Course Syllabus

1	**Course title**	**GENERAL BIOLOGY II**
2	**Course number**	**0304102**
3	**Credit hours**	**3-credit hours**
	Contact hours (theory, practical)	(3,0)
4	**Prerequisites/corequisites**	0304101 and 0304111
5	**Program title**	B.Sc. Biological Sciences
6	**Program code**	04
7	**Awarding institution**	The University of Jordan
8	**School**	Science
9	**Department**	Biological Sciences
10	**Course level**	1st year
11	**Year of study and semester (s)**	2023/2024 First Semester
12	**Other department (s) involved in teaching the course**	
13	**Main teaching language**	English
14	**Delivery method**	On campus lectures
15	**Online platforms(s)**	xMoodle ☐Microsoft Teams ☐Skype ☐Zoom ☐Others……
16	**Issuing/Revision Date**	04/10/2023

17 Course Coordinator:

Prof Dr Said Damhoureyeh; 105 Biology

Office Hours. **Mon, Wed : 08:00 – 08:30; 1:15 pm – 02:15 pm.**

Ext. 22213; Email. saidd@ju.edu.jo

18- Other instructors:

19- Course Description:

General biology II surveys the diversity of living organisms, describes how they coordinate their responses to internal and external stimuli and explores their interactions in the biosphere. It describes the characteristics shared by prokaryotes, protists, fungi, plants and animals, and those that distinguish each taxonomic group and its subdivisions. It explores how the distribution patterns of biodiversity are ordered by abiotic factors such as the climate, by the biological properties of the organisms themselves and by ecological interactions between the taxa. The course further investigates the cellular basis and physiological principles underlying biological response, coordination and control by examining hormonal systems in plants and animals and nervous systems in animals. The comparison between plant hormone and animal endocrine systems demonstrates how different organisms can use different structures and signals to achieve the same basic homeostatic regulatory functions.

20- Course aims and outcomes:

A- Aims:

This course has two major aims: i) to provide an introduction to biological diversity within evolutionary and ecological contexts and ii) to introduce the anatomical basis and physiological functions of major plant and animal control systems.

B- Students Learning Outcomes (SLOs):

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

SLOs / CLOs	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 the diversity and evolutionary adaptations of prokaryotes, protists, fungi,	x					

plants, invertebrates and vertebrates and outline their ecological impacts and relevance to the well-being of humans.							
2- Illustrate using examples the complexity of biological systems and the necessity for biologists to study them at different levels of organization	x						
3- Demonstrate the continuity of heritable information across generations using the sexual and asexual life cycles of living organisms belonging to different taxonomic groups.	x						
4- Outline the basic cellular and	x						

physiological regulatory mechanisms and exemplify their role in maintaining homeostasis using cases from plants and animals.							
5- Describe the correlation between biological structure and function, and illustrate that relationship using concrete examples from plant and animal control systems.	x						

21. 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**	Welcome, Introduction, Overview	1	Face to Face	*	**	***	
1-2	2-4	**9** – Cell Signaling 9.1 External signals are Converted to Responses within the Cell 9.2 Reception: a Signaling Molecule Binds to a Receptor Protein, Causing it to Change Shape 9.3 Transduction: Cascades of Molecular Interactions Relay Signals from Receptors to Target Molecules in the Cell (calcium ions and inositol triphosphate are not included) 9.4 Response: Cell Signaling Leads to Regulation of Transcription or Cytoplasmic Activities Nuclear and Cytoplasmic Responses Regulation of the Response Signal Amplification The Specificity of Cell Signaling and Coordination of the Response Signaling Efficiency: Scaffolding Proteins and signaling complexes	1	Face to Face	*	**	***	Campbell, Ch.9 215-219 219-223 223-226 228-231

2	5-6	**39** - PLANT SIGNALS AND BEHAVIOR 39.1 Signal Transduction Pathways Link Signal Reception to Response Reception Transduction Response Post-Translational Modifications of Preexisting Proteins Transcriptional Regulation De-etiolation ("Greening") Proteins 39.2 Plant Hormones Help Coordinate Growth, Development, and Responses to Stimuli A Survey of Plant Hormones (Table 39.1 not included) Auxin Inquiry: What Part of Grass Coleoptile Senses Light and How is the signal Transmitted? Cytokinins Gibberellins Abscisic Acid Ethylene More Recently Discovered Plant Hormones Brassinosteroids Jasmonates Strigolactones	1		*	**	***		Campbell , Ch.39 897-899 900-909
3	7-9	**41** - CHEMICAL SIGNALS IN ANIMALS 41.1 Hormones and other Signaling Molecules Bind to Target Receptors, Triggering Specific Response Pathways Intercellular Communication Endocrine Signaling Paracrine and Autocrine Signaling Synaptic and Neuroendocrine Signaling	1	Face to Face	*	**	***		953-960

		Signaling by Pheromones Chemical Classes of Local Regulators and Hormones Classes of Local Regulators Classes of Hormones Cellular Hormone Response Pathways Response Pathway for Water-Soluble Hormones Pathway for Lipid-Soluble Hormones Multiple Responses to a Single Hormone Endocrine Tissues and Organs 41.2 Feedback Regulation and Coordination with the Nervous System are Common in Hormone Pathways Simple Endocrine Pathways Simple Neuroendocrine Pathways Feedback Regulation Coordination of Endocrine and Nervous Systems (invertebrate examples are not included) Vertebrates Posterior Pituitary Hormones Anterior Pituitary Hormones Thyroid Regulation: a Hormone Cascade Pathway Disorders of Thyroid Function and Regulation Hormonal Regulation of Growth 41.3 Endocrine Glands Respond to Diverse Stimuli in Regulating Homeostasis, Development, and Behavior Parathyroid Hormone and Vitamin D: Control of Blood Calcium Adrenal Hormones: Response to Stress The Role of the Adrenal Medulla						961-970

		The Role of the Adrenal Cortex Sex Hormones Endocrine Disrupters Hormones and Biological Rhythms Evolution of Hormone Function						

4-5	10-13	**48 - ELECTRICAL SIGNALS IN ANIMALS** 48.1 Neuron Structure and Organization Reflect Function in Information Transfer Neuron Structure and Function Introduction to Information Processing 48.2 Ion Pumps and Ion Channels Establish the Resting Potential of a Neuron Formation of the Resting Potential Modeling The Resting Potential (in brief) 48.3 Action Potentials are the Signals Conducted by Axons Hyperpolarization and Depolarization Graded Potentials and Action Potentials Generation of Action Potentials: a Closer Look Conduction of Action Potentials Evolutionary Adaptations of Axon Structure 48.4 Neurons Communicate with other Cells at Synapses Generation of Postsynaptic Potentials Summation of Postsynaptic Potentials Termination of Neurotransmitter Signaling Modulated Signaling at Synapses Neurotransmitters Acetylcholine Amino Acids Biogenic Amines Neuropeptides Gases	1	Face to Face	*	**	***		Campbell, Ch.48 1125-1127 1128-1140

5	14-15	**49 - NEURAL REGULATION IN ANIMALS** 49.1 Nervous Systems Consist of Circuits of Neurons and Supporting Cells Organization of the Vertebrate Nervous System The Peripheral Nervous System Glia	1	Face to Face	*	****	***	Campbell , Ch.49 1143-1148

6	16-18	**27 - PROKARYOTES** 27.1 Structural and Functional Adaptations Contribute to Prokaryotic Success Cell-Surface Structures Motility Evolutionary Origins of Bacterial Flagella Internal Organization and DNA Reproduction 27.2 Rapid Reproduction, Mutation, and Genetic Recombination Promote Genetic Diversity in Prokaryotes Rapid Reproduction and Mutation Genetic Recombination Transformation and Transduction Conjugation and Plasmids (Fig. 27.13a only) The F Factor as a Plasmid R Plasmids and Antibiotic Resistance 27.3 Diverse Nutritional and Metabolic Adaptations have Evolved in Prokaryotes The Role of Oxygen in Metabolism Nitrogen Metabolism Metabolic Cooperation 27.4 Prokaryotes have Radiated into a Diverse Set of Lineages (Fig.27.16 not included) Bacteria Archaea 27.5 Prokaryotes Play Crucial Roles in the Biosphere Chemical Recycling, Ecological Interactions 27.6 Prokaryotes have both Beneficial and Harmful Impacts on Humans Mutualistic Bacteria Pathogenic Bacteria (in brief)	1	Face to Face	*	**	***		Campbell , Ch.27 627-630 630-634 635-636 637-640 640 - 643

		Prokaryotes in Research and Technology						

7	19-21	**28 - THE ORIGIN AND EVOLUTION OF EUKARYOTES** 28.1 Most Eukaryotes are Single-Celled Organisms Structural and Functional Diversity in Protists Four Supergroups of Eukaryotes Endosymbiosis in Eukaryotic Evolution (in brief) 28.2 Excavates Include Protists with Modified Mitochondria and Protists with Unique Flagella Euglenozoans Kinetoplastids Euglenids 28.3 SAR is a Highly Diverse Group of Protists Defined by DNA Similarities Stramenopiles Diatoms Brown algae Alternation of generations Alveolates Apicomplexans Ciliates 28.4 Red Algae and Green Algae are the Closest Relatives of Plants Red Algae Green Algae	1	Face to Face	*	**	***	Campbell, Ch.28 647-651 651-654 654-661 663-665

8	22-23	**29 - NONVASCULAR AND SEEDLESS VASCULAR PLANTS** 29.1 Plants Evolved from Green Algae Morphological and Molecular Evidence Adaptations Enabling the Move to Land Derived Traits of Plants (including Fig. 29.5) The Origin and Diversification of Plants (including Table 29.1) 29.2 Mosses and other Nonvascular Plants have Life Cycles Dominated by Gametophytes Bryophyte Gametophytes Bryophyte Sporophytes The Ecological and Economic Importance of Mosses 29.3 Ferns and other Seedless Vascular Plants were the First Plants to Grow Tall Origins and Traits of Vascular Plants Life Cycle with Dominant Sporophytes Transport in Xylem and Phloem Evolution of Roots Evolution of Leaves Sporophylls and Spore Variations Classification of seedless Vascular Plants (Fig. 29.19 not included)	1		*		***		Campbell, Ch.29 672-676 677-681 683-687

8-9	24-25	**30 - SEED PLANTS** 30.1 Seeds and Pollen Grains are Key Adaptations for Life on Land Advantages of Reduced Gametophytes Heterospory: The Rule Among Seed Plants Ovules and Production of Eggs Pollen and Production of Sperm The Evolutionary Advantage of seeds 30.2 Gymnosperms Bear "Naked" Seeds, Typically on Cones The Life Cycle of a Pine (including Fig. 30.4) 30.3 The Reproductive Adaptations of Angiosperms Include Flowers and Fruits Characteristics of Angiosperms Flowers Fruits The Angiosperm Life Cycle Angiosperm Diversity	1	Face to Face	*	**	***	Campbell Ch.30 690-694 698-700

9-10	26-28	**31- INTRODUCTION TO FUNGI** 31.1 Fungi are Heterotrophs that Feed by Absorption Nutrition And Ecology Body Structure Specialized Hyphae in Mycorrhizal Fungi 31.2 Fungi Produce Spores through Sexual or Asexual Life Cycles Sexual Reproduction Asexual Reproduction 31.4 Fungi have Radiated into a Diverse Set of Lineages Chytrids Zygomycetes Ascomycetes Basidiomycetes 31.5 Fungi Play Key Roles in Nutrient Cycling, Ecological Interactions, and Human Welfare Fungi as Decomposers Fungi as Mutualists Fungus-Plant Mutualisms Fungus-Animal Mutualism Lichens Fungi as Parasites Practical Uses of Fungi	1	Face to Face	*	**	***		Campbell , Ch.31 708-710 711-712 715-720 720-724

10	29-30	**32- AN INTRODUCTION TO ANIMAL DIVERSITY** 32.1 Animals are Multicellular, Heterotrophic Eukaryotes with Tissues that Develop from Embryonic Layers Nutritional Mode Cell Structure and Specialization Reproduction and Development 32.3 Animals can be Characterized by "Body Plans" Symmetry Tissues Body Cavities Protostome and Deuterostome Development Cleavage Coelom Formation Fate of the Blastopore 32.4 Views of Animal Phylogeny Continue to be Shaped by New Molecular and Morphological Data The Diversification of Animals	1	Face to Face	*	**	***	Campbell, Ch.32 727-728 733-736 736-738

11-12	31-34	**33- INVERTEBRATES** A Dragon without a Backbone (Fig 33.2 not included) 33.1 Sponges are Basal Animals that Lack True Tissues 33.2 Cnidarians are an Ancient Phylum of Eumetazoans Medusozoans (Hydrozoans only, including Fig. 33.7) 33.3 Lophotrochozoans, a Clade Identified by Molecular Data, have the Widest Range of Animal Body Forms Flatworms Free-Living Species Parasitic Species Trematodes Tapeworms Molluscs Gastropods Bivalves Cephalopods Annelids Errantians (in brief) Sedentarians (in brief) Leeches Earthworms 33.4 Ecdysozoans are the Most Species-Rich Animal Group Nematodes Arthropods (“Arthropod Origins” not included) General Characteristics of Arthropods Chelicerates Myriapods	1		*	**	***		Campbell, Ch.33 740 742-743 743-745 746-770

		Pancrustaceans Crustaceans Insects (Figure 33.42 not included) 33.5 Echinoderms and Chordates are Deuterostomes Echinoderms Asteroidea: Sea Stars and Sea Daisies						

		34 - VERTEBRATES 34.1 Chordates have a Notochord and a Dorsal, Hollow Nerve Cord Derived Characters of Chordates Notochord Dorsal, Hollow Nerve Cord Pharyngeal Slits or Clefts Muscular, Post-Anal Tail Lancelets Tunicates 34.2 Vertebrates are Chordates that have a Back bone Derived Characters of Vertebrates Hagfishes and Lampreys Hagfishes	1				***	Campbell, Ch.34 772 -
12-13	35-38	Lampreys 34.3 Gnathostomes are Vertebrates that have Jaws Derived Characters of Gnathostomes Chondrichthyans (Sharks, Rays, and their Relatives) Ray-finned Fishes and Lobe-Fins Ray-finned Fishes Lobe-fins 34.4 Tetrapods are Gnathostomes that have Limbs Derived Characters of Tetrapods Amphibians Salamanders Frogs Caecilians Life Style and Ecology of Amphibians		Face to Face	*	**		

		34.5 Amniotes are Tetrapods that have a Terrestrially Adapted Egg Derived Characters of Amniotes Reptiles Lepidosaurs Turtles Crocodilians Birds Derived Characters of Birds 34.6 Mammals are Amniotes that have Hair and Produce Milk Derived Characters of Mammals Monotremes Marsupials Eutherians (Placental Mammals)						

14	39-40	**51 - AN OVERVIEW OF ECOLOGY** Discovering Ecology 51.1 Earth's Climate Varies by Latitude and Season and is Changing Rapidly Global Climate Patterns Regional and Local Effects on Climate Seasonality Bodies of Water Mountains Microclimate Global Climate Change 51.2 The Distribution of Terrestrial Biomes is Controlled by Climate and Disturbance Climate and Terrestrial biomes General Features of Terrestrial Biomes Disturbance and Terrestrial Biomes 51.4 Interactions Between Organisms and the Environment Limit the Distribution of Species Dispersal and Distribution Natural Range Expansions and Adaptive Radiations Species Transplants Biotic Factors Abiotic Factors Temperature Water and Oxygen Salinity Sunlight Rocks and Soil	1	Face to Face	*	**	***		Campbell , Ch.51 1198 -

* Platform is Microsoft Teams; unless otherwise indicated by your instructor

** Teaching methods include: Synchronous lecturing/meeting; Asynchronous lecturing/meeting

***Evaluation methods include: First exam, Midterm exam, and Final exam

22 Evaluation Methods:

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

Evaluation Activity	Mark	Topic(s)	Period (Week)	Platform
Quiz	20	Chapters 9 & 39	TBD	Exambuilder
Mid-term	30	Chapters 41, 48 & 49	TBD	Exambuilder
Final Exam	50	All material	TBD	Exambuilder

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:
Absence from lectures should not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course.

B- Absences from exams and submitting assignments on time:
You should contact your instructor as soon as possible if you miss an exam. All such cases will be dealt with according to the rules outlined in your student handbook.

C- Health and safety procedures: N/A

D- Honesty policy regarding cheating, plagiarism, misbehavior:
All violations pertaining to cheating, plagiarism, misbehavior will be dealt with in accordance to the rules outlined in your student handbook.

E- Grading policy:
All exams are made up of MCQ' and will be graded automatically.

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

- University of Jordan's E-Learning online educational portal ◊ http://www.elearning.ju.edu.jo

- University of Jordan's E-Exam portal ◊ Exambuilder

25 References:

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

Text Book:

Campbell Biology, 12th edition. Pearson Education.

ISBN-10: 1-292-34163-7

ISBN-13: 978-1-292-34163-7

B- Recommended books, materials and media:

• This course's page at the University of Jordan e-learning portal is where you will find the syllabus, handouts, e-links, and announcements regarding the class (including exam dates and instructions). It is your responsibility, as a student, to check this page on daily basis for important updates.

• https://elearning.ju.edu.jo/ then log-in using your university username and password

• Unused copies of the textbook's international edition are bundled with free access to Mastering Biology, an online tutorial and assessment system. http://www.masteringbiology.com,

• HHMI Biointeractive is an outstanding free source for multimedia resources pertaining to the subjects covered in this and other biology classes. https://www.hhmi.org/biointeractive

26 Additional information:

Name of Course Coordinator: Prof Dr Said Damhoureyeh Signature: ---------- Date: 04/10/2023
Head of Curriculum Committee/Department: ---------- Signature: ----------
Head of Department: ---------- Signature: ----------
Head of Curriculum Committee/Faculty: ---------- Signature: ----------
Dean: ---------- Signature: ----------