlate microscopic features of normal tissues with their physiological roles in the human body. Apply histological techniques and use light microscopy to examine cells and tissues. Compare normal and pathological alterations in selected tissues. Demonstrate scientific communication skills in reporting observations and interpretations.

	Integrate knowledge of cell and tissue biology as a foundation for advanced courses in pathology and biomedical sciences.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The **assessment strategy** comprises of summative and formative assessments. Summative assessments are used to generate a final module mark for each student whereas formative assessments are used as a tool for students to assess their own learning and understanding of the module material. As such, completion of formative assessments does not count towards the final module mark. The **summative assessment** for this module is designed to provide students with the opportunity to demonstrate their knowledge of the principles of cell biology by correctly answering multiple choice style questions. In addition, students will be able to demonstrate their practical, analytical and cognitive skills within the practical assessment.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem.) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem.) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem.) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10(20%)	3,8	1-5, 8-13
	Assignments	1	5(5%)		6,12
	Projects / Lab.	1	10(10%)		
	Report	1	5(5%)		1-8
Summative assessment	**Midterm Exam**	1	10(10%)		1
	Final Exam	1	50(50%)		1-15
Total assessment			100(100%)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Cell Biology • **Contents**: Definition of the cell, cell theory, classification (prokaryotic vs. eukaryotic), introduction to cellular structural organization. • **Physical focus**: Length scales in biology (from meters to nanometers); importance of cellular scale in medical imaging.
Week 2	Chemical Foundations of Cellular Life • **Contents:** Overview of biomolecules: proteins, carbohydrates, lipids, nucleic acids. • **Physical focus:** Physicochemical properties of biomolecules (charge, polarity, mass) and their role in techniques such as electrophoresis and centrifugation.
Week 3	Structure and Function of the Cell Membrane • **Contents:** Fluid mosaic model, membrane proteins, membrane transport (passive and active). • **Physical focus:** Electrical properties of membranes (membrane potential), diffusion principles, physical basis of osmosis and diffusion, introduction to patch-clamp techniques.
Week 4	The Cytoskeleton • **Contents:** Major components (actin filaments, microtubules, intermediate filaments) and their role in motility, shape, and cell division. • **Physical focus:** Mechanical properties of the cell (elasticity, viscosity, tension); how diseases affect these properties; applications in biomechanics.
Week 5	Cellular Energy and Metabolism • **Contents:** Mitochondria, cellular respiration, ATP. • **Physical focus:** Energy conversion (efficiency of chemical energy conversion), entropy in living systems, metabolic imaging (e.g., PET scan).
Week 6	The Nucleus and Gene Expression • **Contents:** DNA structure, transcription, translation, cell division (mitosis and meiosis). • **Physical focus:** Physical forces within the nucleus, DNA damage by radiation (basis of radiotherapy).
Week 7	Cell Signaling • **Contents:** Types of signaling (direct, paracrine, endocrine), receptors, intracellular pathways. • **Physical focus:** Dynamics of chemical signal diffusion, mathematical modeling of signaling cascades.
Week 8	Midterm Exam + Review
Week 9	Introduction to Histology • **Contents:** Definition of tissue, four major tissue types (epithelial, connective, muscle, nervous), slide preparation techniques (fixation, sectioning, staining). • **Physical focus:** Basics of light absorption in histological staining; introduction to light and electron microscopy.
Week 10	Epithelial Tissue • **Contents:** Classification (by shape and layers), functions (protection, absorption,

	secretion). • **Physical focus:** Barrier properties of epithelial tissues, electrical conductivity across epithelial layers.
Week 11	Connective Tissue • **Contents:** Components (cells, fibers, ground substance), types (proper connective tissue, cartilage, bone, blood). • **Physical focus:** Mechanical properties of bone and cartilage (stiffness, elasticity); applications in radiology and bone imaging; rheological properties of blood (viscosity).
Week 12	Muscle Tissue • **Contents:** Types of muscle tissues (skeletal, smooth, cardiac), mechanism of contraction. • **Physical focus:** Physics of muscle contraction (force, tension), muscle electrical signals (EMG), thermal imaging of muscles.
Week 13	Nervous Tissue • **Contents:** Neurons, glial cells, action potentials, synapses. • **Physical focus:** Physics of neural signal conduction (electromagnetics); techniques for measuring neural activity (EEG, MEG); principles of electrical nerve stimulation.
Week 14	Special Tissues and Applications in Medical Physics • **Contents:** Overview of specialized tissues and their integration into organ systems. • **Physical focus:** Applications of biophysics and medical physics in tissue imaging, diagnostics, and therapeutic techniques.
Week 15	**Review**
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Cell and Tissue Laboratory • Familiarization with laboratory safety instructions. • Introduction to the light microscope and its components. • Basic preparation and examination of slides.
Week 2	The Cell under the Microscope • Observation of plant cells (onion) and animal cells (white blood cells and buccal cells). • Comparison between prokaryotic and eukaryotic cells.
Week 3	Basic Cell Staining Techniques • Staining cells with simple dyes (e.g., methylene blue, iodine). • Differentiating between nucleus and cytoplasm.
Week 4	Cell Membrane and Permeability • Demonstration of diffusion and osmosis using plant cells (leaves or potato tubers). • Correlating results with the physical properties of the membrane.
Week 5	Cellular Organelles • Observation of mitochondria/nucleus using specific dyes (e.g., Janus Green). • Practical demonstration of the role of organelles in cellular energy.
Week 6	Cell Division (Mitosis/Meiosis) • Examination of prepared onion root tip slides. • Identification of different stages of cell division under the microscope.
Week 7	Epithelial Tissue

	• Preparation and observation of epithelial tissues (squamous, cuboidal, columnar). • Correlation between structure and function.
Week 8	Midterm Practical Exam
Week 9	Connective Tissue • Observation of connective tissue slides: cartilage, bone, blood. • Study of physical properties (elasticity, rigidity).
Week 10	Muscle Tissue • Observation of muscle tissue types (skeletal, smooth, cardiac). • Comparative study of structure and function.
Week 11	Nervous Tissue • Identification of neurons and glial cells. • Observation of axons and cell bodies using special stains.
Week 12	Advanced Microscopy Techniques • Examination of electron microscopy images (TEM, SEM). • Linking microscopic images to physical properties and medical diagnosis.
Week 13	Comprehensive Review • Revision of all studied slides and tissues. • Discussion of medical and physical applications.
Week 14	Final Practical Exam
Week 15	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		Online
Recommended Texts		Online
Websites		

Grading Scheme
مخطط الدرجات

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.