Course Syllabus

1	**Course title**	Physiology
2	**Course number**	0344363
3	**Credit hours**	4 Credit Hour
	Contact hours (theory, practical)	3+3
4	**Prerequisites/corequisites**	Biology 0304102
5	**Program title**	Bachelor of Biological Sciences
6	**Program code**	0304
7	**Awarding institution**	The University of Jordan
8	**School**	Science
9	**Department**	Biological Sciences
10	**Course level**	Third Year
11	**Year of study and semester (s)**	First Semester 2023-2024
12	**Other department (s) involved in teaching the course**	None
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**	

17 Course Coordinator:

Name: Hana Hammad	Contact hours: 11:30 – 12:30 Sunday & Tuesday
Office number: Biology 308	Phone number: 22202
Email: hhammad@ju.edu.jo	

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18 Other instructors:

Name:
Office number:
Phone number:
Email:
Contact hours:
Name:
Office number:
Phone number:
Email:
Contact hours:

19 Course Description:

Basic mechanisms of human physiology: Homeostasis, signal transduction, nervous system, sensory systems, muscle, endocrine physiology, cardiovascular physiology, respiration, renal physiology and body fluid regulation.

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20 Course aims and outcomes:

A- Aims:

• Explain the principles of homeostasis and negative feedback control, and provide specific examples.

• Understand the physiological functions of the major classes of biomolecules.

• Relate biological structure to function at different levels of biological organization.

• Describe the mechanisms of action of nerve and muscle cells.

• Explain mechanisms of cell signaling in the nervous, sensory, and endocrine systems.

• Outline the functions of the major organ systems of the body and provide examples of coordinated interactions among these systems.

B- Students Learning Outcomes (SLOs):

Upon successful completion of this course, students will be able to:

SLOs / CLOs[4]	SLO (1) An ability to identify, formulate, and solve broadly-defined technical or Scientific problems by applying knowledge of mathematics and science and /or technical topics to areas relevant to discipline.)	SLO (2) An ability to formulate or design a system, process, procedure or program to meet desired needs	SLO (3) An ability to develop and conduct experiments or test hypotheses, analyze and interpret data and use scientific judgement to draw conclusions.	SLO (4) An ability to communicate effectively with a range of audiences.	SLO (5) An ability to understand ethical and professional responsibilities and the impact of technical and /or scientific solutions in global , economic, environmental , and societal contexts.	SLO (6) An ability to function effectively on teams that establish goals plan tasks , meet deadlines and analyze risk and uncertainty
1 Describe some biophysical laws and their relation to human physiology.	X					
2 Describe the cellular functions at the organelle and molecular level.	X					
3 Discuss regulation of extracellular fluid composition and volume	X					
4 Point out the basis of excitability (membrane potentials) in all living cells especially in nerve and muscle cells.	X					
5 Explain the functions of the nerve cell and muscle fiber grossly and at the molecular level	X					

6 Classify the functional organization of sympathetic and parasympathetic nervous systems	X					
7 Describe the organization and function of the endocrine system and explain its role in regulating homeostasis of the human body	X					
8 Describe the structure, properties and functions of muscles grossly and at the molecular level	X					
9 Describe the organization and function of the cardiovascular system	X					
10 Point out the functional anatomy of the kidney, physiology of glomerular filtration, renal tubular function and micturition	X					
11 describe the physiology of pulmonary ventilation, exchange of gases in the lung, and blood gas transport	X					
12 Describe the organization and	X					

21. Topic Outline and Schedule:

function of the digestive system						

Week	Lecture	Topic	Student Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Evaluation Methods	Resources
1	1-4	Introduction Homeostasis: A Framework for Human Physiology 1.1 The Scope of Physiology 1.2 How is the Body Organized? 1.3 Body Fluid compartments 1.4 Homeostasis: A Defining Feature of Physiology 1.5 General Characteristics of Homeostatic Control Systems 1.6 Components of Homeostatic Control 1.7 The Role of Intercellular Chemical Messengers in Homeostasis 1.8 Processes Related To Homeostasis 1.9 General Principles of Physiology	1, 2, 3	Face to face	Discussion and Exams	Textbook
2	5-7	**Control of Cells by Chemical Messengers** 5.1 Receptors 5.2 Signal Transduction Pathways	2	Face to face	Discussion and Exams	Textbook
3, 4	8-12	**Neuronal Signaling and the Structure of the Nervous System** **<u>Neural Tissue</u>** 6.1 Structure and Maintenance of Neurons 6.2 Functional Classes of Neurons	4, 5,6	Face to face	Discussion and Exams	Textbook

		6.3 Glial Cells 6.4 Neural Growth & Regeneration **Membrane Potentials** 6.5 Basic Principles of Electricity 6.6 The Resting Membrane Potential 6.7 Graded Potentials and Action Potentials				
5, 6	13-19	**Neuronal Signaling and the Structure of the Nervous System** **Neural Tissue** 6.1 Structure and Maintenance of Neurons 6.2 Functional Classes of Neurons 6.3 Glial Cells 6.4 Neural Growth & Regeneration (*self reading*) **Membrane Potentials** 6.5 Basic Principles of Electricity 6.6 The Resting Membrane Potential 6.7 Graded Potentials and Action Potentials **Synapses** 6.8 Functional Anatomy of Synapses 6.9 Mechanisms of Neurotransmitter Release 6.10 Activation of the Postsynaptic Cell 6.11 Synaptic Integration 6.12 Synaptic Strength 6.13 Neurotranmitters and Neuromodulators	4, 5,6	Face to face	Discussion and Exams	Textbook

		6.14 Neuroeffector Communication **<u>Structure of the Nervous System</u>** 6.18 Autonomic nervous system 6.19 Blood Supply, Blood Brain Barrier, and Cerebrospinal Fluid				
7	20-23	**Muscle** 9.1 Structure 9.2 Molecular Mechanisms of Skeletal Muscle Contraction 9.3 Mechanics of Single-Fiber Contraction 9.4 Skeletal Muscle Energy Metabolism 9.6 Whole-Muscle Contraction	8	Face to face	Discussion and Exams	Textbook
8	24-27	**The Endocrine System** **<u>Principles of Hormonal Control Systems</u>** 11.1 Hormones and Endocrine Glands 11.2 Hormones Structures and Synthesis 11.3 Hormone Transport in the Blood 11.4 Hormone Metabolism and Excretion 11.5 Mechanism of Hormone Action 11.6 Inputs that Control Hormone Secretion 11.7 Types of Endocrine Disorders **<u>The Hypothalamus and Pituitary Gland</u>** 11.8 Control Systems Involving the Hypothalamus and Pituitary **<u>The Thyroid Gland</u>** 11.9 Synthesis of Thyroid Hormone	7	Face to face	Discussion and Exams	Textbook

		11.10 Control of Thyroid Function 11.11 Actions of Thyroid Hormone **The Endocrine Response to Stress** 11.13 Physiological Functions of Cortisol 11.14 Functions of Cortisol in Stress 11.15 Adrenal Insufficiency and Cushing's Syndrome 11.16 Other Hormones Released During Stress				
9	28-30	**Cardiovascular Physiology** **Overview of the Circulatory System** 12.1 Components of the Circulatory System 12.2 Pressure, Flow, and Resistance **The Heart** 12.3 Anatomy 12.4 Heartbeat Coordination 12.5 Mechanical Events of the Cardiac Cycle 12.6 The Cardiac Output 12.7 Measurement of Cardiac Function	9	Face to face	Discussion and Exams	Textbook
10	31-33	**The Vascular System** 12.8 Arteries 12.9 Arterioles **Integrative Cardiovascular Function: Regulation of Systemic Arterial Pressure** 12.13 Baroreceptor Reflexes	9	Face to face	Discussion and Exams	Textbook

11, 12	34-37	**Respiratory Physiology** 13.1 Organization of the Respiratory System 13.2 Ventilation and Lung Mechanics 13.3 Exchange of Gases in Alveoli and Tissues 13.4 Transport of Oxygen in Blood 13.5 Transport of Carbon Dioxide in Blood 13.6 Transport of Hydrogen Ions Between Tissues and Lungs **13.7 Control of Respiration**	11	Face to face	Discussion and Exams	Textbook
13, 14	38-41	**The Kidneys and Regulation of Water and Inorganic Ions** **Basic Principles of Renal Physiology** 14.1 Renal Functions 14.2 Structure of the Kidneys and Urinary System 14.3 Basic Renal Processes 14.4 The Concept of Renal Clearance 14.5 Micturition **Regulation of Ion and Water Balance** 14.6 Total-Body Balance of Sodium and Water 14.7 Basic Renal Processes for Sodium and Water 14.8 Renal Sodium Regulation 14.9 Renal Water Regulation 14.12 Potassium Regulation 14.13 Renal Regulation of Calcium and Phosphate Ion	10	Face to face	Discussion and Exams	Textbook

15	42-45	**The Digestion and Absorption of Food** 15.1 Overview of the Digestive System 15.2 Structure of the Gastrointestinal Tract Wall 15.3 General Functions of the Gastrointestinal and Accessory Organs 15.4 Digestion and Absorption 15.5 How Are Gastrointestinal Processes Regulated?	12	Face to face	Discussion and Exams	Textbook

22 Evaluation Methods:

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

Evaluation Activity	Mark	Topic(s)	SLOs	Period (Week)	Platform
Test 1	20				
Test 2	20				
Final Exam	40				
Lab Reports and Quizzes	10				
Lab Final Exam	10				

23 Course Requirements

(e.g: students should have a computer, internet connection, webcam, account on a specific software/platform…etc):

24 Course Policies:

A- Attendance policies:

Students are allowed to not attend seven lectures (15%) in the whole semester. In this case, students must attend every lab weekly. If a student does not attend a lab, then he/she has a maximum numbers of four lectures to skip.

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B- Absences from exams and submitting assignments on time:

If a student does not attend an exam, he/she will get zero grade in that exam, unless, he/she shows a medical report that proves he/she could not attend the exam. In this case, a makeup exam will be offered to the student as soon as possible.

C- Health and safety procedures:

Students need to be aware of the basic procedure of laboratory safety. Part of the first lab in the first week of the semester is assigned to teach students these basic laboratory procedures.

D- Honesty policy regarding cheating, plagiarism, misbehavior:

University regulations will be implemented for any cheating attempt, plagiarism and misbehavior.

E- Grading policy:

Evaluation	Grade
First Exam	20
Second Exam	20
Lab Reports and Quizzes	10
Final Lab Exam	10
Final Lecture Exam	40

F- Available university services that support achievement in the course:

The university provides lab materials and equipment. Moreover, the university provides personnel to help in exams.

25 References:

A- Required book(s), assigned reading and audio-visuals:

Widmaier, E.P., Raff, H. and Strang, K. T. Vander's Human Physiology

The Mechanisms of Body Function, 15th Ed. New York, McGraw-Hill, 2018.

Laboratory Manual

B- Recommended books, materials, and media:

26 Additional information:

Name of Course Coordinator: -Dr. Hana Hammad ---Signature: ---------- Date: ----------
Head of Curriculum Committee/Department: ---------- Signature: ----------
Head of Department: ---------- Signature: ----------
Head of Curriculum Committee/Faculty: ---------- Signature: ----------
Dean: ---------- Signature: ----------