



Course Specifications

Course Title:	General Biology
Course Code:	BIO1101
Program:	Faculty of Applied Science Requirement
Department:	Biology Department
College:	Applied Science
Institution:	Umm Al-Qura University

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A. Course Identification

1. Credit hours: 4 Credits
2. Course type
a. University <input type="checkbox"/> College <input checked="" type="checkbox"/> Department <input type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: 1 st Year / 1 st Level
4. Pre-requisites for this course (if any):
5. Co-requisites for this course (if any):

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60hrs	100%
2	Blended	-	-
3	E-learning	-	-
4	Distance learning	-	-
5	Other	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	30hrs
2	Laboratory/Studio	30hrs
3	Tutorial	-
4	Others (specify)/ Office hours	40hrs
	Total	100 hrs

B. Course Objectives and Learning Outcomes

1. Course Description

General Biology provides an overview of life on Earth, the evolutionary relationships among major groups of organisms, and the structural and functional characteristics of these organisms. The course covers major areas of biology ranging from cellular to whole organism and includes the study of ecosystems. The focus on cellular level processes leads to an understanding of the importance and roles of the cell. By comparing the processes in unicellular organism and multicellular plants and animals, candidates investigate the increasing levels of life complexity. The key areas of biodiversity and interdependence are covered, along with the processes leading to evolution as well as food security and ethical issues. General Biology is intended primarily for students majoring in any of the biological sciences or life science-related fields (Chemistry, physics, and mathematics).

2. Course Main Objective

The main objective of this course is to give an overview of the many features that are common to living organisms and what is meant by "life" and "living organisms."

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
K1	Understanding the basic biological principles through an integrated approach.	
K2	Investigating the cellular processes of living organisms with an emphasis on biological chemistry applications.	
K3	Identify the unifying themes and key concepts of different organisms.	
K4	Describe the anatomy, function, genetics and evolution of different types of organisms.	
K5	Demonstrate factual knowledge of contemporary natural science.	
2	Skills :	
S1	The student will apply contemporary scientific models to describe the natural world.	
S2	To understand and apply the scientific method.	
S3	Demonstrate basic problem-solving processes, including observation, inference, measurement, prediction, use of numbers, classifying and use of space and time relationships in life sciences	
S4	Demonstrate integrated process skills, including identification and control of variables, interpretation of data, formulation and testing of hypotheses, and experimentation in the life sciences.	
3	Values:	
V1	An awareness of ethical, social and cultural issues within a global context and their importance in the exercise of professional skills and responsibilities.	
V2	A commitment to continuous learning and the capacity to maintain intellectual curiosity throughout life.	

C. Course Content

No	List of Topics	Contact Hours
1	The Chemistry of Life <ul style="list-style-type: none">• The Chemical Context of Life• Water and Life• Carbon and the Molecular Diversity of Life• The Structure and Function of Large Biological Molecules	3
2	The Cell <ul style="list-style-type: none">• A Tour of the Cell• Membrane Structure and Function• An Introduction to Metabolism• Cellular Respiration and Fermentation• Photosynthesis	3

	<ul style="list-style-type: none"> • Cell Communication • The Cell Cycle 	
3	Genetics <ul style="list-style-type: none"> • Meiosis and Sexual Life Cycles • Mendel and the Gene Idea • The Chromosomal Basis of Inheritance • The Molecular Basis of Inheritance • Gene Expression: From Gene to Protein • Regulation of Gene Expression • Viruses • DNA Tools and Biotechnology 	4
	Mechanisms of Evolution <ul style="list-style-type: none"> • Descent with Modification: A Darwinian View of Life • The Evolution of Populations • The Origin of Species • The History of Life on Earth 	3
4	The Evolutionary History of Biological Diversity <ul style="list-style-type: none"> • Phylogeny and the Tree of Life • Bacteria and Archaea • Protists • Plant Diversity I: How Plants Colonized Land • Plant Diversity II: The Evolution of Seed Plants • Fungi • An Overview of Animal Diversity • An Introduction to Invertebrates • The Origin and Evolution of Vertebrates 	4
5	Plant Form and Function <ul style="list-style-type: none"> • Vascular Plant Structure, Growth, and Development • Resource Acquisition and Transport in Vascular Plants • Soil and Plant Nutrition • Angiosperm Reproduction and Biotechnology • Plant Responses to Internal and External Signals 	4
6	Animal Form and Function <ul style="list-style-type: none"> • Basic Principles of Animal Form and Function • Animal Nutrition • Circulation and Gas Exchange • The Immune System • Osmoregulation and Excretion • Hormones and the Endocrine System • Animal Reproduction • Animal Development • Neurons, Synapses, and Signaling • Nervous Systems • Sensory and Motor Mechanisms • Animal Behavior 	5
7	Ecology <ul style="list-style-type: none"> • An Introduction to Ecology and the Biosphere • Population Ecology 	4

	<ul style="list-style-type: none"> • Community Ecology • Ecosystems and Restoration Ecology • Conservation Biology and Global Change 	
Total		30

No	Practical Topics	Contact Hours
1	Biology Lab Safety, Lab Notebook, Basic Biology Laboratory Equipment	3
2	Scientific Investigation Laboratory <ul style="list-style-type: none"> • Questions and Hypotheses Exercise • Designing Experiments to Test Hypotheses Exercise • Designing an Experiment Exercise • Presenting and Analyzing Results Exercise • Interpreting and Communicating Results 	3
3	Microscopes and Cells Laboratory <ul style="list-style-type: none"> • The Compound Light Microscope Exercise • Basic Microscope Techniques Exercise • The Stereoscopic Microscope Exercise • The Organization of Cells 	3
4	Diffusion and Osmosis Laboratory <ul style="list-style-type: none"> • Diffusion of Molecules Exercise • Osmotic Activity in Cells Exercise • Investigating Osmolarity of Plant Cells 	3
5	Cellular Respiration and Fermentation Laboratory <ul style="list-style-type: none"> • Alcoholic Fermentation Exercise • Cellular Respiration Exercise • Designing and Performing Your Open-Inquiry Investigation 	3
6	Photosynthesis Laboratory <ul style="list-style-type: none"> • The Wavelengths of Light for Photosynthesis Exercise • Pigments in Photosynthesis Exercise • Separation and Identification of Plant Pigments by Paper Chromatography Exercise • Determining the Absorption Spectrum for Leaf Pigments 	3
7	Mitosis and Meiosis Laboratory <ul style="list-style-type: none"> • Modeling the Cell Cycle and Mitosis in an Animal Cell Exercise • Observing Mitosis and Cytokinesis in Plant Cells Exercise • Observing Chromosomes, Mitosis, and Cytokinesis in Animal Cells Exercise • Modeling Meiosis Exercise 	3

	<ul style="list-style-type: none"> • Meiosis in <i>Sordaria fimicola</i>: A Study of Crossing 	
8	Bacteriology Laboratory <ul style="list-style-type: none"> • Investigating Characteristics of Bacteria Exercise • Ecological Succession of Bacteria in Milk Exercise • Bacteria in the Environment Exercise • Controlling the Growth of Bacteria 	3
9	Animal Development Laboratory <ul style="list-style-type: none"> • Development in Echinoderms: Sea Urchin and Sea Star Exercise • Development in an Amphibian Exercise • Development in the Zebrafish Exercise • Development in a Bird: The Chicken 	3
10	Plant Growth Laboratory <ul style="list-style-type: none"> • Factors Influencing Seed Germination Exercise • Plant Growth Regulators: Auxin Exercise • Plant Growth Regulators: Gibberellins Exercise 	3
Total		30

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and Understanding		
K1	Understanding the basic biological principles through an integrated approach.	Lectures Lab work	Quiz. Final and mid-term exam. Assignments and activities
K2	Understanding the cellular processes of living organisms.	Lectures Lab work	Quiz. Final and mid-term exam. Assignments and activities
K3	Identify the unifying themes and key concepts of different organisms.	Lectures Lab work	Quiz. Final and mid-term exam. Assignments and activities
K4	Describe the anatomy, function, genetics and evolution of different types of organisms.	Lectures Lab work	Quiz. Final and mid-term exam. Assignments and activities

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
K5	Demonstrate factual knowledge of contemporary natural science.	Lectures Research activity. Web based study	Quiz. Final and mid-term exam. Assignments and activities
2.0	Skills		
S1	The student will apply contemporary scientific models to describe the natural world.	Lectures Lab work	Quiz. Final and mid-term exam. Assignments and activities
S2	To understand and apply the scientific method.	Lectures Lab work Research activity	Quiz. Final and mid-term exam. Assignments and activities
S3	Demonstrate basic problem-solving processes, including observation, inference, measurement, prediction, use of numbers, classifying and use of space and time relationships in life sciences	Lectures Lab work Research activity	Quiz. Final and mid-term exam. Assignments and activities
S4	Demonstrate integrated process skills, including identification and control of variables, interpretation of data, formulation and testing of hypotheses, and experimentation in the life sciences.	Lab work Research activity	Quiz. Final and mid-term exam. Assignments and activities
3.0	Values		
V1	An awareness of ethical, social and cultural issues within a global context and their importance in the exercise of professional skills and responsibilities.	Lectures Lab work Research activity	Quiz. Final and mid-term exam. Assignments and activities
V2	A commitment to continuous learning and the capacity to maintain intellectual curiosity throughout life.	Lectures Lab work Research activity	Quiz. Final and mid-term exam. Assignments and activities

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Assignats, Problem set, Projects		10%

#	Assessment task*	Week Due	Percentage of Total Assessment Score
2	Midterm Exam (Lecture)		20%
3	Midterm Exam (Lab)		10%
5	Final Exam (Lab)		20%
6	Final Exam (Lecture)		40%
8	Total		100%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

4 office hours per week

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	<p>Campbell Biology, 12th Edition, Author(s): Lisa A. Urry, Micheal L. Cain, Steven A. Wasserman, Peter V. Minorsky, Rebecca B. Orr, Neil A. Campbell, Publisher: Pearson, Year: 2020, ISBN: 9780135988046; 0135988047</p> <p>Investigating Biology Laboratory Manual, Ninth Edition by Judith Giles Morgan, Emory University, and M. Eloise Brown Carter, Oxford College of Emory University 978-0-13447346-8/0-134-47346-9</p>
Essential References Materials	
Electronic Materials	<ol style="list-style-type: none"> 1. https://www.coursera.org/learn/Biology 2. https://www.edx.org
Other Learning Materials	<ol style="list-style-type: none"> 1. Handouts and Lecture notes 2. Microsoft office package. 3. Multi- media associated with the textbook and the relevant websites.

2. Facilities Required

Item	Resources
<p>Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)</p>	<ol style="list-style-type: none"> 1. Lecture room suitable for 40 students. 2. Lecture room equipped with Data show. 3. Biology laboratory.
<p>Technology Resources (AV, data show, Smart Board, software, etc.)</p>	<ol style="list-style-type: none"> 1. Computers or internet connection. 2. Active Board. 3. Data show is required in every room.
<p>Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)</p>	<p>Laboratory instruments & equipment: light microscope, Spectrophotometer, centrifuge, pH meters, flasks,</p>

Item	Resources
	beakers, screw capped tubes, slides and tips and chemicals kits.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Observations and the assistance of colleagues.	Faculty	Indirect
Effectiveness of teaching and assessment	Program leader, curriculum committee; external reviewers	Direct
Extent of achievement of CLO's	Peer Reviewer	Direct

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Biology Program Updating Committee
Reference No.	
Date	1443(2022)