Course Syllabus

1	**Course title**	Human Anatomy and Physiology
2	**Course number**	0308231
3	**Credit hours**	4 hrs (3 theory, 1 practical)
	Contact hours (theory, practical)	3 theory
4	**Prerequisites/co-requisites**	Histology (0308211)
5	**Program title**	Clinical Laboratory Sciences
6	**Program code**	0308
7	**Awarding institution**	University of Jordan
8	**School**	Science
9	**Department**	Department of Clinical Laboratory Sciences
10	**Course level**	2nd Year
11	**Year of study and semester (s)**	Fall 2023/ 2024
12	**Other department (s) involved in teaching the course**	
13	**Main teaching language**	English
14	**Delivery method**	☐Face to face learning ☐ Blended ☐Fully online
15	**Online platforms(s)**	☐ Moodle ☐ Microsoft Teams ☐Skype ☐Zoom ☐Others……
16	**Issuing/Revision Date**	2/2024

17. Course Coordinator:

Abbas Al-Momany, PhD
Office: 216 Biology building
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Office hours:

18. Other instructors:

None

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19. Course Description:

This course is designed to provide medical laboratory students with an understanding of the structure, function, regulation, and integration of the major organ systems of the body. The course will cover the basis of structure and function, control of neural and hormonal homeostatic mechanisms, and basic relationships between the systems of the human body, namely the nervous, circulatory, respiratory, digestive, urinary, muscular, and reproductive system.

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20. Course aims and outcomes:

A- Aims:

The aim for this course includes: To correlate human anatomy with body functions via understanding homeostatic regulatory mechanisms based on physiological concepts. Through this aim medical laboratory students will be prepared for more in-depth learning about abnormal changes in pathology, endocrinology, haematology, and clinical chemistry courses.

B- Students Learning Outcomes (SLOs):

For purposes of mapping the course SLOs to the Clinical Laboratory Sciences program SLOs, at the successful completion of the program, graduates are expected to be able to:

SLO (1). Understand and apply the theoretical foundations of medical laboratory sciences to accurately calibrate and operate advanced laboratory equipment.

SLO (2). Demonstrate knowledge of safety protocols, Ministry of Health regulations, and environmental preservation practices when handling samples of pathogens and chemical/biological risks.

SOL (3). Acquire in-depth technical knowledge to stay abreast of scientific advancements and actively participate in local and global applied research in the field.

SOL (4). Perform diverse analyses and effectively interpret results for various clinical samples across laboratory disciplines such as haematology, clinical chemistry, microbiology, urine analysis, body fluids, molecular diagnostics, and immunology.

SOL (5). Apply practical training to solve complex problems, troubleshoot issues, and interpret results, ensuring a connection between data and specific medical conditions for precise diagnosis.

SOL (6). Show effective communication skills to convey information accurately and appropriately in a laboratory setting.

SOL (7). Demonstrate a commitment to lifelong learning and innovation by applying modern techniques, critically analyzing information, and contributing to the creation and application of new knowledge in medical laboratory sciences which fulfil the requirements of national and international CBD.

SOL (8). Uphold professional behaviour, ensuring the confidentiality of client information, and respecting client privacy throughout all aspects of laboratory work.

SOL (9). Apply managerial skills that align with quality assurance, accreditation, quality improvement, laboratory education, and resource management, showcasing competence in the effective administration of laboratory practices.

Descriptors	ILO/ID	Program SLOs / Course SLOs	SLO (1)	SLO (3)	SLO (4)	SLO (5)
Knowledge	A1	Recall and define the basic concepts of human physiology as based on scientific laws		X		
	A2	Demonstrate an understanding of the human body systems: Nervous, endocrine, cardiovascular, respiratory, renal and digestive.		X		
Skills	B1	To apply scientific laws on physiological mechanisms.			X	
	B2	To develop student's skills of identifying, describing, and using course concepts in related courses of medical laboratory sciences they need.				X
Competence	C1	Develop the ability to conceptualize, apply, analyze, synthesize and/or evaluate information gathered from, or generated by, observation experience reflection, reasoning, or communication.	X			
	C2	Integrate knowledge of anatomy and physiology to propose potential diagnostic or therapeutic applications in medicine.		X		

20. Topic Outline and Schedule:

Week	Lecture	Topic	Student Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
1	1.1	Introduction to Physiology	A1	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
	1.2	Homeostasis & feedback control	A2, B1,B2	Blended	Moodle	Asynchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
2	2.1	Interactions between cells and the extracellular environment	A2, B1,B2	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
	2.2	The Membrane Potential; Equilibrium potentials; Resting membrane potential	A2, B1,B2	Blended	Moodle	Asynchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
3	3.1	The Nervous System: Introduction	A2, B1,B2	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
	3.2	Classification of Neurons; Neuroglial cells; Electrical activity in axons; Ion gating in axons; Action potentials.	A2, B1,B2	Blended	Moodle	Asynchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
4	4.1	All or none law; Coding for stimulus intensity. Refractory Periods, Conduction of nerve impulses, Synapse	A2, B1,B2	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
	4.2	Actions of neurotransmitter	A2, B1,B2	Blended	Moodle	Asynchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
5	5.1	Central nervous system:	A2, B1,B2	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Stuart Ira Fox's

Week	Lecture	Topic	Student Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
		Structural organization of the brain; Cerebrum: Cerebral cortex (Electroencephalogram, Sleep);						Human Physiology
	5.2	Basal nuclei; Cerebral lateralization; Language; Limbic system and Emotion; Memory. Diencephalon: Thalamus and Epithalamus; Hypothalamus and Pituitary gland;		Blended	Moodle	Asynchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
6	6.1	Regulation of Autonomic system; regulation of circadian rhythms.	A2, B1,B2	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
	6.2	Midbrain; Hindbrain; Spinal cord tracts: Ascending tracts; Descending tracts.		Blended	Moodle	Asynchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
7	7.1	Peripheral nervous system: Cranial and Spinal nerves	A2, B1,B2	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
	7.2	The Autonomic Nervous System: Neural control of involuntary effectors; Autonomic neurons; Visceral effector organs; Divisions of the Autonomic nervous system; Sympathetic division; Collateral ganglia. Adrenal glands; Parasympathetic division.		Blended	Moodle	Asynchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
8	8.1	Functions of the Autonomic nervous system; Adrenergic &	C1, C2	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Stuart Ira Fox's

Week	Lecture	Topic	Student Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
		cholinergic synaptic transmission;						Human Physiology
	8.2	Responses to adrenergic stimulation; Responses to cholinergic stimulation; Organs with dual innervation (examples). Organs without dual innervation.		Blended	Moodle	Asynchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
9	9.1	Sensory physiology: Functional Categories of sensory receptors; Vestibular Apparatus & Equilibrium: Sensory hair cells of the Vestibular apparatus; Utricle & Saccule; Semi-circular canals.	C1, C2	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
	9.2	The Ears & Hearing: Outer Ear; Middle Ear; Cochlea; Spiral organ (Organ of Corti); Neural pathways for hearing.		Blended	Moodle	Asynchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
10	10.1	The Eyes and Vision: Refraction; Accommodation; Visual acuity; Retina:	A2, B1,B2	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
	10.2	Effect of light on the rods; Electrical activity of retinal cells; Cones & colour vision; Visual acuity & sensitivity.	A2, B1,B2	Blended	Moodle	Asynchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
11	11.1	Skeletal Muscles; Structure of Skeletal Muscles; Motor end plates and Motor units;	A2, B1,B2	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
	11.2	Mechanisms of Contraction; Sliding Filament Theory of Contraction;	A2, B1,B2	Blended	Moodle	Asynchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology

Week	Lecture	Topic	Student Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
		Regulation of Contraction.						
12	12.1	Cardiovascular System: Anatomy of the heart: Pulmonary & systemic circulation; Atrioventricular & semilunar valves; Heart sounds; Cardiac cycle. Pressure changes during cardiac cycle;	C1, C2	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
	12.2	Electrical activity of the heart & the ECG; Pacemaker potential; Myocardial action potential. Conduction tissues of the heart; Conduction of the Impulse; Excitation-contraction coupling in heart muscle. Blood vessels; Arteries; Capillaries; Veins.		Blended	Moodle	Asynchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
13	13.1	Cardiac Output, Blood flow, & Blood Pressure: Cardiac output; Regulation of cardiac rate; Regulation of stroke volume; Frank-Starling Law of the heart; Intrinsic control of contraction; Extrinsic control of contractility. Venous return; Blood volume; Exchange of fluid between capillaries and tissues;	C1, C2	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
	13.2	Vascular Resistance to blood flow; Extrinsic regulation of blood	C1, C2	Blended	Moodle	Asynchronous	Quiz, Exam	Stuart Ira Fox's

Week	Lecture	Topic	Student Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
		flow; Regulation by sympathetic nerves; Parasympathetic control of blood flow. Paracrine regulation of blood flow; Intrinsic regulation of blood flow; Myogenic control mechanisms; Metabolic control mechanisms; Blood Pressure; Baroreceptor reflex; Atrial stretch reflexes.						Human Physiology
14	14.1	Anatomy and Physiology of the kidneys: Structure & function of the Kidneys: Gross and microscopic structure of the urinary system; Control of Micturition; Glomerular Filtration: Regulation of Glomerular Filtration rate. Reabsorption of Salt & Water: Reabsorption in the proximal tubule.	A2, B1,B2	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
	14.2	The Counter current multiplier system (Ascending & Descending limbs of Henle loop; Vasa recta); Collecting duct: Effect of ADH.; Renal Plasma Clearance: (Tubular secretion of drugs); Reabsorption of Glucose (Glycosuria). Renal control of Electrolyte & Acid-base balance: Role of Aldosterone in Na^+/K^+ balance		Blended	Moodle	Asynchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology

Week	Lecture	Topic	Student Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
		(Sodium reabsorption, Potassium secretion). Control of Aldosterone Secretion; Juxtaglomerular Apparatus (Control of Renin secretion; Role of the macula densa); Natriuretic Peptides; Renal Acid-Base Regulation						
15	15.1	Introduction to the digestive system; Layers of the gastrointestinal tract (GIT); Regulation of the GIT. From mouth to stomach: Oesophagus: Stomach; Pepsin and HCl secretion. Small intestine: Villi and Microvilli; Intestinal Enzymes; Intestinal contractions and Motility; Large intestine: Intestinal Microbiota; Fluid and Electrolyte Absorption in the Intestine; Defecation.	A2, B1,B2	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
	15.2	Liver: Structure of the Liver; Functions of the Liver; parts and functions; Pancreas; Regulation of the digestive System: Regulation of the Gastric Function; Regulation of Intestinal Function, Regulation of Pancreatic Juices and Bile Secretion; Trophic effects of	A2, B1,B2	Blended	Moodle	Asynchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology

Week	Lecture	Topic	Student Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
		Gastrointestinal Hormones.						
16	16.1	Respiratory System: Structure of respiratory system; Physical aspects of ventilation; Intrapulmonary & Intrapleural pressures; Boyle's law;	A2, B1,B2	Face to Face	Lecture Room	Synchronous	Quiz, Exam	Stuart Ira Fox's Human Physiology
	16.2	Physical properties of the lungs; Compliance; Elasticity; Surface tension; Surfactant & the respiratory distress syndrome; Mechanics of breathing.	A2, B1,B2	Blended	Moodle	Asynchronous	Quiz, Exam	

21. Teaching Methods and Assignments:

Development of SLOs is promoted through the following teaching and learning methods:

- Interactive lecture using data show and Microsoft teams.
- Office hour discussions
- Quizzes
- Lab reports

22. Evaluation Methods and Course Requirements:

Opportunities to demonstrate achievement of the SLOs are provided through the following assessment methods and requirements:

Short answer questions during the lectures
Quizzes
Exams

23. Course Policies:

A- Attendance policies: Regular class *attendance* is expected, *attendance* by *seating* number.
B- Absences from exams and handing in assignments on time: Reporting a valid reason of absence is accepted.
C- Health and safety procedures: All students should comply with the university health and safety procedures

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D- Honesty policy regarding cheating, plagiarism, misbehaviour: All students should comply with the university Honesty policy regarding cheating, plagiarism, misbehaviour

E- Grading policy: Depends on average

Mid-Term Exam	30%
Final Exam (Practical)	30%
Final Exam (theory)	40%

24. Required equipment:

Available university services that support achievement in the course:

Data Show Projector, internet access
Human anatomy models and charts, microscopes, ECG and spirometry device/s,
Blood pressure devices: digital and sphygmomanometer , gluco-check devices and glucostrips, clinical hammer.

Week	Topic (Practical / Lab)
1	Introduction to human anatomy and physiology and safety rules
2	Basic Anatomical Terminology
3	Skeletal system anatomy (I): Axial: Models
4	Skeletal system anatomy (II): Appendicular: Models
5	Muscles anatomy: models
6	Spinal and Cranial Reflexes
7	Sensory Physiology and anatomy (Hearing and Vision)
8	Human Cardiovascular system: Blood Pressure and ECG
9	Blood Glucose and OGTT
10	Reproductive Physiology: Pregnancy Test
11	Pulmonary system anatomy and Physiology: PFTs: Spirometry

25. References:

1. Human Physiology, Stuart Ira Fox, 2019, 15th edition, Mc Graw Hill.
2. Essentials of Human Anatomy and Physiology, Elaine Marieb, 2015, 11th edition, Pearson Education, Inc.
3. Principles of Anatomy and Physiology, Gerard J. Tortora and Bryan H. Derrickson, 2012, 13th edition, Wiley and Sons, Inc.

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26 Additional information:

Name of Course Coordinator: **Dr. Abbas Al-Momany** Signature: *Abbas Al-Momany* Date:3/2024

Head of Curriculum Committee/Department: **Dr. Suzan Matar** Signature: *Suzan Matar*

Head of Department: **Dr. Ahmed Abu siniyeh** Signature: *Ahmed Abu siniyeh*

Head of Curriculum Committee/Faculty: **Dr**. **Mu'ayyad Al Hseinat** Signature: *Mu'ayyad Al Hseinat*

Dean: **Prof. Mahmoud Jaghoub** Signature: *Mahmoud Jaghoub*