Course Specification
(Bachelor)

Course Title:	Basics of Biology
Course Code:	EVS 1112
Program:	Bachelor of Science in Environmental Science
Department:	Biology
College:	Science
Institution:	Imam Mohammed Ibn Saud Islamic University
Version:	1
Last Revision Date:	-

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: 4 (Lecture 3+ Lab 2)					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Level 1 / First year)					
4. Course General Description:					
Basic biology is a core discipline that seeks to provide students with a fundamental understanding of biological principles and concepts. This course covers a wide range of topics, including cellular structure and function, genetics, evolution, the diversity of life (including animal and plant taxonomy), evolutionary connections between species, and the physiological systems of organisms and their interaction with the environment. By engaging in lectures, laboratory exercises, and interactive activities, students will acquire a fundamental understanding of biology and its practical implications in both daily life and scientific research.					
5. Pre-requirements for this course (if any)**:**					
None.					
6. Co-requisites for this course (if any)**:**					
None.					
7. Course Main Objective(s):					
The course aims to : -Explain the basic structure and function of cells, including cell organelles and cellular processes. -Describe the principles of genetics, including inheritance, DNA structure, and gene expression. -Discuss the theory of evolution and the mechanisms that drive evolutionary change. Identify and classify the diversity of life forms, from microorganisms to multicellular organisms. -Illustrate the ecological principles and the interactions between organisms and their environments. -Develop the critical thinking and scientific inquiry skills of the students through laboratory experiments.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	√	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	45
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		75

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	**Describe basic structure and function of cells, including cell organelles and cellular processes.**	K1	Three credits weekly lectures	-Written exams -Quizzes -Class participation -Assignments

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.2	**Discuss the fundamentals of evolution theory and evolutionary mechanisms as well as reproduction at the Cellular Level.**	K2	Three credits weekly lectures	-Written exams -Quizzes -Class participation -Assignments
1.3	**Outline the principles of genetics, including inheritance, DNA structure**	K3	Three credits weekly lectures	-Written exams - Quizzes -Class participation -Assignments
1.4	**Clarify the classification and the diversity of life forms, from microorganisms to multicellular organisms.**	K4	Three credits weekly lectures	-Written exams -Quizzes -Class participation -Assignments
2.0	**Skills**			
2.1	**Relate the concepts and theories of biology to explain the various biological phenomena**	V1	-Weekly lab sessions. -Lab tutorials	-Lab group discussions -Presentations -Lab report
2.2	**Employ the practical skills and lab tools to conduct experimental work**	V2	-Weekly lab sessions. -Lab tutorials	-Lab group discussions -Presentations -Lab report
2.3	**Evaluate, interpret, and**	V3	-Weekly lab sessions.	-Lab group discussions

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	analyze the research results using the appropriate analytical methods		-Lab tutorials	- Presentations -Lab report
3.0	**Values, autonomy, and responsibility**			
3.1	**Demonstrate the ability to work independently and cooperate in a team**	V1	-Lectures and cooperative education -Group discussions	-Reports -Data Search - Presentations
3.2	**Show the ability to assemble information from a variety of sources (textbooks, research papers and review articles), and use information technology to prepare, process and present information**	V2	-Lectures and cooperative education -Group discussions	-Reports Presentations
3.3	**Adhere to ethical regulations while working in the field of biology**	V4	-Lectures and cooperative education -Group discussions	-Reports

C. Course Content

No	List of Topics (Lectures)	Contact Hours
1.	**Introduction to Biology** • The Biosphere From Organisms to Ecosystems • Characteristics of living organisms • Levels of biological organization Chemistry of Life : • The Building Blocks of Molecules, Water, pH and Buffers • Synthesis and Breakdown of Macromolecules • Biogeochemical Cycles:(Water – Carbon- Nitrogen Cycle)	**6**
2.	**Cell Biology:** • Cell theory • Structure and function of prokaryotic and eukaryotic cells • Cellular organelles and their functions • Cell membrane structure, function and transporting mechanisms • Cellular respiration (Energy in Living Systems)and photosynthesis	**6**
3.	**Introduction to Reproduction at the Cellular Level** • The Genome • The Cell Cycle and Mitosis • Prokaryotic Cell Division • Sexual Reproduction • Meiosis	**6**
4.	**Genetics** • Mendelian genetics (Gregor Mendel and Genetic Crosses) • Extensions of the Laws of Inheritance • Chromosomal Basis of Inheritance • DNA structure and replication • Gene expression and regulation	**6**
5.	**Evolution and Taxonomy** • Taxonomy : An overview of the major kingdoms and domains of life • Characteristics of viruses, bacteria, protists and fungi • The history of evolutionary thought • Natural selection and adaptation	**3**

	• Speciation and evolutionary relationships	
6.	**Plant Taxonomy** • The plant kingdom • Seedless plants • Seed plants: gymnosperms • Seed plants: angiosperms	**3**
7.	**Animal Taxonomy** • Features of the Animal Kingdom • Sponges and Cnidarians • Flatworms, Nematodes, and Arthropods • Mollusks and Annelids • Echinoderms and Chordates • Vertebrates.	**3**
8.	**Comparative anatomy and animal physiology** • The Body's Systems • Homeostasis and Osmoregulation • Digestive System, Circulatory and Respiratory Systems • Endocrine System • Musculoskeletal System • Nervous System • The Immune System and Disease: Innate Immunity and Adaptive Immunity Animal Reproduction and Development: • How Animals Reproduce • Development and Organogenesis • Human Reproduction	**9**
9.	**Ecology** • Ecosystems and biomes • Population dynamics • Community interactions: predation, competition, and symbiosis • Energy flow and nutrient cycles • Human impact on the environment	**3**
Total		**45**

No	List of Topics (Labs)	Contact Hours
1.	Laboratory Biosafety – Identification of lab's instruments and tools	2
2.	Components and types of microscopes Training the use of Light microscope Electron microscopes ((SEM, TEM): theoretical and training the use (if possible) Training the use different types of manual pipettes and automated pipettes	4
3.	Specimen Collection and Fixation • Types of specimens (plant, animal, microbial) • Fixatives and their chemical properties • Fixation techniques	4
4.	Embedding and Sectioning : Paraffin embedding - Cryoembedding Microtomy techniques :(rotary and sliding microtomes) : Training the use (if possible) Sectioning strategies Staining techniques: basic stains (hematoxylin and eosin) Microscopy and Imaging Light microscopy (bright field, phase contrast, dark field) Electron microscopy (SEM, TEM)	4
5.	Molecular Models, Structure of Animals and Plants Cells. Animal and Plant Tissue Slides.	2
6.	Kingdom Fungi Slides. Kingdom Protista Slides. Kingdom Monera Slides..	4
7.	Genetic crosses and analysis Cell Cycle and Mitosis& Meiosis.	2
8.	Identification of different systems in human Classifications of some animals in animal's museum in the college	2
9.	Enzyme activity assays Osmosis and Diffusion.	2
10.	Molecular biology techniques such as DNA extraction and gel electrophoresis	2
11.	Ecological field studies Revision	2
Total		30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	**Midterm exam 1**	Around 5th week	15 %
2.	**Midterm exam 2**	Around 8th week	15%
3.	**Quizzes, Participation, Attendance, Presentations, Essays**	During the course	10 %
4.	**Lab reports**	11 th week	5%
5.	**Final Lab. Exam**	15th week	15 %
6.	**Final Exam**	16 th week	40 %
7.	**Total**		100 %

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	-Campbell, N.A. and Reece, J. B. (2008) Biology 8th edition, Pearson Hickman C. P. Jr. et al., Integrated Principles of Zoology. 16th ed. (2013). ISBN-13: 9780073524214. - Paul Waldau. Animal Studies: An Introduction 1st Edition (2013). ISBN-13: 9780199827039. Barnes,R.D. Invertebrate Zoology (1982) VI Edition. Holt Saunders International Edition. -Bruce Alberts et al., Essential Cell Biology, Third edition, London, UK. (2009). ISBN-13: 978-0815341291. Lodish, et al. Molecular Cell Biology. 5th ed. New York, NY: W.H
Supportive References	http://www. Britannica.com/science/biology
Electronic Materials	Access to scientific databases, educational videos, and interactive simulations
Other Learning Materials	-

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms , Laboratories and exhibition rooms
Technology equipment (projector, smart board, software)	Projector and Smartboard
Other equipment (depending on the nature of the speciality)	Tutorial Videos

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Direct
Effectiveness of Students assessment	Program Leader	Direct
Quality of learning resources	Peer Reviewer	Indirect
The extent to which CLOs have been achieved	Program Leader	Direct
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Head of Biology Department**
REFERENCE NO.	
DATE	