Republic of Yemen

Ministry of Higher Education & Scientific Research

21 SEPTEMBER UNIVERSITY for MEDICALS & APPLIED SCIENCES

Faculty of Medicine

Program of Medicine

Bachelor of Medicine and Surgery

Course Specification of

Introduction to Cell Biology & Histology

Course Code. (A21P129)

2023

T4: This Template is Developed and Approved by CAQA-Yemen, 2023

Prepared by:	Reviewed by:	Head of department	Quality Unit:	Dean of Medicine Faculty	Center of Development and Quality Assurance Dean
Dr. Hala J. Al Jobory	Prof. Salem Nasser Al-ryashi		Dr. Fadhl Shujaa Al-deen	Dr. Salwa Al-Ghomeri	

I. General Information:

1.	**Course Title:**	Introduction to Cell biology & Histology				
2.	**Course Code:**	A21P١٢٩				
3.	**Credit Hours:**	**Credit Hours**	**Theory Contact Hours**		**Practical Contact Hours**	
			Lecture	**Tutorial/ Seminar**	**Lab**	**Clinical**
		3	2	--	2	--
4.	**Level/ Semester at which this Course is offered:**	1st Level / 2nd Semester				
5.	**Pre –Requisite (if any):**	None				
6.	**Co –Requisite (if any):**	None				
7.	**Program (s) in which the Course is Offered:**	Bachelor of Medicine and Surgery				
8.	**Language of Teaching the Course:**	English				
9.	**Location of Teaching the Course:**	Faculty of Medicine				
10.	**Prepared by:**	Dr. Hala Jameel Aeid Al Jobory				
١١	**Date and Number of Approval by Council:**	2023				

II. Course Description:

The course provides students with an in-depth understanding of the structures, functions, and interactions of different cells in various tissues and organs within the human body and the microscopic characterization of tissues. Through detailed lectures, laboratory sessions, and practical activities, students will acquire advanced knowledge on topics covered include cell components, cytogenesis, tissue characteristics/types/functions, and preparation techniques for histological examination under light microscopy…etc. Students accordingly will be equipped with analytical skills required for careers within healthcare sciences or research fields where intimate comprehension of cell and tissue structure are vital for success.

III. Course Intended Learning Outcomes (CILOs) : Upon successful completion of the course, students will be able to:		Referenced PILOs		
A. Knowledge and Understanding:		**I, P or M/A**		
a1	Describe the fundamental structure of the cell, the different stages of the cell cycle and cell division.	**I**	**A1**	Describe the general and basic sciences related to human body structure and functions with emphasis on normal and abnormal conditions.
a2	Discuss the basic histological tissues of the body and recognize some clinical applications in relation to histological structure.	**I**		
B. Intellectual Skills:				
b1	Correlate between histological structure & function of any cell or tissue of the body.	**I**	**B1**	Compare between normal and abnormal conditions and predict the appropriate treatment or intervention.
b2	Predict the functional deficit that can arise from certain structural disorders of any tissue element.	**I**	**B2**	Analyze and interpret the finding from history, clinical examination and investigations to propose a diagnosis and develop a shared management plan for common acute, chronic and urgent physical and mental health presentations.
b3	Differentiate between normal and abnormal tissue structures and karyotyping.	**I**	**B1**	Compare between normal and abnormal conditions and predict the appropriate treatment or intervention.
C. Professional and Practical Skills:				

c1	Tackle sufficient practical skills as proficiently using the microscope, preparing tissue samples, and skillfully manipulating slides utilizing maximum microscopic resources to ensure competence.	**I**	**C3**	Carry out routine medical procedure and demonstrate the ability of using common medical tools required for diagnosis and management with highly qualified competency.
c2	Illustrate microscopic samples, anatomical and morphological features correctly and accurately and record observations and report the findings using the scientific methods.	**I**	**C1**	Perform complete clinical examination and precise investigations to reach the final diagnosis.
	D. Transferable Skills:			
d1	Show ability to act independently with minimal supervision or as a part of a team efficiently with the instruments and equipment of the department in a responsible manner keeping them intact and clean.	**I**	**D2**	Work individually or in a team and develop lifelong learning using up to date technology that help in understanding the diseases and its control and prevention.
d2	Express a professional image in manner, dress, speech and relationships that is consistent with the accepted contemporary medical profession standards.	**I**	**D3**	Respect the different cultural beliefs, ethics, personalities, privacy and values for patients and community with a good behavior and follow the institutional and national roles of medical practice.
I= Introduced, P=Practiced or M/A= Mastered/Advanced				

(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
a1	Describe the fundamental structure of the cell, the	- Interactive lectures. - Seminar.	- Written Exams. - Quizzes.

	different stages of the cell cycle and cell division.	- Discussions.	- Assignment.
a2	Discuss the basic histological tissues of the body and recognize some clinical applications in relation to histological structure.	- Interactive lectures. - Seminar. - Discussions. - Self-learning.	- Written Exams. - Quizzes. - Assignment.

(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
b1	Correlate between histological structure & function of any cell or tissue of the body.	- Interactive lectures. - Seminar. - Discussions. - Self-learning.	-Written Exam. -Final Practical Exam. -Assignment.
b2	Predict the functional deficit that can arise from certain structural disorders of any tissue element.	- Interactive lectures. - Seminar. - Discussions. - Self-learning.	-Written Exam. -Final Practical Exam. - Assignment.
b3	Differentiate between normal and abnormal tissue structures and karyotyping.	- Interactive lectures. - Seminar. - Discussions. - Self-learning.	-Written Exam. -Final Practical Exam. - Assignment.

(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
c1	Tackle sufficient practical skills as proficiently using the microscope, preparing tissue samples, and skillfully manipulating slides utilizing maximum microscopic resources to ensure competence.	- Practical sessions. - Training.	- Final Practical Exam

c2	Illustrate microscopic samples, anatomical and morphological features correctly and accurately and record observations and report the findings using the scientific methods.	- Practical sessions. - Training.	- Final Practical Exam

(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
d1	Show ability to act independently with minimal supervision or as a part of a team efficiently with the instruments and equipment of the department in a responsible manner keeping them intact and clean.	- Presentation. - Discussions. - Self-learning.	- Assignment. - Teamwork. - Homework.
d2	Express a professional image in manner, dress, speech and relationships that is consistent with the accepted contemporary medical profession standards.	- Presentation. - Discussions. - Self-learning.	- Assignment. - Teamwork. - Homework.

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	**Introduction: Microtechnique**	– Introduction. – Microtechnique (LM & EM).	1	2	a1, d1

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
	& Cytology	– General structure of the cell, functions of cell membrane and cell coat. – Cytoplasmic contents (organelles & inclusion). – Classification of organelles into membranous and non-membranous organelles.			
2/3	**Cytology**	– Structure & functions of the membranous organelles (Mitochondria, Golgi apparatus, ER, Lysosomes and Peroxisomes). – Structure & functions of the non-membranous organelles (Ribosomes, Centrioles, Cilia, Flagella, Microtubules and Microfilaments). – Cell inclusions. – Structure & functions of the nucleus.	2	4	a1, d1
4/5	**Cytogenetics**	– Cell division (mitosis & meiosis). – Cell cycle & interphase (abnormalities of cell division). – Karyotyping & classification of chromosomes. – Structure of chromosomes (sex chromosomes, chromosomal number). – Chromosomal aberrations (causes, aberrations in number (Mongolism), aberrations in structure, and aberrations of sex chromosomes (Turner & Klinefelter syndromes)).	2	4	a1, b2, b3, d1

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
6	**Epithelial Tissue**	– General characteristics and types. – Simple epithelium (types, structure, sites, and transitional epithelium). – Stratified epithelium (types, structure, and sites). – Glandular epithelium. – Neuro and myo-epithelium. – General functions of epithelium. – Modifications of epithelial cells surfaces (apical, basal & lateral modifications).	1	2	a2, b1, b2, d1
7	**Connective Tissue**	– General characteristics and types (cells and proper). – Connective tissue fibres and ground substances. – Types of connective tissues proper and sites. – General functions of connective tissues proper.	1	2	a2, b1, d1
8	**Mid-Term Theoretical Exam**	**Mid-Term Theoretical Exam**	1	2	a1, a2, b1, b2, b3, d1
9/10	**Cartilages & Bones**	– Types of cartilages, bones & their sites. – Histology of each cartilage type. – Histology of compact & spongy bones. – General functions of cartilages & bones. – Ossification (intramembranous & intracartilagenous). – Differences between cartilages & bones.	2	4	a2, b1, d1

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
11/12	**Blood**	– The blood elements. – Normal structure, size, numbers and functions of RBCs. – Abnormalities in structure, size and numbers of RBCs. – Polycythaemia & anaemia (causes and symptoms). – Normal structure, size, normal % and functions of WBCs (neutrophils, eosinophils, basophils, lymphocytes, and monocytes). – Differences between RBCs & WBCs. – Normal structure & function of platelets. – Types & structure of bone marrow. – Erythropoiesis & Granulopoiesis. – Development of lymphocytes, monocytes & platelets.	2	4	a2, b1, b2, b3, d1, d2
13	**Muscular Tissue**	– General histological structure of muscle cells (fibres). – Types & functions of muscles. – Skeletal muscles. – Smooth muscles. – Cardiac muscles. – Conducting system of heart (Purkinje muscle fibres).	1	2	a2, b1, d1
14/15	**Nervous Tissue**	– General histological structure of neuron (cell body, dendrites & axon). – Types & functions of neurons. – Histology of peripheral nerve	2	4	a2, b1, b2, b3, d1, d2

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
		fibres. – Structure of nerve trunk. – Spinal & autonomic ganglia. – Synapse. – Degeneration & Regeneration. – Neuroglia types, sites, structures & functions. – Nerve endings (in epithelium, connective tissue & muscles). – Some neurons disorders related to nervous system abnormalities.			
١٦	**Final Theoretical Exam**	**Final Theoretical Exam**	1	2	a1, a2, b1, b2, b3
Number of Weeks /and Units Per Semester			**16**	**32**	

B. Practical Aspect (Lab/Clinical) (if any):

No.	Tasks/ Experiments	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	Biological safety and measurements II (lab equipment and measurements).	1	2	c1
2	Microscope structure and applications, with examining different cell types.	1	2	c1, d1
3	Observing the cell membrane functions (permeability and osmosis).	1	2	c1, d1
4	Examining different cell organelles and differentiate between them according to their structure, staining and morphology.	1	2	b1, c1, d1
5	Mitosis and meiosis, chromosomes' structures.	1	2	b2, b3, c1, d1
6	Examining different epithelial tissues slides (simple squamous, cubical, columnar, pseudostratified) (stratified squamous-keratinized & nonkeratinized- transitional	1	2	b1, c1, c2, d1

No.	Tasks/ Experiments	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
	epithelium).			
7	Examining different connective tissues slides (loose tissue, adipose tissue, regular and irregular white collagenous tissue, yellow elastic tissue, reticular tissue, fibroblasts, plasma cells and pigment cells).	1	2	b1, c1, c2, d1
8	**Mid-Term Practical Exam**	1	2	b1, b2, b3, c1, c2, d1
9	Examining different cartilages & bones slides (hyaline cartilage, elastic cartilage, ground compact bone, decalcified compact bone, spongy bone, and intracartilagenous ossification).	1	2	b1, c1, c2, d1
10	Examining blood films showing (neutrophils, RBCs, eosinophils, basophils, lymphocytes, monocytes, and platelets).	1	2	b1, c1, c2, d1
11	Examining different muscles slides (skeletal – longitudinal & transverse sections- smooth & cardiac).	1	2	b1, c1, c2, d1
12	Examining spinal ganglion, sympathetic ganglion, neuron, the white and grey matter in brain and spinal cord.	1	2	b1, c1, c2, d1
13	Preparing, staining and examining different tissues, inclusions and blood smears.	1	2	b1, c1, c2, d1
14	Examining different abnormal tissues and compare them with the normal corresponding.	1	2	b2, b3, c1, c2, d1
15	**Final Practical Exam**	1	2	b1, b2, b3, c1, c2, d1
Number of Weeks /and Units Per Semester		**15**	**30**	

C. Tutorial Aspect (if any):

No.	Tutorial	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	None			

No.	Tutorial	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
Number of Weeks /and Units Per Semester				

VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	Homework (Search for answers to questions using the internet or the scientific references available in the library) .	3rd, 9th, 11th	4.5	d1, d2
2	Oral presentation.	12th	1.5	d1, d2
3	Self-learning (extracting information about the specific topic required).	7th, 15th	4	a2, b1, b2, b3, d1, d2
Total			10	

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	**Assignments & Quiz**	3rd, 7th, 9th, 11th, 12th, 15th	10	10%	a1, a2, b1, b2, b3, d1,d2
3	**Mid-Term Theoretical Exam**	8th	10	10%	a1, a2, b1, b2, b3
4	**Mid-Term Practical Exam**	8th	10	10%	b1, b2, b3, c1, c2
5	**Final Practical Exam**	15th	20	20%	b1, b2, b3, c1, c2
6	**Final Theoretical Exam**	16th	50	50%	a1, a2, b1, b2, b3
Total			100	100%	

IX. Learning Resources:

1- Required Textbook(s):

1- Bruce Alberts, Dennis Bray, Karen Hopkin, Alexander D. Johnson, Julian Lewis, Martin Raff, Keith Roberts, and Peter Walter, 2013: Essential Cell Biology, 4th edition, Garland

Science, Pp: 864.

2- Abraham L Kierszenbaum and Laura L. Tres, 2011, Histology and Cell Biology: An Introduction to Pathology, 3rd edition, Elsevier / Mosby, Pp: 720.

3- Junqueira, LC and Carneiro, J (2005): Basic histology. 11th edition. McGraw-Hill companies. New York.

4- Krause, WJ (2005): Essential Human Histology for Medical Students. Boca Raton. Florida. USA.

2- Essential References:

1- Leslie P. Gartner, 2020: Textbook of Histology, 5th edition, Elsevier publications, Pp:704.

2- Donald B. McMillan and Richard James Harris, 2018: An Atlas of Comparative Vertebrate Histology, 1st edition, Elsevier publications, Pp:634.

3- Electronic Materials and Web Sites etc.:

Websites recommended books:

1- Paulsen, DF (2010): Histology and cell biology, examination and broad review.5th edition.

2- McGraw-Hill Education. Singapore. Ross, MH. and Paulina, W. (2011): Histology, text and atlas: with correlated cell and molecular biology. 6th edition. Lippincott Wiliam & Wilkin. Philadelphia.

Journals:

1- Histology & histochemistry journal.

2- Cell Biology International (https://onlinelibrary.wiley.com/journal/10958355).

Other Web Sources:

1. http://www.lab.anhb.uwa.edu.
2. http://www.getbodysmart.com/ap/histology/menu/menu.html
3. http://www.histology-world.com/stains/stains.htm
4. https://www.bu.edu/histology/m/index.htm/
5. http://www.drjastrow.de/WAI/EM/EMAtlas.html
6. http://www.uni-mainz.de/FB/Medizin/Anatomie/workshop/EM/EMAtlas.html

X. Course Policies: (Based on the Uniform Students' By law (2007)

1	**Class Attendance:** Class Attendance is mandatory. A student is considered absent and shall be banned from taking

	the final exam if his/her absence exceeds 25% of total classes.
2	**Tardiness:** A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	**Exam Attendance/Punctuality:** No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	**Assignments & Projects:** Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	**Cheating:** Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	**Forgery and Impersonation:** Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply**.**
7	**Other policies:** The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Faculty of Medicine

Bachelor Program of Medicine and Surgery

Course Plan (Syllabus) of

Introduction to Cell Biology & Histology

Course Code. (A21P129)

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:	Dr. Hala Jameel Aeid Al Jobory	**Office Hours**					
Location& Telephone No.:	Sana'a University/Since Collage T. 772299734						
E-mail:	h.aljubouri@su.edu.ye aljebouri1967@gmail.com	SAT	SUN	MON	TUE	WED	THU

2023

II. Course Identification and General Information:

	Course Title:	Introduction to Cell biology & Histology				
	Course Code:	A21P١٢٩				
	Credit Hours:	**Credit Hours**	**Theory Contact Hours**		**Practical Contact Hours**	
			Lecture	**Tutorial/Seminar**	**Lab**	**Clinical**
		3	2	--	2	--
	Level/ Semester at which this Course is offered:	1st Level / 2nd Semester				
	Pre –Requisite (if any):	None				
	Co –Requisite (if any):	None				
	Program (s) in which the Course is Offered:	Bachelor of Medicine and Surgery				
	Language of Teaching the Course:	English				
	Location of Teaching the Course:	Faculty of Medicine				
	Prepared by:	Dr. Hala Jameel Aeid Al Jobory				
١١	**Date and Number of Approval by Council:**	2023				

III. Course Description:

The course provides students with an in-depth understanding of the structures, functions, and interactions of different cells in various tissues and organs within the human body and the microscopic characterization of tissues. Through detailed lectures, laboratory sessions, and practical activities, students will acquire advanced knowledge on topics covered include cell components, cytogenesis, tissue characteristics/types/functions, and preparation techniques for histological examination under light microscopy…etc. Students accordingly will be equipped with analytical skills required for careers within healthcare sciences or research fields where intimate comprehension of cell and tissue structure are vital for success.

IV. Course Intended Learning Outcomes (CILOs) :

Upon successful completion of the Course, student will be able to:

	A**. Knowledge and Understanding:**
a1	Describe the fundamental structure of the cell, the different stages of the cell cycle and cell division.
a2	Discuss the basic histological tissues of the body and recognize some clinical applications in relation to histological structure.
	B**. Intellectual Skills:**
b1	Correlate between histological structure & function of any cell or tissue of the body.
b2	Predict the functional deficit that can arise from certain structural disorders of any tissue element.
b3	Differentiate between normal and abnormal tissue structures and karyotyping.
	C. Professional and Practical Skills:
c1	Tackle sufficient practical skills as proficiently using the microscope, preparing tissue samples, and skillfully manipulating slides utilizing maximum microscopic resources to ensure competence.
c2	Illustrate microscopic samples, anatomical and morphological features correctly and accurately and record observations and report the findings using the scientific methods.
	D. Transferable Skills:
d1	Show ability to act independently with minimal supervision or as a part of a team efficiently with the instruments and equipment of the department in a responsible manner keeping them intact and clean.
d2	Express a professional image in manner, dress, speech and relationships that is consistent with the accepted contemporary medical profession standards.

I= Introduced, P=Practiced or M/A= Mastered/Advanced

V. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
1	**Introduction: Microtechnique & Cytology**	– Introduction. – Microtechnique (LM & EM). – General structure of the cell, functions of cell membrane and cell coat. – Cytoplasmic contents (organelles & inclusion). – Classification of organelles into membranous and non-membranous organelles.	1	2
2/3	**Cytology**	– Structure & functions of the membranous organelles (Mitochondria, Golgi apparatus, ER, Lysosomes and Peroxisomes). – Structure & functions of the non-membranous organelles (Ribosomes, Centrioles, Cilia, Flagella, Microtubules and Microfilaments). – Cell inclusions. – Structure & functions of the nucleus.	2	4
4/5	**Cytogenetics**	– Cell division (mitosis & meiosis). – Cell cycle & interphase (abnormalities of cell division). – Karyotyping & classification of chromosomes. – Structure of chromosomes (sex chromosomes, chromosomal number). – Chromosomal aberrations (causes, aberrations in number (Mongolism), aberrations in structure, and aberrations of sex chromosomes (Turner & Klinefelter syndromes)).	2	4
6	**Epithelial Tissue**	– General characteristics and types. – Simple epithelium (types, structure, sites, and transitional epithelium).	1	2

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
		– Stratified epithelium (types, structure, and sites). – Glandular epithelium. – Neuro and myo-epithelium. – General functions of epithelium. – Modifications of epithelial cells surfaces (apical, basal & lateral modifications).		
7	**Connective Tissue**	– General characteristics and types (cells and proper). – Connective tissue fibres and ground substances. – Types of connective tissues proper and sites. – General functions of connective tissues proper.	1	2
8	**Mid-Term Theoretical Exam**	**Mid-Term Theoretical Exam**	1	2
9/10	**Cartilages & Bones**	– Types of cartilages, bones & their sites. – Histology of each cartilage type. – Histology of compact & spongy bones. – General functions of cartilages & bones. – Ossification (intramembranous & intracartilagenous). – Differences between cartilages & bones.	2	4
11/12	**Blood**	– The blood elements. – Normal structure, size, numbers and functions of RBCs. – Abnormalities in structure, size and numbers of RBCs. – Polycythaemia & anaemia (causes and symptoms). – Normal structure, size, normal % and	2	4

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
		functions of WBCs (neutrophils, eosinophils, basophils, lymphocytes, and monocytes). – Differences between RBCs & WBCs. – Normal structure & function of platelets. – Types & structure of bone marrow. – Erythropoiesis & Granulopoiesis. – Development of lymphocytes, monocytes & platelets.		
13	**Muscular Tissue**	– General histological structure of muscle cells (fibres). – Types & functions of muscles. – Skeletal muscles. – Smooth muscles. – Cardiac muscles. – Conducting system of heart (Purkinje muscle fibres).	1	2
14/15	**Nervous Tissue**	– General histological structure of neuron (cell body, dendrites & axon). – Types & functions of neurons. – Histology of peripheral nerve fibres. – Structure of nerve trunk. – Spinal & autonomic ganglia. – Synapse. – Degeneration & Regeneration. – Neuroglia types, sites, structures & functions. – Nerve endings (in epithelium, connective tissue & muscles). – Some neurons disorders related to nervous system abnormalities.	2	4
١٦	**Final Theoretical**	**Final Theoretical Exam**	1	2

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
	Exam			
Number of Weeks /and Units Per Semester			16	32

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
1	**Introduction: Microtechnique & Cytology**	– Introduction. – Microtechnique (LM & EM). – General structure of the cell, functions of cell membrane and cell coat. – Cytoplasmic contents (organelles & inclusion). – Classification of organelles into membranous and non-membranous organelles.	1	2
2/3	**Cytology**	– Structure & functions of the membranous organelles (Mitochondria, Golgi apparatus, ER, Lysosomes and Peroxisomes). – Structure & functions of the non-membranous organelles (Ribosomes, Centrioles, Cilia, Flagella, Microtubules and Microfilaments). – Cell inclusions. – Structure & functions of the nucleus.	2	4
4/5	**Cytogenetics**	– Cell division (mitosis & meiosis). – Cell cycle & interphase (abnormalities of cell division). – Karyotyping & classification of chromosomes. – Structure of chromosomes (sex chromosomes, chromosomal number). – Chromosomal aberrations (causes, aberrations in number (Mongolism), aberrations in structure, and aberrations	2	4

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
		of sex chromosomes (Turner & Klinefelter syndromes)).		
6	**Epithelial Tissue**	– General characteristics and types. – Simple epithelium (types, structure, sites, and transitional epithelium). – Stratified epithelium (types, structure, and sites). – Glandular epithelium. – Neuro and myo-epithelium. – General functions of epithelium. – Modifications of epithelial cells surfaces (apical, basal & lateral modifications).	1	2
7	**Connective Tissue**	– General characteristics and types (cells and proper). – Connective tissue fibres and ground substances. – Types of connective tissues proper and sites. – General functions of connective tissues proper.	1	2
8	**Mid-Term Theoretical Exam**	**Mid-Term Theoretical Exam**	1	2
9/10	**Cartilages & Bones**	– Types of cartilages, bones & their sites. – Histology of each cartilage type. – Histology of compact & spongy bones. – General functions of cartilages & bones. – Ossification (intramembranous & intracartilagenous). – Differences between cartilages & bones.	2	4
11/12	**Blood**	– The blood elements. – Normal structure, size, numbers and functions of RBCs.	2	4

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
		– Abnormalities in structure, size and numbers of RBCs. – Polycythaemia & anaemia (causes and symptoms). – Normal structure, size, normal % and functions of WBCs (neutrophils, eosinophils, basophils, lymphocytes, and monocytes). – Differences between RBCs & WBCs. – Normal structure & function of platelets. – Types & structure of bone marrow. – Erythropoiesis & Granulopoiesis. – Development of lymphocytes, monocytes & platelets.		
13	**Muscular Tissue**	– General histological structure of muscle cells (fibres). – Types & functions of muscles. – Skeletal muscles. – Smooth muscles. – Cardiac muscles. – Conducting system of heart (Purkinje muscle fibres).	1	2
14/15	**Nervous Tissue**	– General histological structure of neuron (cell body, dendrites & axon). – Types & functions of neurons. – Histology of peripheral nerve fibres. – Structure of nerve trunk. – Spinal & autonomic ganglia. – Synapse. – Degeneration & Regeneration. – Neuroglia types, sites, structures & functions. – Nerve endings (in epithelium,	2	4

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
		connective tissue & muscles). – Some neurons disorders related to nervous system abnormalities.		
١٦	**Final Theoretical Exam**	**Final Theoretical Exam**	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

B. Case Studies and Practical Aspect:

No.	Tasks/ Experiments	Number of Weeks	Contact Hours
1	**Biological** safety and measurements II (lab equipment and measurements).	1	2
2	**Microscope** structure and applications, with examining different cell types.	1	2
3	**Observing** the cell membrane functions (permeability and osmosis).	1	2
4	**Examining** different cell organelles and differentiate between them according to their structure, staining and morphology.	1	2
5	**Mitosis** and meiosis, chromosomes' structures.	1	2
6	**Examining** different epithelial tissues slides (simple squamous, cubical, columnar, pseudostratified) (stratified squamous-keratinized & nonkeratinized- transitional epithelium).	1	2
7	**Examining** different connective tissues slides (loose tissue, adipose tissue, regular and irregular white collagenous tissue, yellow elastic tissue, reticular tissue, fibroblasts, plasma cells and pigment cells).	1	2
8	**Mid-Term Practical Exam**	1	2
9	**Examining** different cartilages & bones slides (hyaline cartilage, elastic cartilage, ground compact bone, decalcified compact bone, spongy bone, and intracartilagenous ossification).	1	2
10	**Examining** blood films showing (neutrophils, RBCs, eosinophils, basophils, lymphocytes, monocytes, and platelets).	1	2

No.	Tasks/ Experiments	Number of Weeks	Contact Hours
11	**Examining** different muscles slides (skeletal – longitudinal & transverse sections- smooth & cardiac).	1	2
12	**Examining** spinal ganglion, sympathetic ganglion, neuron, the white and grey matter in brain and spinal cord.	1	2
13	**Preparing**, staining and examining different tissues, inclusions and blood smears.	1	2
14	**Examining** different abnormal tissues and compare them with the normal corresponding.	1	2
15	**Final Practical Exam**	1	2
Number of Weeks /and Units Per Semester		**15**	**30**

No.	Tasks/ Experiments	Number of Weeks	Contact Hours
1	Biological safety and measurements II (lab equipment and measurements).	1	2
2	Microscope structure and applications, with examining different cell types.	1	2
3	Observing the cell membrane functions (permeability and osmosis).	1	2
4	Examining different cell organelles and differentiate between them according to their structure, staining and morphology.	1	2
5	Mitosis and meiosis, chromosomes' structures.	1	2
6	Examining different epithelial tissues slides (simple squamous, cubical, columnar, pseudostratified) (stratified squamous-keratinized & nonkeratinized- transitional epithelium).	1	2
7	Examining different connective tissues slides (loose tissue, adipose tissue, regular and irregular white collagenous tissue, yellow elastic tissue, reticular tissue, fibroblasts, plasma cells and pigment cells).	1	2
8	**Mid-Term Practical Exam**	1	2
9	Examining different cartilages & bones slides (hyaline cartilage, elastic cartilage, ground compact bone, decalcified compact bone, spongy bone, and intracartilagenous ossification).	1	2
10	Examining blood films showing (neutrophils, RBCs, eosinophils, basophils, lymphocytes, monocytes, and platelets).	1	2
11	Examining different muscles slides (skeletal – longitudinal & transverse sections- smooth & cardiac).	1	2

No.	Tasks/ Experiments	Number of Weeks	Contact Hours
12	Examining spinal ganglion, sympathetic ganglion, neuron, the white and grey matter in brain and spinal cord.	1	2
13	Preparing, staining and examining different tissues, inclusions and blood smears.	1	2
14	Examining different abnormal tissues and compare them with the normal corresponding.	1	2
15	**Final Practical Exam**	1	2
Number of Weeks /and Units Per Semester		**15**	**30**

C. Tutorial Aspect:

No.	Tutorial	Number of Weeks	Contact Hours
1	None		
Number of Weeks /and Units Per Semester			

VI. Teaching Strategies of the Course:

خطأ! لم يتم العثور على مصدر المرجع.

VII. Assessment Methods of the Course:

خطأ! لم يتم العثور على مصدر المرجع.

VIII. Assignments:

No.	Assignments	Week Due	Mark
1	Homework (Search for answers to questions using the internet or the scientific references available in the library).	3rd, 9th, 11th	4.5
2	Oral presentation.	12th	1.5
3	Self-learning (extracting information about the	7th, 15th	4

No.	Assignments	Week Due	Mark
	specific topic required).		
Total			**10**

IX. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
1	**Assignments & Quiz**	3rd, 7th, 9th, 11th, 12th, 15th	10	10%
3	**Mid-Term Theoretical Exam**	8th	10	10%
4	**Mid-Term Practical Exam**	8th	10	10%
5	**Final Practical Exam**	15th	20	20%
6	**Final Theoretical Exam**	16th	50	50%
Total			**100**	**100%**

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
1	**Assignments & Quiz**	3rd, 7th, 9th, 11th, 12th, 15th	10	10%
3	**Mid-Term Theoretical Exam**	8th	10	10%
4	**Mid-Term Practical Exam**	8th	10	10%
5	**Final Practical Exam**	15th	20	20%
6	**Final Theoretical Exam**	16th	50	50%
Total			**100**	**100%**

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
1	**Assignments & Quiz**	3rd, 7th, 9th, 11th, 12th, 15th	10	10%

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
3	**Mid-Term Theoretical Exam**	8th	10	10%
4	**Mid-Term Practical Exam**	8th	10	10%
5	**Final Practical Exam**	15th	20	20%
6	**Final Theoretical Exam**	16th	50	50%
Total			**100**	**100%**

X. Learning Resources:

1- Required Textbook(s):

Bruce Alberts, Dennis Bray, Karen Hopkin, Alexander D. Johnson, Julian Lewis, Martin Raff, Keith Roberts, and Peter Walter, 2013: Essential Cell Biology, 4th edition, Garland Science, Pp: 864.

3- Abraham L Kierszenbaum and Laura L. Tres, 2011, Histology and Cell Biology: An Introduction to Pathology, 3rd edition, Elsevier / Mosby, Pp: 720.

4- Junqueira, LC and Carneiro, J (2005): Basic histology. 11th edition. McGraw-Hill companies. New York.

5- Krause, WJ (2005): Essential Human Histology for Medical Students. Boca Raton. Florida. USA.

2- Essential References:

Leslie P. Gartner, 2020: Textbook of Histology, 5th edition, Elsevier publications, Pp:704.

3- Donald B. McMillan and Richard James Harris, 2018: An Atlas of Comparative Vertebrate Histology, 1st edition, Elsevier publications, Pp:634.

1- 3- Electronic Materials and Web Sites etc.:

Websites recommended books:

Paulsen, DF (2010): Histology and cell biology, examination and broad review.5th edition.

3- McGraw-Hill Education. Singapore. Ross, MH. and Paulina, W. (2011): Histology, text and atlas: with correlated cell and molecular biology. 6th edition. Lippincott Wiliam & Wilkin. Philadelphia.

Journals:

2- Histology & histochemistry journal.

3- Cell Biology International (https://onlinelibrary.wiley.com/journal/10958355).

Other Web Sources:

7. http://www.lab.anhb.uwa.edu.
8. http://www.getbodysmart.com/ap/histology/menu/menu.html
9. http://www.histology-world.com/stains/stains.htm
10. https://www.bu.edu/histology/m/index.htm/
11. http://www.drjastrow.de/WAI/EM/EMAtlas.html
12. http://www.uni-mainz.de/FB/Medizin/Anatomie/workshop/EM/EMAtlas.html

XI. Course Policies: (Based on the Uniform Students' Bylaw (2007)

1	**Class Attendance:** Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	**Tardiness:** A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	**Exam Attendance/Punctuality:** No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	**Assignments & Projects:** Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	**Cheating:** Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	**Forgery and Impersonation:** Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	**Other policies:** The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University

	Administration.

Prepared by:	Reviewed by:	Head of department	Quality Unit:	Dean of Medicine Faculty	Center of Development and Quality Assurance Dean
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