كلية الطب

Faculty of Medicine

الجامعـــة الهاشميـــة

The Hashemite University

Syllabus: Histology and Molecular Biology (111501105)
Second Semester 2025 /2026

COURSE INFORMATION	
Course Name: Histology and Molecular Biology **Semester:** Second **Department:** Department of Anatomy, Physiology, and Biochemistry **Faculty:** Faculty of Medicine	**Course Code:** 111501105 **Section:** All **Core Curriculum**: MD Program
Day(s) and Time(s): To be determined **Classrooms:** Lectures: To be determined Labs: Histology Labs (Faculty of Medicine, 2nd floor, Room 3061) Molecular Biology Labs **(**Faculty of Medicine, 1st floor, Rooms 2007)	**Credit Hours:** 3 **Prerequisites**: None

COURSE DESCRIPTION

Histology is a basic medical science that studies normal microscopic features of tissues, ultra-structure of cells and their relation to functions. Through class lectures and lab sessions, the students will be made to master the basic knowledge and theory of human histology. Students are also encouraged to train themselves to use the microscope correctly and to refine their abilities to analyze and describe various histological structures.
In Molecular Biology, the students are taught about the relationship between macromolecules structure and properties and their biological functions inside the cells.

DELIVERY METHODS

The course will be delivered through a combination of active learning strategies. These will include:

- PowerPoint lectures and active classroom-based discussion
- Collaborative learning through small groups acting in an interdisciplinary context.
- Problem-based learning
- Relevant films and documentaries
- Video lectures
- E-learning resources: e-reading assignments and practice quizzes through Microsoft Team

FACULTY INFORMATION

Name	**Dr. Mustafa Saad Yousuf (Histology - Course coordinator)**
Academic Title:	**Lecturer**
Office Location:	**Faculty of Medicine, 2nd floor, Room 3019**
Telephone Number:	**5432**
Email Address:	**mustafas@hu.edu.jo**
Office Hours:	TBD *Please send an e-mail (mustafas@hu.edu.jo) to meet at any other time. You can also contact me through Microsoft Teams*
Name	**Dr. Ahmed Salem (Molecular Biology)**
Academic Title:	**Assistant Professor**
Office Location:	**Faculty of Medicine, Ground floor, Room 1019**
Telephone Number:	**5433**
Email Address:	**asalem@hu.edu.jo**
Office Hours:	TBD *Please send an e-mail (asalem@hu.edu.jo) to meet at any other time.*
Name	**Dr. Nebras Melhem (Molecular Biology)**
Academic Title:	**Full-time Lecturer**
Office Location:	**Faculty of Medicine, Ground floor, Room 1039**
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Email Address:	**nebras@hu.edu.jo**
Office Hours:	TBD *Please send an e-mail (nebras@hu.edu.jo) to meet at any other time.*

REFERENCES AND LEARNING RESOURCES

Molecular Biology

Required Textbook:

- Victor W. Rodwell, David A. Bender, Kathleen M. Botham, Peter J. Kennelly, P. Anthony Weil. ***Harper's Illustrated Biochemistry*** (McGraw-Hill Education / Medical. 31st edition: 2018). ISBN-13: 978-1259837937, ISBN-10: 1259837939

Suggested Additional Resources:

- Thomas M. Devlin. ***Textbook of Biochemistry with Clinical Correlations*** (John Wiley & Sons. 7th edition: 2010). ISBN-10: 0470281731, ISBN-13: 978-0470281734
- D. M. Vasudevan, S. Sreekumari, Kannan Vaidyanathan. ***Textbook of biochemistry for medical students.*** (Jaypee Brothers Medical publishers. 2019). ISBN-10: 9350905302, ISBN-13: 978-9350905302

Histology

Required Textbook:

- Anthony L. Mescher. ***Junqueira's Basic Histology: Text and Atlas*** (McGraw-Hill Education. 15th edition: 2018). ISBN: 978-1260026177

Suggested Additional Resources:

- Michael H. Ross and Wojciech Pawlina, ***Histology: A Text and Atlas, with Correlated Cell and Molecular Biology*** (Lippincott Williams & Wilkins. 8th edition: 2018). ISBN: 978-1496383426
- Victor P. Eroschenko, ***Atlas of Histology with Functional Correlations*** (Lippincott Williams & Wilkins. 13th edition: 2017). ISBN: 978-1496316769

Useful Web Resources:

Histology Guide – virtual microscopy laboratory - https://histologyguide.com/

Histologic – https://peir.path.uab.edu/wiki/Histologic

OpenScience Laboratories – Histology & histopathology: virtual microscope – https://learn5.open.ac.uk/mod/htmlactivity/view.php?id=19

STUDENT LEARNING OUTCOMES MATRIX

Program Learning Outcomes	Course Objectives	Course Student Learning Outcomes	Assessment Method
	Histology		
D1 D5 E2	1. Introduction: Understand the main principles of microscopy and tissue preparation.	1.1 Understand the principles of light and electron microscopy and atomic force microscopes. 1.2 Know the steps used in the routine preparation of tissues for histological study and the justification for each step. 1.3 Understand the principles of tissue staining. 1.4 Comprehend the principles of various special techniques used in tissue preparation. 1.5 Recognize problems that may occur during the process of tissue preparation.	• Exams
D1 D5 E2	2. Epithelial tissue: Recognize the structure, types, and functions of epithelial tissues.	2.1 Define epithelial tissue and recognize its main features. 2.2 Classify epithelium and understand the bases behind the classification. 2.3 Identify the main functions and locations of the different types of epithelia. 2.4 Understand the various methods to classify glands. Know examples of each type. 2.5 Define cell polarity. 2.6 Identify the specialized features of the different regions of a cell. 2.7 Correlate function with appearance.	• Exams
D1 D5 E2	3. Connective tissue: Recognize the structure, types, and functions of connective tissues.	3.1 Define connective tissue and recognize its main features. 3.2 Enumerate the various types of cells of the connective tissue and recognize their main features and functions. 3.3 Define the extracellular matrix and know its main components. 3.4 Classify connective tissue and understand the bases behind the classification. 3.5 Identify the main features and functions of the various types of proper connective tissue. 3.6 Define cartilage. Know the types of cartilage and the main features, locations, and functions of each type. 3.7 Define bone. Recognize the main features and functions of bone cells. Classify bone into its types. Define the epiphyseal plate. Understand the process of ossification. 3.8 Define blood. Know the components of blood. Identify the main features and functions of blood elements. 3.9 Correlate function with appearance.	• Exams
D1 D5	4. Nervous tissue: Recognize the main	4.1 Identify the characteristic features of neurons. 4.2 Enumerate the types of glia cells. Know the main features, location, and functions of each type.	• Exams

E2	features of the nervous tissue.	4.3 Understand the histology of the main parts of the central nervous system. 4.4 Identify the components of the blood-brain barrier. 4.5 Understand the basic histology of peripheral nerves and ganglia. Differentiate between nerve/tract, ganglion/nucleus. 4.6 Correlate function with appearance.	
D1 D5 E2	5. Muscular tissue: Recognize the structure, types, and functions of muscular tissues.	5.1 Recognize the main histological features of skeletal muscle tissue. 5.2 Identify the various components of sarcomeres. 5.3 Recognize the main histological features of cardiac muscle tissue. 5.4 Recognize the main histological features of smooth muscle tissue. 5.5 Correlate function with appearance.	• Exams
D1 D5 E2	6. Practical Histology: Gain the ability to recognize basic body tissues from microscopic slides	6.1 Study the main parts of light microscopes and the function of each. 6.2 Gain ability to identify various cells and components of tissue. 6.3 Recognize the various types of epithelial tissues from microscopic slides. 6.4 Recognize the various types of connective tissues from microscopic slides. 6.5 Recognize the various types of neurons and glia cells and the main parts of the nervous system from microscopic slides. 6.6 Recognize the various types of muscular tissues from microscopic slides. 6.7 Apply knowledge of features to practice. 6.8 Correlate function with appearance.	• Exams
	Molecular Biology		
D1 D5 E2	7. Carbohydrates of biological importance: Develop an understanding of carbohydrates of biological importance	7.1 Define carbohydrates and list their classification. 7.2 Recognize the structure and functions of monosaccharides. 7.3 List the important monosaccharides and their derivatives and point out their importance. 7.4 List the important disaccharides, recognize their structure and mention their importance. 7.5 Define glycosides and mention biologically important examples. 7.6 State examples of homopolysaccharides and describe their structure and functions. 7.7 Classify glycosaminoglycans, mention their constituents and their biological importance. 7.8 Define proteoglycans and point out their functions. 7.9 Differentiate between glycoproteins and proteoglycans. 7.10 Apply knowledge gained about carbohydrates to formulate answers to simple and complex metabolic and dietary clinical questions (via a problem-based learning)	• Exams
D1	8. Lipids of biological importance:	8.1 Define and identify the major classes of lipids in the human body and in our diet.	• Exams

D5 E2	Develop an understanding of lipids of biological importance	8.2 Classify the fatty acids and recognize their general structure and importance in the body. 8.3 List the types and functions of eicosanoids. 8.4 Define simple lipids and classify them into two main subgroups. 8.5 Recognize the components and properties of triacylglycerol. 8.6 Illustrate the basic structure of the different classes of compound lipids and recognize their importance. 8.7 Identify the types and function of different steroids. 8.8 Apply knowledge gained about lipids to formulate answers to simple and complex metabolic and dietary clinical questions (via a problem-based learning)	
D1 D5 E2	9. Proteins of biological importance: Develop an understanding of protein structure	9.1 List and name the 20 amino acids that commonly occur in proteins and classify them according to chirality, polarity, size, and charge. 9.2 Define essential, conditionally essential, and nonessential amino acids, and list them accordingly. 9.3 Describe the bonds and forces (peptide, disulfide, and hydrogen bonds; hydrophobic, dipole-dipole, van der Waals, and electrostatic interactions) that contribute to the conformation of proteins and the interaction of proteins with other biomolecules. 9.4 Define and discuss the following terms: peptide bond, peptide backbone, N-terminus, C-terminus, disulfide bridges 9.5 Discriminate between primary, secondary, tertiary, and quaternary protein structure. 9.6 Understand protein folding and chaperone function as mechanisms of disease (via a problem-based learning approach)	• Exams
D1 D5 E2	10. Practical Molecular Biology: Gain the ability to perform simple biochemical tests and interpret their results and answer clinical questions via a problem-based learning approach	10.1 Learn about lab safety measures and pipetting. 10.2 Perform simple biochemical tests using a spectrophotometer independently (glucose and albumin). 10.3 Define and discuss the diagnostic criteria for metabolic syndrome, diabetes, and normal and abnormal lipid and albumin levels. 10.4 Apply knowledge to interpret the results of blood glucose measurement and serum lipids and albumin to reach a presumptive diagnosis. 10.5 Apply knowledge gained about carbohydrates and lipids to formulate answers to simple and complex metabolic and dietary clinical questions (via a problem-based learning).	• Exams

ACADEMIC SUPPORT

It is The Hashemite University policy to provide educational opportunities that ensure fair, appropriate and reasonable accommodation to students who have disabilities that may affect their ability to participate in course activities or meet course requirements. Students with disabilities are encouraged to contact their instructor to ensure that their individual needs are met. The University through its Special Need section will exert all efforts to accommodate for individual's needs.

Special Needs Section: Student Services and Care Unit
Tel: 053903333 ext. 4132 / 4583 / 5023
Location: Deanship of Students Affairs
Email: **student@hu.edu.jo**

COURSE REGULATIONS

Attendance

Class participation and attendance are important elements of every student's learning experience at The Hashemite University, and the student is expected to attend all classes. It is the student's responsibility to monitor the frequency of their own absences. Attendance record begins on the first day of class irrespective of the period allotted to drop/add and late registration. It is a student's responsibility to sign-in; failure to do so will result in a non-attendance being recorded.

The student must know the limits permitted for absence. Any absence above those limits will result in the consequences stated in the regulations of the Faculty of Medicine at the Hashemite University.

Plagiarism

Plagiarism is considered a serious academic offence and can result in your work losing marks or being failed. The Hashemite University expects its students to adopt and abide by the highest standards of conduct in their interaction with their professors, peers, and the wider University community. As such, a student is expected not to engage in behaviours that compromise his/her own integrity as well as that of the Hashemite University.

Plagiarism includes the following examples and it applies to all student assignments or submitted work:

- **Use of the work, ideas, images or words of someone else without his/her permission or reference to them.**
- **Use of someone else's wording, name, phrase, sentence, paragraph or essay without using quotation marks.**
- **Misrepresentation of the sources that were used.**

The instructor has the right to fail the coursework or deduct marks where plagiarism is detected

Student Complaints Policy

Students at The Hashemite University have the right to pursue complaints related to faculty, staff, and other students. The nature of the complaints may be either academic or non-academic. For more information about the policy and processes related to this policy, you may refer to the students' handbook.

Absences from exams

If a student misses an examination, then he/she has the opportunity to do a make-up examination, according to the University Regulations. A student is not allowed to have a makeup exam unless he/she presents a valid excuse within 72 hours of the scheduled exam or when the excuse is lifted. The excuses are presented to the Excuse Committee, which has the right to accept or refuse the excuse. Only a student with an accepted excuse will be able to take the make-up exam. (The time and date of the makeup exams will be announced at the appropriate times).

Health and safety procedures

College members and students must at all times, conform to Health and Safety rules and procedures.

COURSE ASSESSMENT

Course Calendar and Assessment

Students will be graded through the following means of assessment and their final grade will be calculated from the forms of assessment as listed below with their grade weighting taken into account.

Assessment	Grade Weighting	Approximate Time
Mid Exam	40%	Week 8 or 9
Practical Exam	20%	Week 14
Final Exam	40%	Week 15 or 16

Description of Exams

Test questions will predominately come from the material presented in the lectures. The exam will consist of multiple-choice questions for the regular exams and short essay questions for makeup exams (for students with accepted excuses, only documented absences will be considered as per the Hashemite University guidelines).

Mid exam:
Material included: 14 lectures (7 Histology + 7 Molecular Biology)
Marks: 40 (20 for Histology + 20 for Molecular Biology)
Number of questions: 50 MCQS (25 for Histology + 25 for Molecular Biology)
Duration: 65 minutes

Practical exam:
Material included: All topics studied in the labs (11 Labs: 7 Histology + 4 Molecular Biology)
Marks: 20 (12 for Histology + 8 for Molecular Biology)
Number of questions: 20 MCQS (12 for Histology + 8 for Molecular Biology)
Duration: 25 minutes

Final exam
Material included: 26 lectures (13 Histology + 13 Molecular Biology)
Marks: 40 (20 for Histology + 20 for Molecular Biology)
Number of questions: 50 MCQS (25 for Histology + 25 for Molecular Biology)
Duration: 65 minutes

Grades are not negotiable and are awarded according to the following criteria:

Letter Grade	Description	Grade Points
A+	Excellent	4.00
A		3.75
A-		3.50
B+	Very Good	3.25
B		3.00
B-		2.75
C+	Good	2.50
C		2.25
C-		2.00
D+	Pass	1.75
D	Pass	1.50
F	Fail	0.00
I	Incomplete	-

WEEKLY LECTURE SCHEDULE AND CONTENT DISTRIBUTION

Week	*Lecture / Lab*	*Topic*	*Chapter of Recommended Book**
Week 1 (22-26/2/2026)	Histology Lecture 1	• Microscopy • Tissue preparation	Junqueira's Chapter 1
	Molecular Biology Lecture 1	• Classification of carbohydrates • Importance of monosaccharides & Monosaccharide derivatives	Harper's Illustrated Biochemistry: Chapter 15
Week 2 (1-5/3/2026)	Histology Lecture 2	<u>Epithelium I:</u> • Definition • Classification	Junqueira's Chapter 4
	Molecular Biology Lecture 2	• Classification & Forms of Isomerism of monosaccharides	Harper's Illustrated Biochemistry: Chapter 15
	Histology Lab 1	• Parts of light microscope • Stains	
Week 3 (8-12/3/2026)	Histology Lecture 3	<u>Epithelium II:</u> • Simple epithelium • Stratified epithelium • Glandular epithelium	Junqueira's Chapter 4
	Molecular Biology Lecture 3	• Disaccharides, Oligosaccharides & Homogeneous polysaccharides	Harper's Illustrated Biochemistry: Chapter 15
	Molecular Biology Lab 1	• Introduction • Safety measures • Pipetting	
Week 4 (15-19/3/2026)	Histology Lecture 4	<u>Epithelium III:</u> • Epithelial cell polarity	Junqueira's Chapter 5
	Molecular Biology Lecture 4	• Heteropolysaccharides • PBL session: Using gained knowledge about CHO to analyze metabolic and dietary questions	Harper's Illustrated Biochemistry: Chapter 15
	Histology Lab 2	• Simple Epithelium	
Week 5 (22-26/3/2026)	Histology Lecture 5	<u>Connective tissue I:</u> • Definition • Cells	Junqueira's Chapter 5
	Molecular Biology Lecture 5	• Definition, importance and classification of lipids • Fatty Acids: - Nomenclature, classifications and examples of fatty acids	Harper's Illustrated Biochemistry: Chapter 21
	Histology Lab 3	• Stratified Epithelium	
Week 6 (29/3-2/4/2026)	Histology Lecture 6	<u>Connective tissue II:</u> • Extracellular matrix • Classification of connective tissue • Proper connective tissue	Junqueira's Chapter 6 Junqueira's Chapter 12
	Molecular Biology Lecture 6	• Properties of fatty acids, TAG and waxes	Harper's Illustrated Biochemistry: Chapter 21

	Molecular Biology Lab 2	• Perform glucose test using a spectrophotometer • Diagnostic criteria for metabolic syndrome and diabetes • Apply knowledge to interpret the results of blood glucose	
Week 7 (5-9/4/2026)	Histology Lecture 7	<u>Connective tissue III:</u> • Adipose tissue • Blood	Junqueira's Chapter 7
	Molecular Biology Lecture 7	• Compound Lipids: Types and importance of phospholipids & glycolipids	Harper's Illustrated Biochemistry: Chapter 21
	Histology Lab 4	• Proper connective tissue • Blood	
Week 8 (12-16/4/2026)	Histology Lecture 8	<u>Connective tissue IV:</u> • Cartilage	Junqueira's Chapter 8
	Molecular Biology Lecture 8	• Derived Lipids - Classification and importance of steroids (sterols, bile acids and steroid hormones)	Harper's Illustrated Biochemistry: Chapter 21
	Molecular Biology Lab 3	• PBL session: Using gained knowledge about lipids/ carbohydrates to analyze metabolic and dietary questions (case-based discussions)	
Week 9 (19-23/4/2026)	Histology Lecture 9	<u>Connective tissue V:</u> • Bone (part 1)	Junqueira's Chapter 8
	Molecular Biology Lecture 9	• Chemical and nutritional classification of amino acids I	Harper's Illustrated Biochemistry: Chapter 3
Week 10 (26–30/4/2026)	Histology Lecture 10	<u>Connective tissue VI:</u> • Bone (part 2)	Junqueira's Chapter 8
	Molecular Biology Lecture 10	• Chemical and nutritional classification of amino acids II	Harper's Illustrated Biochemistry: Chapter 3
	Histology Lab 5	• Cartilage and bone	
Week 11 (3-7/5/2026)	Histology Lecture 11	<u>Nervous tissue I:</u> • Neurons • Glia cells	Junqueira's Chapter 9
	Molecular Biology Lecture 11	• Properties of amino acids & biologically important peptides	Harper's Illustrated Biochemistry: Chapter 3
	Molecular Biology Lab 4	• Perform albumin test using a spectrophotometer • Diagnostic criteria for normal and abnormal albumin levels • Apply knowledge to interpret the results of blood albumin	
Week 12 (10-14/5/2026)	Histology Lecture 12	<u>Nervous tissue II:</u> • Central nervous system • Peripheral nervous system	Junqueira's Chapter 9

	Molecular Biology Lecture 12	• Structure & classification of proteins	Harper's Illustrated Biochemistry: Chapters 4, 5
	Histology Lab 6	• Nervous tissue	
Week 13 (17-21/5/2026)	Histology Lecture 13	<u>Muscular tissue:</u> • Skeletal muscle tissue • Cardiac muscle tissue • Smooth muscle tissue	Junqueira's Chapter 10
	Molecular Biology Lecture 13	• PBL session: Understand protein folding and chaperone function as mechanisms of disease	Harper's Illustrated Biochemistry: Chapters 4, 5
	Histology Lab 7	• Muscular tissue	

* Refer to 'References and Learning Resources' section above for the full title of the recommended books

"Lecture hours and weeks are approximate and may change as needed"

Instructors per lectures

Topic	Lectures	Instructor
Molecular Biology	1-7	Dr. Ahmed Salem
	8-13	Dr. Nebras Melhem
Histology	All	Dr. Mustafa Saad