هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	Animal Biology
Course Code:	
Program:	BSc Biology (Zoology and Botany Tracks)
Department:	Biology Department
College:	Science
Institution:	Umm Al-Qura University

Table of Contents

A. Course Identification

1. Credit hours:	3hrs
2. Course type	
a.	University [ ] College [ ] Department [√] Others [ ]
b.	Required [√] Elective [ ]
3. Level/year at which this course is offered:	1st Year / 2nd Level
4. Pre-requisites for this course (if any)**:**	General Biology 1st Year / 1st Level
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**	50 hrs	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20hrs
2	**Laboratory/Studio**	30hrs
3	**Tutorial**	-
4	**Others** (specify)	-
	Total	50hrs

B. Course Objectives and Learning Outcomes

1. Course Description

It will explore the animal kingdom and the scientific principles that underpin this important and wide-ranging subject area. The course will give you a sound knowledge and understanding of animal biology. it will cover major scientific principles, including anatomy and physiology, behavior, genetics, ecology, and nutrition. Core scientific study is supported by practical animal course.

2. Course Main Objective

This course will introduce you to how animals work, from cells to organ systems, how traits are inherited, and how animals interact with and adapt to their environments. You will also learn about animal classification, diversity of animals, and evolutionary relationship between many different types of organisms covered in lab, from sponges to mammals, as well as how those evolutionary relationships take shape.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Recognize the multiple levels of complexity at which biological systems operate, from molecules to ecosystems and the biosphere, and explain the emergent properties and processes characteristic of each level.	K1
1.2	Describe mechanisms for the continuity of life, including the processes of inheritance, development, and evolution.	K2
1.3	Demonstrate proficiency in the methods and philosophy of science, including articulation and application of the Scientific Method, collection and analysis of biological data, and application of professional ethics.	K3
2	**Skills :**	
2.1	Evaluate and synthesize biological information from multiple sources, including the primary scientific literature.	S1
2.1	communicate biological knowledge to both professional and non-professional audiences.	S2
2.3	Articulate the application of biological science to meeting the needs of society, including basic research, stewardship of biodiversity, human health, and entrepreneurial innovation.	S3
3	**Values:**	
3.1	Able to interpret biological data	V1
3.2	Able to solve many biological problems	V1
3.3	Able to deal with biological data bases	V3
3.4	Able to deal with the highly complicated biological tools	V2

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to animal biology	2
2	Biomolecules	2
3	Structures of Animal Cells	2
4	Cellular Energy Production	2
5	Evolution in Populations and Speciation	2
6	Animal Diversity	2
7	Animal Form and Function	2
8	The Biosphere	2
9	Ecosystem and Conservation Biology	2
10	Animal Population Ecology	2
Total		20 hrs

Wk	Lab Topic	Contact hours
1	Animal Cells	3
2	Properties of membranes: Diffusion & Osmosis	3
3	Metabolism	3
4	Mitosis & Meiosis	3
5	Digestive enzymes (digestion of carbohydrates ,fat and protein)	3
6	Deuterostomes (Birds, Reptiles, & Mammals)	3
7	Invertebrates I (Porifera, Cnidaria, Platyhelminthes, Nematoda)	3
8	Invertebrates II (Mollusca, Annelida)	3
9	Invertebrates III (Tardigrada, Arthropoda)	3
10	Rat Dissection	3
	Total	30 hrs

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**		
1.1	Recognize the multiple levels of complexity at which biological systems operate	1. In-class lecturing where the previous knowledge is linked to the current and future topics. 2. Homework assignments. 3. Discussions (connecting what they learn in the class and applying this information in laboratory). 4. Handout of lecture notes for each topic.	1- homework and quizzes. 2- Midterm and final written exams (theoretical and practical). 3- Evaluation of reports. 4- Oral presentation. 5-Course work reports.
1.2	Describe mechanisms for the continuity of life.		
1.3	Demonstrate proficiency in the methods and philosophy of science, including articulation and application of the Scientific Method, collection and analysis of biological data.		
2.0	**Skills**		
2.1	Critically evaluate and synthesize biological information from multiple sources.	Application of essential scientific techniques through lectures, classes and essays. Small group discussion.	-Evaluation of the topics prepared by students according to the content, arrangement, and
2.2	Articulate the application of biological science to meeting the needs of society.		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		Ask the students to make small search project during the semester. Making connections between different topics across the course. Class discussions (Engage students in interaction with questions and answers). Homework assignments. Use of microscopic illustrations. Laboratory training. Activities and homework.	covering of the topic. -Midterm and final exams. -Checking the homework assignments. -Course work reports.
3.0	**Values**		
3.1	Able to interprete biological data	Engage student in carrying out internet search. The ability to debate the scientific basis of physiological mechanisms of body systems. Writing group reports. Solving problems in groups during tutorial. Checking the homework assignments in groups during discussion. Cooperative learning and application of scientific method in thinking the scientific problem solving. Work as part of a team.	Oral exams. Evaluation of student essays assignments and search work. Observation of student ethical and moral behavior. Students' attendance is recorded during lectures. Assessment of the student reports. 6-Grading homework assignments.
3.2	Able to solve many biological problems		
3.3	Able to deal with biological data bases		
3.4	Able to deal with the highly complicated biological tools		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		Conducting group experiments and writing group reports. Dividing students into groups to cooperate with each other during the experiments.	

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Assignments, Reports and Essay	-	10%
2	Mid Term Exam (Theoretic)	6	20%
3	Mid Term Exam (practical)	6	10%
4	Final Practical Exam	11	20%
5	Final Exam	12	40%
6	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	Zoology 11th Edition by Stephen Miller, Todd A. Tupper, McG$%&'()** Educ%/)01?3456, ISBN-13: 978-1259880025, ISBN-10: 1259880028
Essential References Materials	1. Biological Science , by Freeman, Quillin, Allison, Black, Taylor, Podgorski and Carmichael, 6th ed , 2017 , Pearson pblisher 2. Michael L. Cain, Hans Damman, Robert Lue, Carol K. Yoon and Richard Morel. Discover Biology. 4th Edition, W.W.Norton & Company, 2009.
Electronic Materials	1. https://www.coursera.org/learn/Biology 2. https://www.edx.org
Other Learning Materials	1. Handouts and Lecture notes 2. Microsoft office package. 3. Multi- media associated with the text book and the relevant websites.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	1. Lecture room equipped with a black board , smart board and Data show. 2. Well equiped Biology lab.
Technology Resources (AV, data show, Smart Board, software, etc.)	1. Computers & internet connection. 2. Smart Board. 3. Data show is required in every room.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	▪ Laboratory instruments & equipment: Spectrophotometer, centrifuge, pH meters, flasks, beakers, screw capped tubes, slides and tips and chemicals kits.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching	Students	Direct
2. Quality of learning resources	Staff and Students	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	
Reference No.	
Date	

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	Basic Biological Laboratory Skills
Course Code:	
Program:	BSc Biology (Zoology and Botany Tracks)
Department:	Biology Department
College:	Science
Institution:	Umm Al-Qura University

Table of Contents

A. Course Identification

1. Credit hours:	3hrs
2. Course type	
a.	University ☐ College ☐ Department ■ Others ☐
b.	Required ■ Elective ☐
3. Level/year at which this course is offered:	1st Year / 2nd Level
4. Pre-requisites for this course (if any)**:**	General Biology (1st Year / 1st Level)
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**	50hrs	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20hrs
2	**Laboratory/Studio**	30hrs
3	**Tutorial**	-
4	**Others** (specify) / office hours	30hrs
	Total	80hrs

B. Course Objectives and Learning Outcomes

1. Course Description

This course is designed to give students both a theoretical background and a working knowledge of the basic biological laboratory skills, including documentation, safety, solution and buffer preparation, quality control and bioethics. Students develop proficiency in aseptic technique, spectrophotometry, microscopy, pH meters, centrifugation and performing measurements to produce valid results. Laboratory exercises emphasizing student mastery of basic laboratory skills needed to succeed in the biological sciences; intended for beginning (first-year) biology majors.

2. Course Main Objective

The aim of the course is to provide students with the theoretical background and practical laboratory-based experience of wide range of commonly used lab techniques in the biosciences field.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Understand and use biological terminology and advanced concepts and techniques in experimental biology.	K1, K2
1.2	Apply scientific method and techniques in advanced experimental design.	K2
1.3	Understand essential calculations for solution preparation and the theory behind the lab techniques.	K1, K2
1.4	Know how to Collect and process biological information.	K1, K2, K3
2	**Skills :**	
2.1	Interpret biological information.	S2, S3
2.2	Apply ethical conduct in learning and research.	S1, S3
2.3	Demonstrate hazard recognition and minimization in safe biological investigation.	S2, S3
3	**Values:**	
3.1	Efficiently organize and perform experimental procedures including all necessary calculations.	V1
3.2	Communicate data in writing.	V2
3.3	Work in team.	V2
3.4	Efficiently deal with the most advanced lab equipment.	V1,V2,V3

C. Course Content

No	List of Topics	Contact Hours
1	**Working in the laboratory** - Health and Safety issues - Laboratory environment - Equipment - Method selection	2
2	**Measuring volume** - Types of equipment available - Markings on equipment used for volumetric measurements - Selecting a suitable piece of equipment - Cleaning and maintenance of volumetric equipment - Checking the accuracy of volumetric equipment	2
3	**Measuring mass** - Mass versus weight - Types of balance available - Selecting a suitable balance	2
4	**Measuring pH** - What is pH? - Equipment for measuring pH - Care of electrodes - Calibration of pH meters - Measuring the pH of a liquid - Checklist for making pH measurements using a pH meter	2
5	**Preparing solutions of known concentration** - When are solutions of known concentration used? - Calculating the concentration of solutions - Labelling and storage of solutions	2

	- Checklist for preparing solutions of known concentration - Special considerations when preparing solutions	
6	**Preparing reagent solutions** - Calculating the concentration of reagent solutions - Solution concentrations expressed as %w/v or %v/v - Solution concentrations expressed as mol L^{-1} - Preparing reagent solutions by dilution - Preparing reagent solutions - Labelling and storage of reagent solutions - Checklist for preparing reagent solutions	2
7	**Centrifugation** - What is centrifugation and when is it used? - rpm versus g - Different types of centrifuge - Correct operation of a centrifuge: safety and quality issues - Checklist for using a centrifuge	2
8	**Quality management** - Definition of quality - Quality management, quality assurance and quality control - International quality standards - Method validation - Sample handling - Archiving	2
9	**Animal and Plant Model Organisms Care** - Handling - Bread various species - Growth conditions and requirements - Prepare special diets - Collect sample	2
10	**Documentation: The Lab Notebook & Lab Report** - Pre-lab write-up - During Lab - Post-lab Report - Conduct basic statical analysis - Data processing and presentation	2
Total		**20hrs**

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**		
1.1	Understand and use biological terminology and advanced concepts and techniques in experimental biology.	1. In-class lecturing where the previous knowledge is linked to the current and future topics. 2. Homework assignments.	1. Term tests a. Mid-term b. Final exam 2. Assignments 3. Course activities 4. Written analyses
1.2	Apply scientific method and techniques in advanced experimental design.		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.3	Understand essential calculations for solution preparation and the theory behind the lab techniques.	3. Discussions (connecting what they learn in the class and applying this information in laboratory). 4. Handout of lecture notes for each topic.	
1.4	Know how to Collect and process biological information.		
2.0	**Skills**		
2.1	Interpret biological information.	1.Students will receive credit for these activities based on their responses to the particular questions and assignments. These will include reading summaries, reflective questions, quizzes	1- Evaluation of the topics prepared by students according to the content, arrangement, and covering of the topic. 2- Midterm and final exams. 3- Checking the homework assignments. 4- Course work reports.
2.2	Apply ethical conduct in learning and research.		
2.3	Demonstrate hazard recognition and minimization in safe biological investigation.		
3.0	**Values**		
3.1	Efficiently organize and perform experimental procedures including all necessary calculations.	1- Engage student in carrying out internet search. 2- The ability to debate the scientific basis of biological lab.techniques 3-Writing group reports. 4-Solving problems in groups during tutorial. 5- Checking the homework assignments in groups during discussion. 6- Cooperative learning and application of scientific method in thinking the scientific problem solving. 7- Work as part of a team. 8-Conducting group experiments and writing group reports.	1- Oral exams. 2- Evaluation of student essays assignments and search work. 3- Observation of student ethical and moral behavior. 4- Students' attendance is recorded during lectures. 5-Assessment of the student reports. 6-Grading homework assignments.
3.2	Communicate data in writing.		
3.3	Work in team.		
3.4	Efficiently deal with the most advanced lab equipment.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Project, Problem Sets	-	10%
2	Midterm Exam (Lab)	6	10%
3	Exam Midterm (Lecture)	6	20%
4	Final Exam (Lab)	11	20 %
5	Final Exam (Lecture)	12	40%
6	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 : 3 office hours per week

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	The Biology Laboratory: Skills, Concepts and Insights, 2004, by Kenneth E. Mantai , Marginal Media (Publisher) , ISBN-13 : 978-0942788150 Laboratory skills training handbook, LGC, C Bailey and V Barwick (2007) ISBN 978 0 948926 259
Essential References Materials	Van De Graaff's Photographic Atlas for the Biology Laboratory, 2018 , 8th Edition, by Byron J. Adams,Morton Publishing Company, ISBN-13 : 978-1617317651 Laboratory Skills for Science and Medicine,An Introduction,2007 , 1st EditionBy Maxine Lintern , Susan Greenfield, Vern Barnet , CRC Press, ISBN 9781846190162
Electronic Materials	
Other Learning Materials	1.Handouts and Lecture notes 2.Microsoft office package. 3.Multi-media associated with the text book and the relevant websites.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms Laboratories equipped with many biological apparatuses and manuals, aireators , suction pumps….etc. personal protective equipment
Technology Resources (AV, data show, Smart Board, software, etc.)	AV, data show, Smart Board, software
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Strategies for Obtaining Student Feedback on Effectiveness of Teaching	Students	Direct
Quality of learning resources	Staff and Students	Direct
Degree of conviction and application efficiency	Staff , Students , related persons	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	
Reference No.	
Date	

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	Biochemistry
Course Code:	
Program:	BSc Biology (Zoology and Botany Tracks)
Department:	Biology Department
College:	Science
Institution:	Umm Al-Qura University

Table of Contents

A. Course Identification

1. Credit hours: 4hrs
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: 2nd Year / 4th Level
4. Pre-requisites for this course (if any)**:** Organic chemistry 1st Year / 3rd Level
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**	60 hrs	100 %
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

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

B. Course Objectives and Learning Outcomes

1. Course Description

The major goal is to understand the basic biochemical properties of biomolecules and the relationship between structure and function. This course covering the fundamentals of biochemistry. Topics covered include: the structure and function of important biomolecules such as carbohydrates, lipids, amino acids, proteins and nucleic acids; enzyme kinetics and the use of cofactors & coenzymes; and metabolic pathways including glycolysis, TCA, electron-transport system, fatty acid and amino acid pathways. Laboratory work includes current biochemical laboratory techniques such as chromatography and electrophoresis, application of specific topics described above, and analysis of data from laboratory experiments.

2. Course Main Objective

- Provide students with information needed to understand the essential topics of biochemistry, including the structure of micro and macromolecules.
- Compare and contrast the chemical, structural differences between biomolecules.

- Develop student's ability to learn and understand the structure, function relationship of biomolecules.
- Apply the processes of scientific research and experimental design to the diversity of biomolecules in living cells.
- Describe how biomolecules control every aspect of the cell function.
- Develop the skills of students to laboratory techniques, investigation, and identification of Biochemical compounds

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Recognize knowledge and basic information of biochemistry and the relationships between biomolecules structure and their functions.	K1, K2
1.2	To describe the role of biomolecules in living cells and differentiate between biomolecules and their structures and functions.	K1, K2
1.3	Understanding the concept of biochemical metabolism and their cycles in live model	K1, K2, K3
2	**Skills:**	
2.1	To Summarize most of the biochemical data (Carb, protein, lipids, enzymes, nucleic acids) and their importance.	S2
2.2	To evaluate the interrelationships between biomolecules	S1, S2
2.3	To interpret the relation between the biomolecule's abnormalities and health.	S1
2.4	Differentiate between healthy and unhealthy biomolecules in food.	S1, S3
3	**Values:**	
3.1	Appraise their time in self-study of the course materials (homework, conducted research)	V1, V3
3.2	Analyze, write and exchange the data.	V1, V2
3.3	Working in teamwork.	V2

C. Course Content

No	List of Topics	Contact Hours
1	General introduction of the meaning of biochemistry and its importance.	2
2	The structure, classification and functions of Carbohydrates and the metabolism cycle	4
3	The structure, classification and functions of protein and the metabolism cycle of exceed amino acids	4
4	The structure, classification and functions of lipids and the metabolism cycle of fatty acids	4
5	The structure, classification and functions of enzymes.	4
6	The structure, classification and functions of vitamins and their importance	2
Total		20

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**		
1.1	Recognize knowledge and basic information of biochemistry and the relationships between biomolecules structure and their functions.	• Classroom lecturing • Homework assignments • Discussions (connecting what they learn in the class. • Handout of lecture notes for each topic • Small group discussions.	• Homework and Quizzes. • Midterm and final written exams • Evaluation of reports • Oral presentation
1.2	To describe the role of biomolecules in living cells and differentiate between biomolecules.		
1.3	To Recall and differentiate between biomolecules.		
1.4	To define the levels of protein and nucleic acid structures.		
1.5	Understanding the concept of biochemical metabolism and their cycles		
2.0	**Skills**		
2.1	To Summarize most of the biochemical data (Carb, protein, lipids, enzymes, nucleic acids, vitamins) and their importance.	• Small group discussion • Ask the students to make small search projects during the semester • Class discussions (Engage students in interaction with questions and answers). • Homework assignments	
2.2	To evaluate the interrelationships between biomolecules		
2.3	To interpret the relation between the biomolecule's abnormalities and health.		
2.4	Differentiate between healthy and unhealthy biomolecules in food.		
3.0	**Values**		
3.1	To be able to evaluate time management, discipline, and also to ethical behavioral, respect from different points of view.	• Small group discussion • Ask the students to make small search projects during the semester • Class discussions (Engage students in interaction with questions and answers). • Homework assignments	• Assignments (Individual or in groups) • Presentation (Individual or in groups) to evaluate the knowledge of understanding. • Research search assignments.
3.2	Learn continuously through self-study and or experience to recognize the value of learning.		
3.3	Work collaboratively and effectively in teams		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Oral presentation & open discussion	-	10%
2	Mid-term Exam (written exam)	5th	20%
3	Mid-term Exam (lab part)	5th	10%
4	Final Exam (written exam)	11-12th	40%
5	Final Lab Exam (written exam)	111-12th	20%
	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:

- Faculty members must be available for academic counseling and support.
- Laboratory assistance.
- E-mail communications.
- Private tutorial.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Biochemistry, David Hames & Nigel Hooper 3th edition, Taylor & Francis group. Lippincott's Illustrated Reviews: Biochemistry, Denise R. Ferrier, 6th edition, Wolters Kluwer business.
Essential References Materials	
Electronic Materials	
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• Lecture room • Library.
Technology Resources (AV, data show, Smart Board, software, etc.)	• Computers and internet connection. • Active Board • Data show is required in every room
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Regular evaluation of the theoretical part of the course to identify the weakness areas and lack of understanding	Department/Faculty	Direct
Confidential completion of standard course evaluation questionnaires	Students	Direct
At the end of each semester feedback regarding the effective of teaching and assessment of staff and the facilities in the college is taken from the students in order to develop in the year	Program leader Head of the Department Quality Committee	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	
Reference No.	
Date	

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	Biochemistry
Course Code:	
Program:	BSc Biology (Zoology and Botany Tracks)
Department:	Biology Department
College:	Science
Institution:	Umm Al-Qura University

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A. Course Identification

1. Credit hours: 4hrs
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: 2nd Year / 4th Level
4. Pre-requisites for this course (if any)**:** Organic chemistry 1st Year / 3rd Level
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**	60 hrs	100 %
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

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

B. Course Objectives and Learning Outcomes

1. Course Description

The major goal is to understand the basic biochemical properties of biomolecules and the relationship between structure and function. This course covering the fundamentals of biochemistry. Topics covered include: the structure and function of important biomolecules such as carbohydrates, lipids, amino acids, proteins and nucleic acids; enzyme kinetics and the use of cofactors & coenzymes; and metabolic pathways including glycolysis, TCA, electron-transport system, fatty acid and amino acid pathways. Laboratory work includes current biochemical laboratory techniques such as chromatography and electrophoresis, application of specific topics described above, and analysis of data from laboratory experiments.

2. Course Main Objective

- Provide students with information needed to understand the essential topics of biochemistry, including the structure of micro and macromolecules.
- Compare and contrast the chemical, structural differences between biomolecules.

- Develop student's ability to learn and understand the structure, function relationship of biomolecules.
- Apply the processes of scientific research and experimental design to the diversity of biomolecules in living cells.
- Describe how biomolecules control every aspect of the cell function.
- Develop the skills of students to laboratory techniques, investigation, and identification of Biochemical compounds

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Recognize knowledge and basic information of biochemistry and the relationships between biomolecules structure and their functions.	K1, K2
1.2	To describe the role of biomolecules in living cells and differentiate between biomolecules and their structures and functions.	K1, K2
1.3	Understanding the concept of biochemical metabolism and their cycles in live model	K1, K2, K3
2	**Skills:**	
2.1	To Summarize most of the biochemical data (Carb, protein, lipids, enzymes, nucleic acids) and their importance.	S2
2.2	To evaluate the interrelationships between biomolecules	S1, S2
2.3	To interpret the relation between the biomolecule's abnormalities and health.	S1
2.4	Differentiate between healthy and unhealthy biomolecules in food.	S1, S3
3	**Values:**	
3.1	Appraise their time in self-study of the course materials (homework, conducted research)	V1, V3
3.2	Analyze, write and exchange the data.	V1, V2
3.3	Working in teamwork.	V2

C. Course Content

No	List of Topics	Contact Hours
1	General introduction of the meaning of biochemistry and its importance.	2
2	The structure, classification and functions of Carbohydrates and the metabolism cycle	4
3	The structure, classification and functions of protein and the metabolism cycle of exceed amino acids	4
4	The structure, classification and functions of lipids and the metabolism cycle of fatty acids	4
5	The structure, classification and functions of enzymes.	4
6	The structure, classification and functions of vitamins and their importance	2
Total		20

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**		
1.1	Recognize knowledge and basic information of biochemistry and the relationships between biomolecules structure and their functions.	• Classroom lecturing • Homework assignments • Discussions (connecting what they learn in the class. • Handout of lecture notes for each topic • Small group discussions.	• Homework and Quizzes. • Midterm and final written exams • Evaluation of reports • Oral presentation
1.2	To describe the role of biomolecules in living cells and differentiate between biomolecules.		
1.3	To Recall and differentiate between biomolecules.		
1.4	To define the levels of protein and nucleic acid structures.		
1.5	Understanding the concept of biochemical metabolism and their cycles		
2.0	**Skills**		
2.1	To Summarize most of the biochemical data (Carb, protein, lipids, enzymes, nucleic acids, vitamins) and their importance.	• Small group discussion • Ask the students to make small search projects during the semester • Class discussions (Engage students in interaction with questions and answers). • Homework assignments	
2.2	To evaluate the interrelationships between biomolecules		
2.3	To interpret the relation between the biomolecule's abnormalities and health.		
2.4	Differentiate between healthy and unhealthy biomolecules in food.		
3.0	**Values**		
3.1	To be able to evaluate time management, discipline, and also to ethical behavioral, respect from different points of view.	• Small group discussion • Ask the students to make small search projects during the semester • Class discussions (Engage students in interaction with questions and answers). • Homework assignments	• Assignments (Individual or in groups) • Presentation (Individual or in groups) to evaluate the knowledge of understanding. • Research search assignments.
3.2	Learn continuously through self-study and or experience to recognize the value of learning.		
3.3	Work collaboratively and effectively in teams		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Oral presentation & open discussion	-	10%
2	Mid-term Exam (written exam)	5th	20%
3	Mid-term Exam (lab part)	5th	10%
4	Final Exam (written exam)	11-12th	40%
5	Final Lab Exam (written exam)	111-12th	20%
	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:

- Faculty members must be available for academic counseling and support.
- Laboratory assistance.
- E-mail communications.
- Private tutorial.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Biochemistry, David Hames & Nigel Hooper 3th edition, Taylor & Francis group. Lippincott's Illustrated Reviews: Biochemistry, Denise R. Ferrier, 6th edition, Wolters Kluwer business.
Essential References Materials	
Electronic Materials	
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• Lecture room • Library.
Technology Resources (AV, data show, Smart Board, software, etc.)	• Computers and internet connection. • Active Board • Data show is required in every room
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Regular evaluation of the theoretical part of the course to identify the weakness areas and lack of understanding	Department/Faculty	Direct
Confidential completion of standard course evaluation questionnaires	Students	Direct
At the end of each semester feedback regarding the effective of teaching and assessment of staff and the facilities in the college is taken from the students in order to develop in the year	Program leader Head of the Department Quality Committee	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	
Reference No.	
Date	

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	Bioethics
Course Code:	
Program:	BSc Biology (Zoology and Botany Tracks)
Department:	Biology Department
College:	Science
Institution:	Umm Al-Qura University

Table of Contents

A. Course Identification

1. Credit hours: 2 hrs
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: 2nd Year / 6thLevel
4. Pre-requisites for this course (if any)**:**
5. Co-requisites for this course (if any)**:** General Biotechnology 2nd Year / 6thLevel

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	-	-
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	20 hrs	100%
5	**Other**	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20 hrs
2	**Laboratory/Studio**	-
3	**Tutorial**	-
4	**Others** (specify)	-
	Total	20 hrs

B. Course Objectives and Learning Outcomes

1. Course Description

A comprehensive study of current ethical issues in biology, including topics in genetics and biotechnology, species conservation, use of natural resources, and medicine and human/nonhuman interests. Understanding and application of value choices and ethics is emphasized.

2. Course Main Objective

The main objective of this course is to introduce students to the fundamentals of the ethical theories and principles that apply to bioethical dilemmas.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Develop an understanding of the basic principles and approaches of bioethics.	K1
1.2	Appreciate the bioethical consequences and implications of the major biological fields including scientific research, use of humans and animals in research, ecology and the environmental, and biotechnology.	K1 , K2
2	**Skills :**	
2.1	Critically consider multiple sides of a bioethical argument and from different perspectives.	S1
2.2	Produce sound, logical, coherent, and consistent bioethical arguments.	S3
2.3	Describe, employ, examine, and critique bioethical principles and the dilemmas that arise in contemporary medical practices because of them	S2
3	**Values:**	
3.1	Analyze and assess bioethical arguments offered by others and the student themselves	V1
3.2	Develop resolutions to ethical problems and dilemmas using recognizable ethical principles and established patterns of argumentation	V2 ,V3

C. Course Content

No	List of Topics	Contact Hours
1	Course Introduction & Overview of Ethical Theories	2
2	Ethical Reasoning - Ethics - Religion - Reasoning - Method	2
3	Life Science Ethics - Environment - Land - Farms - Food - Biotechnology - Genetically Modified Foods - Animals in Agriculture - Animals in Research - Climate Change - Nanotechnology	8
4	Case Studies - Environment: Marine Mammal Protection - Land: Hybrid Corn - Farms: Lost in the Maize. - Food: Edible Antibiotics in Food Crops - Biotechnology: Trait Protection System - Genetically Modified Foods: Golden Rice	8

	- Animals in Agriculture: Beef, Milk, and Eggs - Animals in Research - Climate Change: Coastal Dead Zones - Nanotechnology: Nanotechnology and Human Enhancement	
	Total	20

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**		
1.1	Develop an understanding of the basic principles and approaches of bioethics.	In-class lecturing where the previous knowledge is linked to the current and future topics. Homework assignments. Handout of lecture notes for each topic.	Term tests Mid-term Final exam Assignments Course activities Written analyses
1.2	Appreciate the bioethical consequences and implications of the major biological fields including scientific research, use of humans and animals in research, ecology and the environmental, and biotechnology.		
1.3	Explain and analyze bioethical discussions in text and oral forms		
2.0	**Skills**		
2.1	Critically consider multiple sides of a bioethical argument and from different perspectives.	These will include reading summaries, reflective questions, quizzes	Evaluation of the topics prepared by students according to the content, arrangement, and covering of the topic. Midterm and final exams. Checking the homework assignments. Course work reports.
2.2	Produce sound, logical, coherent, and consistent bioethical arguments.		
2.3	Describe, employ, examine, and critique bioethical principles and the dilemmas that arise in contemporary medical practices because of them		
3.0	**Values**		
3.1	Analyze and assess bioethical arguments offered by others and the student themselves	Engage student in carrying out internet search. Writing group assay. Solving problems. Checking the homework assignments in groups during discussion.	Evaluation of student essays assignments and search work. Assessment of the student reports.
3.2	Develop resolutions to ethical problems and dilemmas using recognizable ethical principles and established patterns of argumentation		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Project, Problem Sets	-	25%
3	Exam Midterm (Lecture)	6	25%
5	Final Exam (Lecture)	12	50%
	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 :

2 office hours per week

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Life Science Ethics Second Edition, 2010 , Gary L. Comstock, ISBN 978-90-481-8791-1
Essential References Materials	Deni Elliot. Ethical Challenges: Building an Ethics Toolkit. Authorhouse: 2008. ISBN: 1-4343-8802-6. Principles of Biomedical Ethics, by Tom L. Beauchamp and James F. Childress, eight edition,2018, Oxford University Press, ISBN 978-0-19-064087-3. Robert M. Veatch, The Basics of Bioethics. 3rd Edition. Routledge, 2016. ISBN: 978-0-205-76562-1.
Electronic Materials	http://ethicsunwrapped.utexas.edu/wp-content/uploads/2017/01/Ethical- Challenges-PDF-1-Elliott-1.pdf
Other Learning Materials	1.Handouts and Lecture notes 2.Microsoft office package. 3.Multi- media associated with the text book and the relevant websites.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	
Technology Resources (AV, data show, Smart Board, software, etc.)	Computers and internet access
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Related videos

G. Course Quality Evaluation

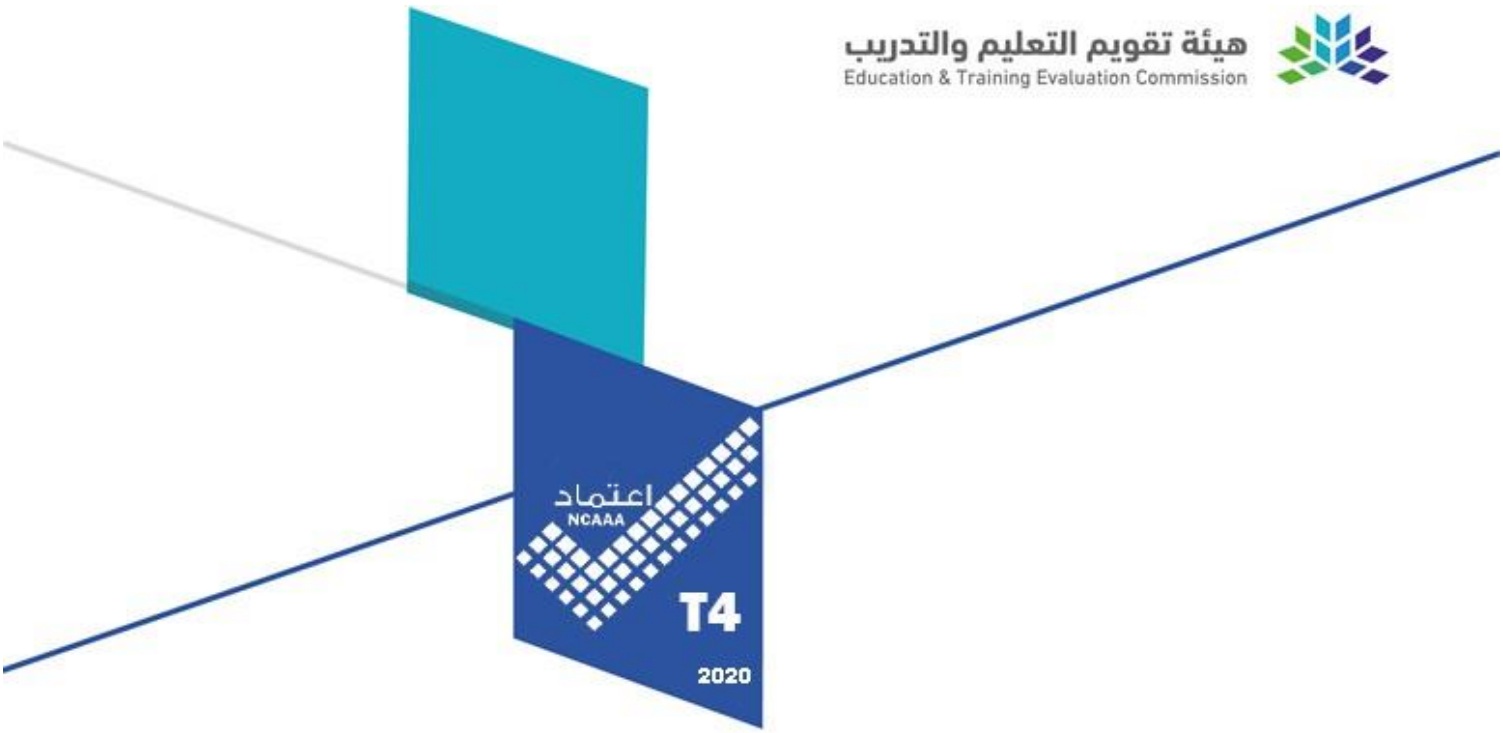
Evaluation Areas/Issues	Evaluators	Evaluation Methods
Strategies for Obtaining Student Feedback on Effectiveness of Teaching	Students	Direct
Quality of learning resources	Staff and Students	Direct
Degree of conviction and application efficiency	Staff , Students , related persons	Direct

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	
Reference No.	
Date	

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	Bio-future
Course Code:	
Program:	BSc Biology (Zoology and Botany Tracks)
Department:	Biology Department
College:	Science
Institution:	Umm Al-Qura University

Table of Contents

A. Course Identification

1. Credit hours:	2hrs
2. Course type	
a.	University ☐ College ☐ Department ■ Others ☐
b.	Required ■ Elective ☐
3. Level/year at which this course is offered:	1st Year / 1st 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**	20 hrs	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20 hrs
2	**Laboratory/Studio**	-
3	**Tutorial**	-
4	**Others** (specify) Office hours	20hrs
	Total	40 hrs

B. Course Objectives and Learning Outcomes

1. Course Description

This course is designed to introduce lower-division college students to biology through the lens of the contemporary problems facing people, the planet and the species of the planet. Modern biology technology contributions will be presented on such issues as genetic engineering of plants and animals, the emergence of new pathogens, the role of genetic variation among individuals, and the extent to which DNA is and isn't destiny. Students will be challenged to think intentionally about how they will approach learning biology inside and outside the classroom and what factors might influence their cademic achievement, attainment of learning objectives, acquisition of desired skills and competencies, satisfaction, persistence, and post-college performance.

2. Course Main Objective

The overarching goal of this course is to help students create a solid foundation on which they can build to enhance their success in college and especially in their studies within the life sciences.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Knowledge about the life sciences community	K1, K2
1.2	Understanding legal, ethical, cultural, scientific, and commercial aspects of the rapidly changing world of biological sciences.	K2
1.3	Able to explore career opportunities in a challenging economic environment	K1, K2, k3
1.4	Recognize and support the need for greater diversity in our life sciences workforce	K1, K2
2	**Skills :**	
2.1	Enable more students to explore career opportunities in a challenging economic environment	S2
2.2	Increase awareness and meet a need identified by multiple stakeholders	S1, S2, S3
2.3	Provide a peer network of students interested in working in the life sciences	S3
3	**Values:**	
3.1	Dealing with the data of the next century regarding the great development in the sciences and technologies of biology	V1, V2
3.2	Ability to deal with problems related to obvious advances in agriculture, medicine and industry	V1 , V2
3.3	Work within the team	V2
3.4	Prediction and the ability to deal with risks associated with development and recent scientific discoveries	V1

C. Course Content

No	List of Topics	Contact Hours
1	**Introduction** • The World of Biology • Biology – Timelines • Themes in Biology • The Study of Biology • Biological Discoveries that Revolutionized Life Science	2
2	**The global challenges Overview** • Population • Poverty • Food and agriculture • Freshwater • Forests • Energy • Climate change • Health and water • Health and air pollution.	2
3	**The Green Revolution** • History • Criticisms	2

	• Environmental impact • Health impact • Transformed Agriculture and Food Production	
4	**Human genome project** • The Human Genome Project, Past Present and Future	2
5	**The Pathways to Our Bio-Future (BioRevolution)** • Genetics and genomics in target discovery and patient selection • Cell & Gene Therapy & Viral Vectors • Better Predictive Tools for drug discovery and development • Tools for improved selection of drug targets • Antimicrobial therapies • Microbiome Sciences • Bio-processing Sciences • Novel molecules synthesis • GMO • Biomolecules • Biosystem • Biomachine interfaces • Biocomputing	2
6	**Sustainability of Bio-Based Products** • Bioplastics • Cellulose Fibers • Biobased Composites • Bioadhesives • Biobased Chemicals • Biosolvents • Bioenergy/Biofuels • Biogas • Biodiesel • Biomanufacturing of Materials and Devices	2
7	**Bioeconomy** • What is the bioeconomy? • What is the Knowledge-Based Bio-Econom? • What are the main drivers of the bioeconomy? • To reject or reclaim the bioeconomy?	2
8	**Bio-innovation for Changemakers** • Panel Discussion - DNA-Based Data Storage - Synthetic Organisms - Ecological Engineering	2
9	**Factors Shaping the Future of biology** • Economic • Social • Political • Education and learning • Ethics	2
10	**Challenges and outlook**	2

	Overview of design thinking & innovation discover, define, develop, deliver identifying the opportunity finding the need.	
Total		20 hrs

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**		
1.1	Knowledge about the life sciences community	1. In-class lecturing where the previous knowledge is linked to the current and future topics. 2. Homework assignments. 3. Discussions (connecting what they learn in the class and applying this information in laboratory). 4. Handout of lecture notes for each topic.	1. Term tests Mid-term Final exam 2. Assignments 3. Course activities 4. Report analyses
1.2	Understanding legal, ethical, cultural, scientific, and commercial aspects of the rapidly changing world of biological sciences.		
1.3	Able to explore career opportunities in a challenging economic environment		
1.4	Recognize and support the need for greater diversity in our life sciences workforce		
2.0	**Skills**		
2.1	Enable more students to explore career opportunities in a challenging economic environment	1.Students will receive credit for these activities based on their responses to the particular questions and assignments. These will include reading summaries, reflective questions, quizzes	1-Evaluation of the topics prepared by students according to the content, arrangement, and covering of the topic. 2-Midterm and final exams. 3-Checkingthe homework assignments. 4-Course work reports.
2.2	Increase awareness and meet a need identified by multiple stakeholders		
2.3	Provide a peer network of students interested in working in the life sciences		
3.0	**Values**		
3.1	Dealing with the data of the next century regarding the great development in the sciences and technologies of biology Work within the team	1-Engage student in carrying out internet search. 2-The ability to debate the scientific basis of physiological mechanisms of body systems. 3-Writing group reports. 4-Solving problems in groups during tutorial. 5-Checking the homework assignments in groups during discussion. 6-Cooperative learning and application of scientific method in thinking the scientific problem solving. 7-Work as part of a team. 8-Conducting group experiments and writing group reports. Dividing students into groups to cooperate with each other during the experiments.	1-Oral exams. 2-Evaluation of student essays assignments and search work. 3-Observation of student ethical and moral behavior. 4-Students' attendance is recorded during lectures. 5-Assessment of the student reports. 6-Grading homework assignments.
3.2	Ability to deal with problems related to obvious advances in agriculture, medicine and industry		
3.3	Work within the team		
3.4	Prediction and the ability to deal with risks associated with development and recent scientific discoveries		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Assignats, Problem set, Projects, Presentation		25%
2	Midterm Exam (Lecture)		25%
3	Final Exam (Lecture)		50%
4	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 :

2 office hours per week

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	1. Lecture Handouts 2. Assignment Reading 3. Globalization, Biosecurity, and the Future of the Life Sciences.2006, By Washington, DC: The National Academies Press. https://doi.org/10.17226/11567 4. Bio-Futures: Foreseeing and Exploring the Bioeconomy , by Emmanuel Koukios (Editor), Anna Sacio-Szymańska (Editor) , Springer; 1st ed. 2021 edition , ISBN-13 : 978-3030649685
Essential References Materials	
Electronic Materials	YouTube Ted Talks
Other Learning Materials	1. Handouts and Lecture notes 2. Microsoft office package. 3. Multi- media associated with the text book and the relevant websites.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	1. Lecture room suitable for 40 students. 2. Lecture room equipped with a black board and Data show,videos ……etc
Technology Resources (AV, data show, Smart Board, software, etc.)	1. Computers or internet connection. 2. Active Board. Related videos
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Related videos , field visites for related orgsnizations

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching	Students	Direct
2. Quality of learning resources	Staff and Students	Direct
3. Degree of conviction and application efficiency	Staff , Students , related persons	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	
Reference No.	
Date	

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	Biohazards
Course Code:	
Program:	BSc Biology (Zoology and Botany Tracks)
Department:	Biology Department
College:	Science
Institution:	Umm Al-Qura University

Table of Contents

A. Course Identification

1. Credit hours:	2hrs
2. Course type	
a.	University [ ] College [ ] Department [√] Others [ ]
b.	Required [√] Elective [ ]
3. Level/year at which this course is offered:	2nd Year / 4thLevel
4. Pre-requisites for this course (if any)**:**	Basic Biological Laboratory Skills (1st Year / 2nd level)
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**	20 hrs	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20 hrs
2	**Laboratory/Studio**	-
3	**Tutorial**	-
4	**Others** (specify), office hours	20 hrs
	Total	40 hrs

B. Course Objectives and Learning Outcomes

1. Course Description

Biohazards provides the introductory framework to the practices and principles when working with infectious biological agents. Focus is placed on an introduction to infectious agents, assessment of biological hazards and risks, overview of laboratory safety, risk mitigation via personal protective equipment and biosafety cabinets, program management, and biosafety guidelines and regulations.

2. Course Main Objective

The main objective of this course is to introduce student to the science and profession of biosafety and the application of biosafety in various settings. This course provides foundations in the principles of biohazard containment and control.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Students will be familiar with the concept of biological risk management	K1, K2
1.2	Student will be familiar with the local and international regulations for biosafety and biosecurity.	K1 , K2
1.3	Student will understand the biological risk management system and its risk assessment and application of protection and mitigation systems	K1 , K2
1.4	To spread and consolidate the principles and culture of biological risk management to ensure the health and safety of all.	K1 , K2, K3
2	**Skills :**	
2.1	Link between theoretical and practical information to be able to Identify biological hazards.	S1, S2, S3
2.2	Propose methods of preventing biological hazards and how to bio-safety in biological laboratories	S1, S2
2.3	Rectify errors and how to correct them and predict the biological risks that may result from them	S1, S2, S3
3	**Values:**	
3.1	Predict the biological hazards that may arise for some reason.	V1, V2
3.2	Can take all measures to reduce or mitigate biological risks	V1, V2
3.3	Propose solutions to some problems related to biosafety and biosecurity to reduce biological risks.	V3

C. Course Content

No	List of Topics	Contact Hours
1	**Hazard Identification** - The Microbiota of Humans and Microbial Virulence Factors - Indigenous Zoonotic Agents of Research Animals - Biological Safety Considerations for Plant Pathogens and Plant-Associated Microorganisms of Significance to Human Health - Laboratory-Associated Infections	4
2	**Hazard Assessment** - Risk Assessment of Biological Hazards - Protozoa and Helminths - Mycotic Agents - Bacterial Pathogens - Viral Agents of Human Disease: Biosafety Concerns - Emerging Considerations in Virus-Based Gene Transfer Systems - Biological Toxins: Safety and Science - Molecular Agents - Biosafety for Microorganisms Transmitted by the Airborne Route 285 - Cell Lines: Applications and Biosafety - Allergens of Animal and Biological Systems	4
3	**Hazard Control** - Design of Biomedical Laboratory and Specialized Biocontainment Facilities	4

	- Primary Barriers and Equipment-Associated Hazards - Primary Barriers: Biological Safety Cabinets, Fume Hoods, and Glove Boxes - Arthropod Vector Biocontainment - Aerosols in the Microbiology Laboratory - Personal Respiratory Protection - Standard Precautions for Handling Human Fluids, Tissues, and Cells - Decontamination in the Microbiology Laboratory - Packing and Shipping Biological Materials	
4	**Administrative Control** - Developing a Biorisk Management Program to Support Biorisk Management Culture - Occupational Medicine in a Biomedical Research Setting - Measuring Biosafety Program Effectiveness - Biosafety and Biosecurity: Regulatory Impact	4
5	**Special Environments** - Biological Safety and Security in Teaching Laboratories - Biosafety in the Pharmaceutical Industry - Biosafety Considerations for Large-Scale Processes - Veterinary Diagnostic Laboratories and Necropsy - Special Considerations for Animal Agriculture Pathogen Biosafety - Biosafety of Plant Research in Greenhouses and Other Specialized Containment Facilities - Biosafety Guidelines for Working with Small Mammals in a Field Environment - Components of a Biosafety Program for a Clinical Laboratory - Safety Considerations in the Biosafety Level 4 Maximum-Containment Laboratory	4
Total		20 hrs

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**		
1.1	Students will be familiar with the concept of biological risk management	1.In-class lecturing where the previous knowledge is linked to the current and future topics. 2.Homework assignments. 3.Discussions (connecting what they learn in the	Exams, Assignments, Course activities and Written analyses
1.2	Student will be familiar with the local and international regulations for biosafety and biosecurity.		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.3	Student will understand the biological risk management system and its risk assessment and application of protection and mitigation systems	class and applying this information in laboratory). 4. Handout of lecture notes for each topic.	
2.0	**Skills**		
2.1	Link between theoretical and practical information to be able to Identify biological hazards.	Students will receive credit for these activities based on their responses to the particular questions and assignments. These will include reading summaries, reflective questions, quizzes	Evaluation of the topics prepared by students according to the content, arrangement, and covering of the topic. Midterm and final exams. Checking the homework assignments. Course work reports.
2.2	Propose methods of preventing biological hazards and how to bio-safety in biological laboratories		
2.3	Rectify errors and how to correct them and predict the biological risks that may result from them		
3.0	**Values**		
3.1	Predict the biological hazards that may arise for some reason.	Engage student in carrying out internet search. The ability to debate the scientific basis of physiological mechanisms of body systems. Writing group reports. Solving problems in team.	1-Oral exams. 2-Evaluation of student essays assignments and search work. 3-Observation of student ethical and moral behavior. 4-Students' attendance is recorded during lectures.
3.2	Can take all measures to reduce or mitigate biological risks		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
3.3	Propose solutions to some problems related to biosafety and biosecurity to reduce biological risks.	Cooperative learning and application of scientific method in thinking the scientific problem solving. Work as part of a team. 8-Conducting group experiments and writing group reports.	5-Assessment of the student reports. 6-Grading homework assignments.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Project, Problem Sets	-	25%
3	Exam Midterm (Lecture)	6	25%
5	Final Exam (Lecture)	12	50%
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 :

2 Office hours per week

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Biological Safety: Principles and Practices, 2017, 5th Edition, Dawn P. Wooley, Karen B. Byers, ISBN: 978-1-683-67313-2
Essential References Materials	World Health Organization (2018), Laboratory Bio-security Manual. WHO Press Geneva World Health Organization (2020), Laboratory Bio-safety Manual. 3ed edition. WHO Press Geneva
Electronic Materials	https://www.researchgate.net/publication/276294176_Laboratory_Biorisk_Management_Biosafety_and_Biosecurity
Other Learning Materials	1.Handouts and Lecture notes 2.Microsoft office package. 3.Multi- media associated with the text book and the relevant websites.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	1. Classrooms 2. Personal protective equipment 3. Educational films about dealing with biological hazards, preventing and reducing them
Technology Resources (AV, data show, Smart Board, software, etc.)	AV, data show, Smart Board, softwar
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Related videos

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching	Students	Direct
2. Quality of learning resources	Staff and Students	Direct
3. Degree of conviction and application efficiency	Staff , Students , related persons	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	
Reference No.	
Date	

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	Biostatistics
Course Code:	
Program:	BSc Biology (Zoology and Botany Tracks)
Department:	Biology Department
College:	Science
Institution:	Umm Al-Qura University

Table of Contents

A. Course Identification

1. Credit hours:	4hrs
2. Course type **a.** University ☐ College ☐ Department √ Others ☐ **b.** Required √ Elective ☐	
3. Level/year at which this course is offered:	2nd Year / 5thLevel
4. Pre-requisites for this course (if any)**:** Introduction to Calculus 1st Year / 2nd Level	
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**	40	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**	10hrs
3	**Tutorial**	-
4	**Others** (specify)/ Office hours	-
	Total	40hrs

B. Course Objectives and Learning Outcomes

1. Course Description

Introduction to methods and concepts of statistical analysis and sampling, with special attention to those occurring in biological sciences. Topics include Frequency Distributions, Graphs, Descriptive statistics, and Inferential Statistics. The class is applied using examples from real life and through statistical software.

2. Course Main Objective

The purpose of the course is to teach fundamental concepts and techniques of descriptive and inferential statistics with applications in biology. Basic statistics, including, descriptive statistics, inference for parametric and non-parametric methods are presented. The analytic methods and applications will be linked to topics including real life problems, and program evaluation.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
K1	To understand the basics terms of biostatistics, types of variables numerical or categorical , and different sampling types.	K1, K2
K2	To understand the concepts of descriptive statistic, tables graphs and measures, and how they are used in statistical analysis.	K1, K2
K3	To understand methods of statistical inference including parametric and non-parametric methods.	K1, K2
K4	To understand the difference between descriptive and inferential statistics and when do we use them in real life.	K1, K2
2	**Skills :**	
S1	Choose an appropriate graphical or tabular display for a given data set and question	S1, S2, S3
S2	Determine which basic statistical method(s) is/are most appropriate to analyze the data at hand	S2
S3	Analyze data using fundamental statistical methods	S2, S3
3	**Values:**	
V1	Work collaboratively and constructively in teams with responsibility	V1, V2
V2	A commitment to continuous learning and the capacity to maintain intellectual curiosity throughout life.	V3

C. Course Content

No	List of Topics	Contact Hours
1	**Introduction to Biostatistics Science** - Variables and Types of Data - Data Collection and Sampling Techniques - Experimental Design	10
2	**Data presentation (Frequency Distributions and Graphs)**	10

	- Organizing Data - Histograms, Frequency Polygons, and Ogives - Other Types of Graphs as Bar graphs, Pareto charts, the time series	
3	**Descriptive Statistics** - Measures of central tendency - Measures of dispersion - Measures of position	10
4	**Introduction to Statistical Inference** - Concept of hypothesis testing - Parametric tests - Non-parametric tests	10
Total		**40**

D. Teaching and Assessment

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

CLOs		Teaching Strategies	Assessment Methods
1	**Knowledge and Understanding**		
K1	To understand the basics terms of biostatistics, types of variables numerical or categorical , and different sampling types.	Lectures Lab work	Quiz. Final and mid-term exam. Assignments and activities
K2	To understand the concepts of descriptive statistic, tables graphs and measures, and how they are used in statistical analysis.	Lectures Lab work	Quiz. Final and mid-term exam. Assignments and activities
K3	To understand methods of statistical inference including parametric and non-parametric methods .	Lectures Lab work	Quiz. Final and mid-term exam. Assignments and activities
K4	To understand the difference between descriptive and inferential statistics and when do we use them in real life.	Lectures Lab work	Quiz. Final and mid-term exam. Assignments and activities
2	**Skills :**		
S1	Choose an appropriate graphical or tabular display for a given data set and question	Lectures Lab work	Quiz. Final and mid-term exam. Assignments and activities
S2	Determine which basic statistical method(s) is/are most appropriate to analyze the data at hand	Lectures Lab work	Quiz. Final and mid-term exam.

CLOs		Teaching Strategies	Assessment Methods
			Assignments and activities
S3	Analyze data using fundamental statistical methods	Lectures Lab work	Quiz. Final and mid-term exam. Assignments and activities
3	**Values:**		
V1	Work collaboratively and constructively in teams with responsibility	Lectures Lab work	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	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		25%
2	Miderm Exam (Lecture)		25%
6	Final Exam (Lecture)		50%
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	1- Daniel, W. W., & Cross, C. L. (2018). Biostatistics: a foundation for analysis in the health sciences. Wiley. 2- Bluman, A. G. (2017). Elementary statistics: A step by step approach. New York;: McGraw-Hill Higher Education.
Essential References Materials	1. Griffith, A. (2007). SPSS for Dummies. John Wiley & Sons. 2. Evans, M. (2009). Minitab manual

Electronic Materials	.
Other Learning Materials	3. Handouts and Lecture notes 4. Microsoft office package.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	1. Lecture room 2. Data show.
Technology Resources (AV, data show, Smart Board, software, etc.)	1. Computers or internet connection. 2. Active Board.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

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	
Reference No.	
Date	

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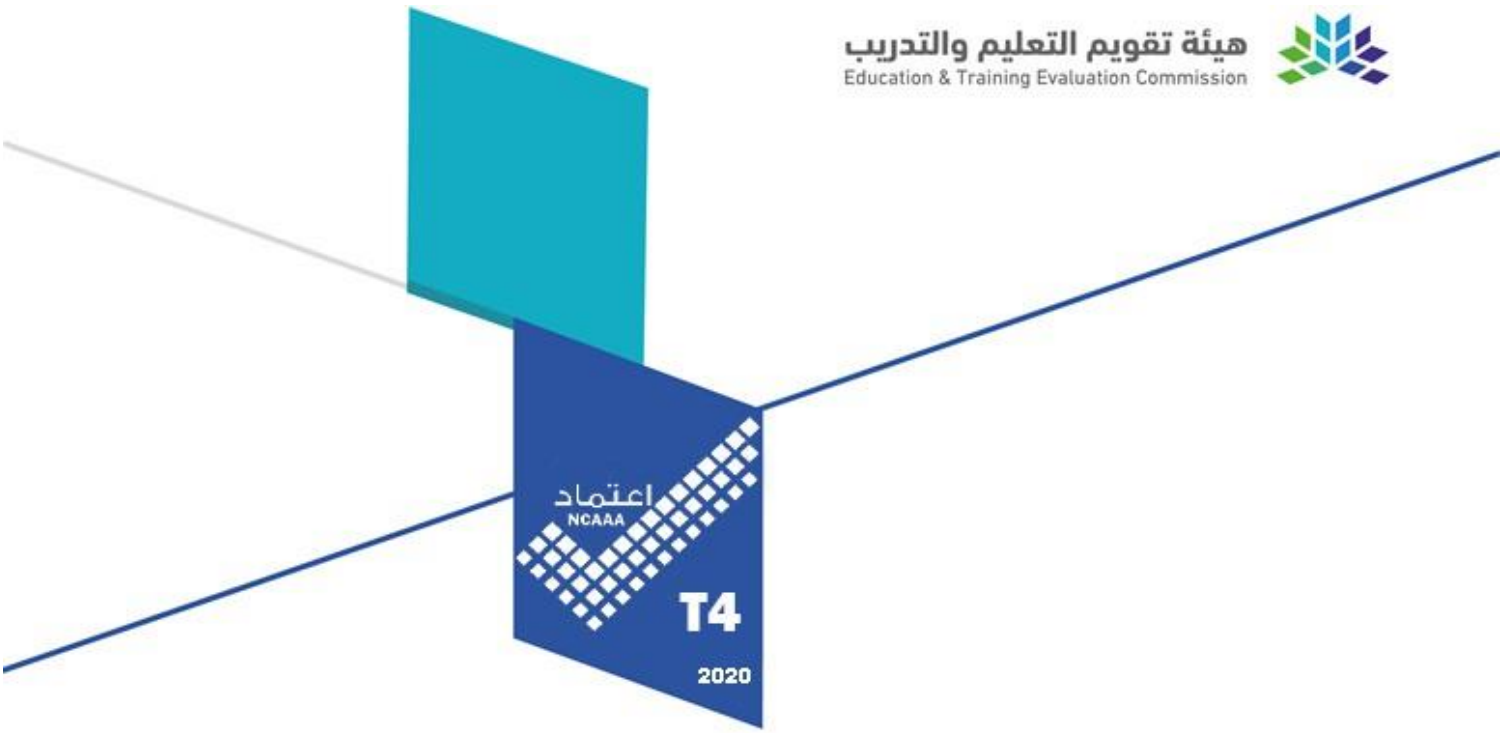
Education & Training Evaluation Commission



Course Specifications

Course Title:	Cell Biology
Course Code:	
Program:	BSc Biology (Zoology and Botany Tracks)
Department:	Biology Department
College:	Science
Institution:	Umm Al-Qura University

Table of Contents

A. Course Identification

1. Credit hours: **3 Credits**
2. Course type **a.** University [ ] College [ ] Department [√] Others [ ] **b.** Required [√] Elective [ ]
3. Level/year at which this course is offered: 2nd Year / 5th Level
4. Pre-requisites for this course (if any)**:** Biochemistry (2nd Year / 4thlevel)
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**	50hrs	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20hrs
2	**Laboratory/Studio**	30hrs
3	**Tutorial**	-
4	**Others** (specify) – Office hours	30hrs
	Total	80hrs

B. Course Objectives and Learning Outcomes

1. Course Description

Cell Biology is a study of the structure and function of the cell, the internal organization of the eukaryotic cell, organelle and membrane function, cell-cell signaling, cell movement, cell adhesion, the extracellular matrix. This course will focus on Eukaryotic cell biology and will cover topics such as membrane structure and composition, transport, and trafficking; the cytoskeleton and cell movement; the breakdown of macromolecules and generation of energy; and the integration of cells into tissues. It will also cover important cellular processes such as cell cycle regulation, signal transduction, apoptosis (programmed cell death), and cancer cell biology, defect in cellular processes will be link to human diseas.

2. Course Main Objective

The main objective of this course is to give an overview of Cell Biology and to train students to think as (cell) scientists. Students will get insight into how problems are solved in modern Cell Biology and will learn about the workings of (mainly eukaryotic) cells.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Describe the fundamental principals of cellular biology.	K1 , K2
1.2	Develop a deeper understanding of cell structure and how it relates to cell functions.	K1 , K2
1.3	Understand how cells grow, divide, and die and how these important processes are regulated.	K1 , K2 , K3
2	**Skills :**	
2.1	Scientific Reasoning- Students will be able to apply the concepts and methods of the natural sciences.	S1 , S2
2.2	Illustrate critical thinking, written, and oral communication skills through written assignments and oral presentations.	S3
3	**Values:**	
3.1	Understand the consequences of cell biology as they relate to human disease.	V1
3.2	Develop the curiosity and desire to incorporate their knowledge of cellular biology into their everyday lives.	V1, V3

C. Course Content

No	List of Topics	Contact Hours
1	**Introduction to Cell Biology and How Cells are Studied (Ch. 1)** • The Diversity and Commonality of the cells • The molecules of a Cells • The Work of Cells • Investigating Cells and their Parts	**1**
2	**Biomembrane Structure and Membrane Transport (Ch. 7 and 13)** • The Lipid Bilayer: Composition and Structural Organization • Membrane Proteins: Structure and Basic Functions • Phospholipids, Sphingolipids, and Cholesterol: Synthesis and Intracellular Movement • Targeting Proteins To and Across the ER Membrane • Insertion of Membrane Proteins into the ER • Targeting of Proteins to Mitochondria and Chloroplasts • Transport Into and Out of the Nucleus	**2**
3	**Cellular Energetics (Ch. 12)** • First step of Harvesting Energy from Glucose: Glycolysis • The Structure and Functions of Mitochondria • The Citric Acid Cycle and Fatty Acid Oxidation	**3**

	• The Electron-Transport Chain and Generation of the Proton-Motive Force • Harnessing the Proton-Motive Force to Synthesize ATP • Photosynthesis and Light- Absorbing Pigments • Molecular Analysis of Photosystems • CO2 Metabolism During Photosynthesis	
4	**Vesicular Traffic, Secretion, and Endocytosis (Ch. 14)** • Early Stages of the Secretory Pathway • Later Stages of the SecretoryPathway • Receptor-Mediated Endocytosis • irecting Membrane Proteins and Cytosolic Materials to the Lysosome	**2**
5	**Cellular Organization and Movement (Microfilaments) (Ch. 17)** • Microfilaments and Actin Structures • Dynamics of Actin Filaments • Mechanisms of Actin Filament Assembly • Organization of Actin-Based Cellular Structures • Myosins: Actin-Based Motor Proteins • Myosin-Powered Movements	**2**
6	**Cellular Organization and Movement (Microtubules and intermediate filaments) (Ch. 18** • Microtubule Structure and Organization • Microtubule Dynamics • egulation of Microtubule Structure and Dynamics • Kinesins and Dyneins: Microtubule-Based Motor Proteins • Mitosis • Intermediate Filaments • Coordination and Cooperation Between Cytoskeletal Elements	**2**
7	**Integrating Cells into Tissues (Ch. 20)** • Cell-Cell and Cell–Extracellular Matrix Adhesion: An Overview • Cell-Cell and Cell–Extracellular Junctions and Their Adhesion Molecules • The Extracellular Matrix I: The Basal Lamina • The Extracellular Matrix II: Connective Tissue • Adhesive Interactions in Motile and Nonmotile Cells • Plant Tissues	**2**
8	**Cell Signaling (Ch. 15 and 16)** • Signal Transduction: From Extracellular Signal to Cellular Response • Studying Cell-Surface Receptors and Signal Transduction Protein • G Protein–Coupled Receptors: Structure and Mechanism • G Protein–Coupled Receptors That Regulate Ion Channels • Receptor Serine Kinases That Activate Smads • Cytokine Receptors and the JAK/STAT Signaling Pathway • Receptor Tyrosine Kinases	**3**

	• The Ras/MAP Kinase Pathway • Phosphoinositide Signaling Pathways • Integration of Cellular Responses to Multiple Signaling Pathways: Insulin Action	
9	**Regulating The Eukaryotic Cell Cycle (Ch. 19)** • Overview of the Cell Cycle and Its Control • Model Organisms and Methods of Studying the Cell Cycle • Regulation of CDK Activity • Commitment to the Cell Cycle and DNA Replication • Entry into Mitosis • Completion of Mitosis: Chromosome Segregation and Exit from Mitosis • Surveillance Mechanisms in Cell Cycle Regulation • Meiosis: A Special Type of Cell Division	**2**
10	**Cancer (Ch. 24)** • How Tumor Cells Differ from Normal Cells • The Origins and Development of Cancer • Misregulation of Cell Growth and Death Pathways in Cancer • Deregulation of the Cell Cycle	**1**
Total		**20**

No	Practical Topics	Contact Hours
1	Lab safety and Cell biology Basic Techniques	**3**
2	Experimental Organism for Studying Cell biology	**3**
3	Growing and Studying Cells in Culture	**3**
4	Light Microscopy: Exploring Cell Structure and Visualizing Proteins Within Cells	**3**
5	Electron Microscopy: High-Resolution Imaging	**3**
6	Isolation of Cell Organelles	**3**
7	Flow Cytometry Separates Different Cell Types	**3**
8	Proteomics Reveals the Protein Composition of Organelles	**3**
9	fluorescent protein applications in cell biology	**3**
10	Drugs and Cell Biological Research	**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	Describe the fundamental principals of cellular biology.	Lectures	Quiz. Final and mid-term exam.

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
K2	Develop a deeper understanding of cell structure and how it relates to cell functions.	Lectures Lab work	Quiz. Final and mid-term exam.
K2	Understand how cells grow, divide, and die and how these important processes are regulated.	Lectures Lab work Web based study	Quiz. Final and mid-term exam Assignments and activities
2.0	**Skills**		
S1	Scientific Reasoning- Students will be able to apply the concepts and methods of the natural sciences.	Lab work Research activity Web based study Library	Quiz Final and mid-term exam Assignments and activities
S2	Illustrate critical thinking, written, and oral communication skills through written assignments and oral presentations.	Lab work Research activity Web based study Library	Homework Quiz Final and mid-term exam Assignments and activities
3.0	**Values**		
V1	Understand the consequences of cell biology as they relate to human disease.	Lectures Projects Lab experiments	Homework, Quiz Final and mid-term exam, assignments and class activities
V2	Develop the curiosity and desire to incorporate their knowledge of cellular biology into their everyday lives.	Lectures Projects Lab experiments	Homework, Quiz Final and mid-term exam, assignments and class activities

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Essay, Presentation	-	10%
2	Mid Term Exam (Theoretic)	6	20%
3	Mid Term Exam (practical)	6	10%
4	Final Practical Exam	11	20%
5	Final Exam	12	40%
6	**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:

3 office hours per week

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Lodish et. al. Molecular Cell Biology. Ninth Edition. Freeman Press. ISBN-13: 978-1319208523, ISBN-10: 1319208525
Essential References Materials	Principles of Cell Biology , George Plopper ,Navigate 2 Advantage Access ,2016 , ISBN 9781284047608 Essential Cell Biology , Alberts Bray Hopkin , Garland Science, Taylor & Francis Group, 2010,ISBN 978-0-8153- 4130-7 2010 Cell Biology, Thomas D. Oollard , EL SEVIER , ,2017 , ISBN 978-0-323-34126-4
Electronic Materials	1.https://www.coursera.org/learn/Biology 2.https://www.edx.org
Other Learning Materials	1.Handouts and Lecture notes 2.Microsoft office package. 3.Multi- media associated with the text book and the relevant websites.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	1. Classrooms, 2. laboratories, 3. demonstration rooms 4. Biology lab.
Technology Resources (AV, data show, Smart Board, software, etc.)	1. Computers 2. Smart Board. 3. Data show
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Laboratory instruments & equipment: Spectrophotometer, centrifuge, pH meters, flasks, beakers, screw capped tubes, slides and tips and chemicals kits.

G. Course Quality Evaluation

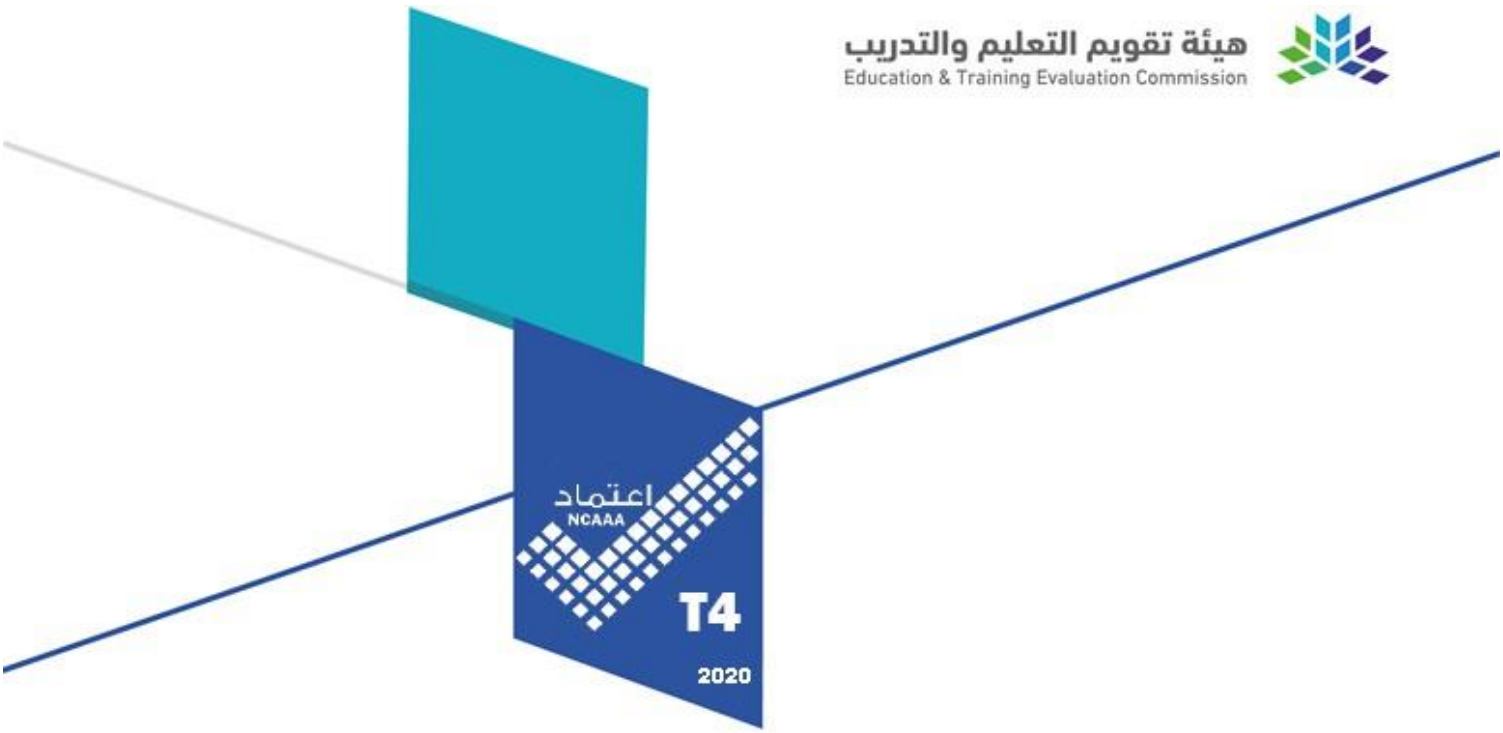
Evaluation Areas/Issues	Evaluators	Evaluation Methods
1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching	Students	Direct
2. Quality of learning resources	Staff and Students	Direct

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	
Reference No.	
Date	

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

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

Table of Contents

A. Course Identification

1. Credit hours:	4 Credits
2. Course type	
a.	University [ ] College [√] Department [ ] Others [ ]
b.	Required [√] Elective [ ]
3. Level/year at which this course is offered:	1st Year / 1st 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.	K1
K2	Investigating the cellular processes of living organisms with an emphasis on biological chemistry applications.	K1, K2
K3	Identify the unifying themes and key concepts of different organisms.	K2
K4	Describe the anatomy, function, genetics and evolution of different types of organisms.	K2
K5	Demonstrate factual knowledge of contemporary natural science.	K3
2	**Skills :**	
S1	The student will apply contemporary scientific models to describe the natural world.	S1
S2	To understand and apply the scientific method.	S2
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	S1,S3
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.	S3
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.	V1, V2
V2	A commitment to continuous learning and the capacity to maintain intellectual curiosity throughout life.	V3

C. Course Content

No	List of Topics	Contact Hours
1	**The Chemistry of Life** • 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** • A Tour of the Cell • Membrane Structure and Function • An Introduction to Metabolism • Cellular Respiration and Fermentation • Photosynthesis	3

	• Cell Communication • The Cell Cycle	
3	**Genetics** • 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 • 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** • 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** • 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** • 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** • An Introduction to Ecology and the Biosphere • Population Ecology	4

	• 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 • 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 • The Compound Light Microscope Exercise • Basic Microscope Techniques Exercise • The Stereoscopic Microscope Exercise • The Organization of Cells	**3**
4	Diffusion and Osmosis Laboratory • Diffusion of Molecules Exercise • Osmotic Activity in Cells Exercise • Investigating Osmolarity of Plant Cells	**3**
5	Cellular Respiration and Fermentation Laboratory • Alcoholic Fermentation Exercise • Cellular Respiration Exercise • Designing and Performing Your Open-Inquiry Investigation	**3**
6	Photosynthesis Laboratory • 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 • 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**

	• Meiosis in Sordaria fimicola: A Study of Crossing	
8	Bacteriology Laboratory • 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 • Development in Echinoderms: Sea Urchin and Sea Star Exercise • Development in an Amphibian Exercise • Development in the Zebraflsh Exercise • Development in a Bird: The Chicken	**3**
10	Plant Growth Laboratory • 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	**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 **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
Essential References Materials	
Electronic Materials	1. https://www.coursera.org/learn/Biology 2. https://www.edx.org
Other Learning Materials	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
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	1. Lecture room suitable for 40 students. 2. Lecture room equipped with Data show. 3. Biology laboratory.
Technology Resources (AV, data show, Smart Board, software, etc.)	1. Computers or internet connection. 2. Active Board. 3. Data show is required in every room.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Laboratory instruments & equipment: light microscope, Spectrophotometer, centrifuge, pH meters, flasks,

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)

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	General Biotechnology
Course Code:	
Program:	BSc Biology (Zoology and Botany Tracks)
Department:	Biology
College:	Faculty of Science
Institution:	Umm Al-Qura University

Table of Contents

A. Course Identification

1. Credit hours:	**3hrs**
2. Course type	
a. University ☐ College ☐ Department ■ Others ☐	
b. Required ■ Elective	
3. Level/year at which this course is offered:	2nd year/ 6thlevel
4. Pre-requisites for this course (if any)**:** Genetics(2nd year/ 5thlevel), Cell Biology (2nd year/ 5thlevel)	
5. Co-requisites for this course (if any)**:**	
Molecular Biology (2nd year/ 6thlevel)	

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	50 hrs.	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20hrs
2	**Laboratory/Studio**	30hrs
3	**Tutorial**	-
4	**Others** (specify) office hours	30hrs
	Total	80 hrs.

B. Course Objectives and Learning Outcomes

1. Course Description

This course is designed to provide students with the introductory knowledge, cognition, and practical skills required in the field of Biotechnology and its Implications. It introduces students to the important terminology, skills, and applications used for the utilization of plants, animals, and microorganisms to create new products or processes for the benefit of mankind. It also covers the agricultural applications of biotechnology as well as proteins and forensic biotechnology, and bioremediation of soil and aquatic environments.

2. Course Main Objective

The purpose of this course is to provide the student with an opportunity to apply basic biological concepts to the applied field of biotechnology, preparing them to pursue entry-level, technical-level, or professional-level careers in bioscience.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Define biotechnology and provide numerous examples of how biotechnology is being applied in different sectors including the medical field, agriculture, environmental science, and forensics	K1, K2
1.2	Describe key concepts in cell biology, biochemistry, and genetics and their significance in biotechnology research and product development	K1, K2, K3
1.3	Define genetic engineering and identify products created with this technology	K1, K2, K3
2	**Skills :**	
2.1	Be able to state the broad categories of biotechnological processes.	S1, S2
2.2	Perform techniques involving measurement and data analysis	S2, S3
2.3	Perform techniques involving the manipulation of DNA; and	S2, S3
3	**Values:**	
3.1	Have an awareness of some of the current and future issues surrounding the relationship between biotechnology and government, investors, the environment and consumers and the impact of these on the development of future biotechnology enterprises.	V1, V2
3.2	Have an awareness of the global significance of biotechnology and its resultant industries, and a broad knowledge of which are represented nationally and locally	V2, V3

C. Course Content

No	List of Topics	Contact Hours
1	**Introduction to Biotechnology:** What is biotechnology? Biotechnology: an interdisciplinary pursuit Biotechnology: a three-component central core Biotechnology and the developing world	2
2	**Molecular Cloning Methods** Gene Cloning The Polymerase Chain Reaction Methods of Expressing Cloned Genes Using the Ti Plasmid to Transfer Genes to Plants	2
3	**Bioprocess/fermentation technology** Principles of microbial growth The bioreactor Scale-up Media design for fermentation processes Solid substrate fermentation Technology of mammalian and plant cell culture Metabolic engineering Downstream processing	2
4	**Biological fuel generation**	2

	Photosynthesis: the ultimate energy source Biofuels from biomass The way ahead for biofuels	
5	**Environmental biotechnology and Sustainability** Microbial ecology/environmental biotechnology Waste water and sewage treatment Landfill technologies Composting Bioremediation Detection and monitoring of pollutants	2
6	**Intro to Plant and forest biotechnology** **Intro to Animal and insect biotechnology**	2
7	**Food and beverage biotechnology** Food and beverage fermentations Microorganisms as food Enzymes and food processing Amino acids, vitamins and sweeteners Organic acids and polysaccharides Rapid diagnostics Bioprocess technology Public acceptance and safety of new biotechnology food	2
8	**Biotechnology and medicine** Pharmaceuticals and biopharmaceuticals Stem cell biotechnology Stem cell cultivation Human– animal embryos Commercial potential for stem cell therapies	2
9	**Biotechnology and forensic applications** Short history of forensic genetics Biological sample collection Methods used in forensic for human identification Impact of genetic identification on justice Emerging biomarkers in forensic identification	2
10	**Safety and Public perception of biotechnology** Problems of biologically active biotechnology products Biowarfare and bioterrorisms Release of genetically manipulated organisms into the environment Genetic modification and food uses The applications of human genetic research	2
Total		20 hrs.

C2. Lab. Content

No	List of Topics	Contact Hours
1	Introduction to Tools and Techniques in biotechnology laboratory	3
2	**Examples of some bacterial enzymes used in biotechnology:** Hydrolysis enzymes (hydrolysis of starch - liquefaction and hydrolysis of gelatin)	3

3	Decomposition of amino acids (production of hydrogen sulfur, production of indole, decomposition of arginine)	3
4	Enzymatic activities experiments (lipolysis, ammonia production, oxidation enzymes, methylene blue dye reduction, hydrogen peroxide reduction, nitrate reduction)	3
5	Enzymatic activities experiments(Lactic acid fermentation, Carbohydrate fermentation, detection of some important substances on sugars fermentation, ethyl alcohol formation test)	3
6	Enzymatic activities experiments(production of sucrose fermentation materials, production of fibrin)	3
7	**Mutagenesis** Isolation of antibiotic-resistant mutants Antibiotic Factors affecting the growth and adaptation of bacteria in their natural environment (Physical agents, chemical agents, biological agents (artificial Antibiotic, natural Antibiotic)(	3
8	**Fungi and their role in the bio-industry** Growing fungal farms Conservation of fungal farms The role of fungi in natural biotechnology The role of fungi in biotechnology for food production Some modern industrial uses of fungi Study of industrial fermentation using yeasts (alcoholic fermentation) Penicillium antibiotic effect	3
9	**The use of microorganisms to bring about biochemical changes in materials:** vinegar industry Bread making (bread yeast, how to use bread yeast, yeast vitality test)	3
10	**Citric acid extraction** Titration of citric acid with sodium hydroxide Precipitation of citric acid using calcium carbonate	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**		
1.1	Define biotechnology and provide numerous examples of how biotechnology is being applied in different sectors including the medical field, agriculture, environmental science, and forensics	- Interactive lectures - Group discussions	▪ Written exams - Short answers ▪ Assignment ▪ Open-book exam ▪ Quizzes
1.2	Describe key concepts in cell biology, biochemistry, and genetics and their		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	significance in biotechnology research and product development		
1.3	Define genetic engineering and identify products created with this technology		
2.0	**Skills**		
2.1	Be able to state the broad categories of biotechnological processes.	- Interactive lectures - Practical work	▪ Written exams ▪ Assignment ▪ Open-book exam ▪ Quizzes
2.2	Perform techniques involving measurement and data analysis		
2.3	Perform techniques involving the manipulation of DNA; and		
3.0	**Values**		
3.1	Have an awareness of some of the current and future issues surrounding the relationship between biotechnology and government, investors, the environment and consumers and the impact of these on the development of future biotechnology enterprises.	- Practical work - Small group Discussion - Case studies	- Lab demonstration - Assignments
3.2	Have an awareness of the global significance of biotechnology and its resultant industries, and a broad knowledge of which are represented nationally and locally		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, assignments, projects	-	10%
2	Midterm exam (lecture)	5	20%
3	Midterm exam (Lab)	6	10%
4	Final exam (Lab)	12	20%
5	Final exam (Lecture)	12	40%
	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 :

3 office hours per week

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Biotechnology Fundamentals" - By Firdos Alam Khan , Copyright Year 2016.
Essential References Materials	Smith, J. E. (2009). Biotechnology. Cambridge University Press. Dumache, R., Ciocan, V., Muresan, C., & Enache, A. (2016). Molecular genetics and its applications in forensic sciences. In Forensic analysis-from death to justice. IntechOpen. "Biotechnology" the Science, the Products, the Government, the Business - By Ronald P. Evens , Copyright Year 2021. Harisha, S. (2008). Biotechnology procedures and experiments handbook. Laxmi Publications, Ltd..
Electronic Materials	- The Journal of Molecular Biology. - Gene Therapy Journals. - Journal of Gene Medicine
Other Learning Materials	Biointeractive.org http://www.hhmi.org/biointeractive National Center for Biotechnology Information (NCBI), http://www.ncbi.nlm.nih.gov/ http://www.omicsonline.org/scholarly/gene-technology-journals-articles-ppts-list.php

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	➢ Lecture room ➢ Laboratory
Technology Resources (AV, data show, Smart Board, software, etc.)	➢ Computers ➢ Internet access ➢ Smart Board (preferred) ➢ Projector
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	➢ Display screen ➢ White board ➢ SDS electrophoresis tanks and its contents ➢ DNA electrophoresis tanks and its contents ➢ PCR Thermocycler ➢ UV rays for DNA visualization ➢ Incubator

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students	➢ Written feedback by individuals ➢ Satisfaction survey at the end of each semester

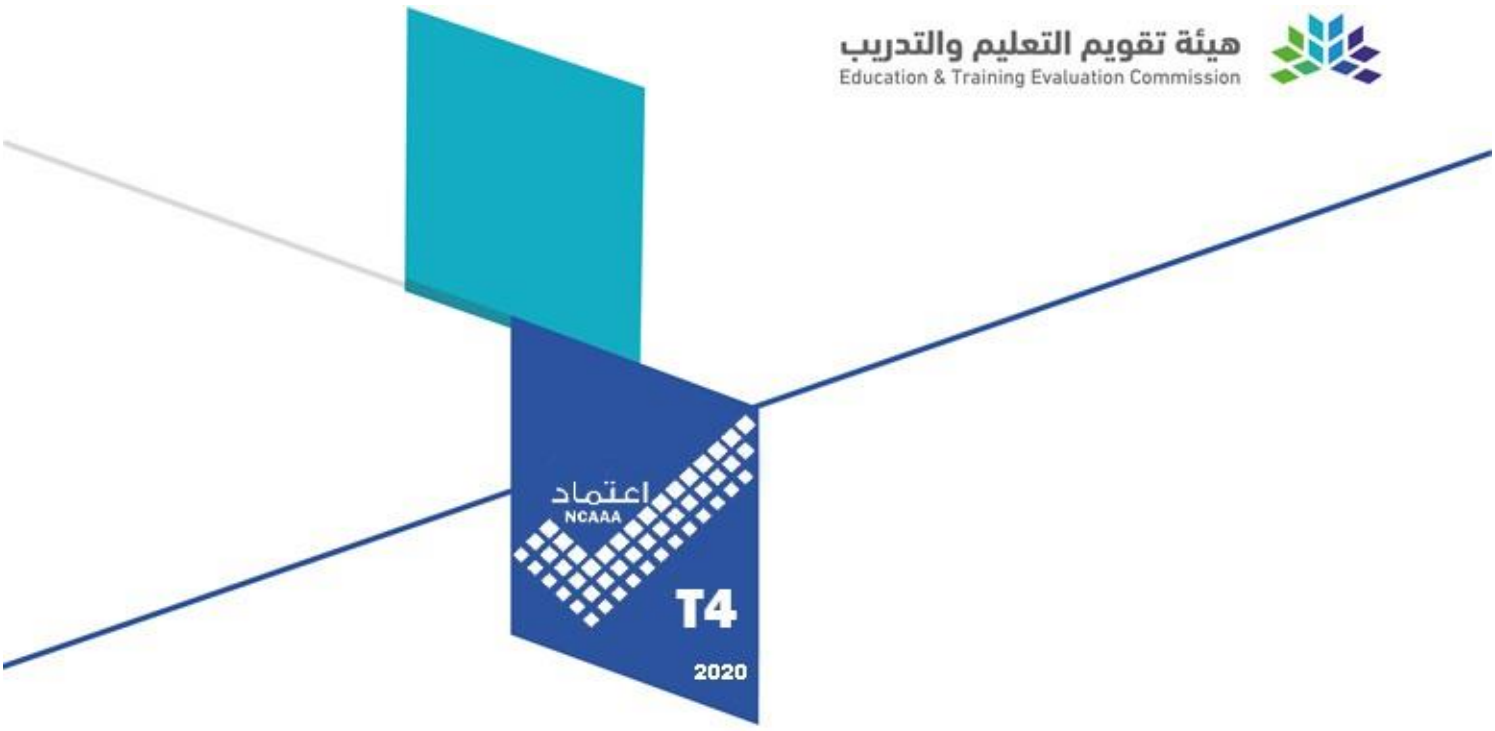
Evaluation Areas/Issues	Evaluators	Evaluation Methods
Extent of achievement of course learning outcomes	Course instructor Peer reviewer Program director	➢ Course development according to the analysis of student feedback ➢ Monitoring students' performance throughout the semester using formative assessment ➢ Analyzing students' progress. ➢ Using statistics to analyze students' achievement at the end of each semester and implement data comparison. ➢ Department council discussion. ➢ Peer evaluation of the instructor.
Quality of learning resources	Course instructor	➢ Attending staff development workshops and programs ➢ Continuous education ➢ Implementing student feedback ➢ Variations of teaching strategies including tutorials, PBL and more emphasizing on the practical sessions

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	
Reference No.	
Date	

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	General Microbiology
Course Code:	
Program:	BSc Biology (Zoology and Botany Tracks)
Department:	Biology Department
College:	Science
Institution:	Umm Al-Qura University

Table of Contents

A. Course Identification

1. Credit hours: 4hrs
2. Course type **a.** University ☐ College ☐ Department ■ Others ☐ **b.** Required ■ Elective ☐
3. Level/year at which this course is offered: 2nd Year / 4th Level
4. Pre-requisites for this course (if any)**:** General Biology 1st Year / 1st Level
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	4hrs
	Total	100hrs

***** The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

This course will cover introduction to general microbiology including historical background and general characteristics of prokaryotic cells, differentiation between the prokaryotes and eukaryotes cells. An overview about the beneficial and hazardous roles of microorganisms in the environment and their applications in different fields, distribution of microorganisms in the environment, short discerption about the different microorganisms (bacteria, fungi, Actinomycetes, protozoa, viruses), Bacterial cell morphology and structure, Factors affecting microbial activity and growth, Control of microbial activity including the different sterilization methods will be covered. Furthermore, some applications of microbiology (Soil microbiology, environmental microbiology, food and dairy microbiology) will be discussed.

2. Course Main Objective

After completing this course students should be able to:
List the major types of Microorganisms in the environment
Describe the general characteristics of prokaryotic microorganisms
Discuss the positive and negative roles of the microorganisms in the environment and their relation to plant, human and animals.
Differentiate between prokaryotic and eukaryotic cells
Familiar with microbial growth requirements
List the factors affecting the growth of microorganisms
List different methods to control of the microbial growth (Sterilization methods)
Describe the general characteristic of bacteria, fungi, protozoa , viruses
Understand the roles of microorganisms in plants, soil, water and foods

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge:**	
	❖ Having successfully completed the course students should be • Understand the general characteristics of prokaryotes • List the major types of Microorganisms in the environment • List the benefits and hazardous roles of the microorganisms in the environment and life. • Differentiate between prokaryotic and eukaryotic cells • List the features of bacteria, fungi and viruses • Familiar with microbial growth requirements and nutrition • List the factors affecting the growth of microorganisms • List different methods of sterilization and understand which on suitable for sterilizing any material. • List types of microorganisms and its roles in soil, water and foods	K1, K2, K3

	CLOs	Aligned PLOs
2	**Skills:**	
2.1	**Cognitive skills to be developed** • Having successfully completed the course students should be able to: • Differentiate between prokaryotic and eukaryotic cells • Analyze requirements of microbial growth. • Discuss features and characteristic of bacteria, fungi and viruses • Explain why some Gram-positive bacteria become Gram-negative stain sometimes during Gram staining • the features of bacteria, fungi and viruses • Describe the different methods for sterilization and control of the microbial growth • Discuss the growth requirements for different microorganisms • Explain why some microorganisms live well in some extreme environments and others couldn't. • Understand the roles of microorganisms in soil, water, plant and foods	S1, S2, S3
2.2.	**Psychomotor Skills** ❖ Upon successful completion of this course, the student is expected to be able to: • Perform the laboratory experiments precisely • Operate all devices in lab • Isolation and subculturing the important microorganisms from soil, water and sewage and plant rhizosphere.	S1, S2, S3
3	**Values:**	
	❖ Upon successful completion of this course, the student is expected to be able to: • Developing oral presentations. • Communicating personal ideas and thoughts. • Work independently and as part of a team to finish some assignments. • Communicate results of work to others. • Use of needed precautions when dealing with pathogen microorganisms • Demonstrate professional attitudes and behaviors towards others. • Propose the smart questions • Understand and dissecting the problem so that it is fully solved understood. • Demonstrate the assertiveness for his decision. • Demonstrate his capability for the responsibility and Accountability • Show Effective verbal communication with clarity and must be characterize with the following interpersonal attributes; (verbal communication, Non-verbal communication, good listening for the others, questioning, good manners, problem solving, Social awareness, self-management, responsibility and accountability) • Enhancing the ability of students to use computers and internet. • Interpret the laboratory data. • Know how to write a report.	V1, V2, V3

CLOs		Aligned PLOs

C. Course Content

No	List of Topics	Contact Hours
1	❖ **History of microbiology:** - introduction about general microbiology; including historical background. - General characteristics of prokaryotic cells, differentiation between the prokaryotes and Eukaryotes cells**.** - an overview about the beneficial and hazardous roles of microorganisms in the environment and their applications in different fields.	**2**
Short discerption of: Bacteria, , fungi, viruses.		
2,3	❖ **Bacteria** - General characteristics - Different genera and morphology of bacteria - Reproduction in bacteria -Bacterial cell structure - Nutrition requirements - Growth curve of bacteria - Roles of bacteria in soil, plant and foods (hazardous and benefits)	**6**
4,5	❖ **Fungi:** - General characteristics of fungi - Different genera - Reproduction in fungi - Nutrition and growth requirements - Roles of fungi in soil, plant and foods (hazardous and benefits)	**6**
6,7	❖ **A Virus** - General characteristics - Different types of viruses (plant viruses, animal viruses, human viruses - Reproduction in virus -Virus structure -Roles of viruses in plant pathology, animal and human pathology	**6**
8	❖ **Factors affecting microbial activity and growth.** ❖ **Control of microbial activity including the different sterilization methods**	**2**
Some Application of Microbiology		
9	❖ A short introduction to Soil Microbiology	**3**
10	❖ A short introduction to Water and sewage microbiology	**3**
11	❖ A short introduction to Food microbiology	**2**
	Total	**30hrs**

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**		
1.1	❖ Having successfully completed the course students should be • Understand the general characteristics of prokaryotes • List the major types of Microorganisms in the environment • List the benefits and hazardous roles of the microorganisms in the environment and life. • Differentiate between prokaryotic and eukaryotic cells • List the features of bacteria, fungi and viruses • Familiar with microbial growth requirements and nutrition • List the factors affecting the growth of microorganisms • List different methods of sterilization and understand which on suitable for sterilizing any material. List types of microorganisms and its roles in soil, water and foods	• Lectures which must start with preliminary one showing course contents • Using images and movies • Studying microorganisms from different environmental specimens in the lab. • Encouraging students to collect new information about different important microorganisms in soil, water, and foods samples • Enable the reference books and scientific sites concerning soil microorganisms on the internet.	• Periodical exam and reports 10% • Mid- term theoretical exam 20% • Mid-term practical exam 5% • Final practical exam 15% • Final exam 50%
2.0	**Skills**		
2.1	**Cognitive skills to be developed** ❖ Having successfully completed the course students should be able to: • Differentiate between prokaryotic and eukaryotic cells • Analyze requirements of microbial growth.	• Lectures. • Brain storming. • Discussion.	• Exam must contain questions that can measure these skills. • Quiz and exams. • Discussions after the lecture.

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	• Discuss features and characteristic of bacteria, fungi and viruses • Explain why some Gram-positive bacteria become Gram-negative stain sometimes during Gram staining • the features of bacteria, fungi and viruses • Describe the different methods for sterilization and control of the microbial growth • Discuss the growth requirements for different microorganisms • Explain why some microorganisms live well in some extreme environments and others couldn't. Understand the roles of microorganisms in soil, water, plant and foods		
2.2	**Psychomotor Skills** ❖ Upon successful completion of this course, the student is expected to be able to: ❖ Perform the laboratory experiments precisely ❖ Operate all devices in the lab ❖ Perform aseptic microbiological techniques. ❖ Preparation different media for isolation and cultivation of bacteria ❖ Cultivate the bacterial isolates on the agar plate	- Follow up the students in lab and carry out all the laboratory experiments	-Giving additional marks for the students they have accurate laboratory results and good seminar presentation -Practical exam.
3.0	**Values:**		
	❖ Upon successful completion of this course, the student is expected to be able to: • Developing oral presentations. • Communicating personal ideas and thoughts. • Work independently and as part of a team to finish some assignments.	- Lab work - Case Study - Active learning - Small group discussion - Homework (preparing a report on some topics related to the course depending on web sites).	- Oral exams. - Evaluate the efforts of each student in preparing the report. - Evaluate the scientific values of reports. - Evaluate the work in team

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	• Communicate results of work to others. • Use of needed precautions when dealing with pathogen microorganisms • Demonstrate professional attitudes and behaviors towards others. • Propose the smart questions • Understand and dissect the problem so that it is fully solved understood. • Demonstrate the assertiveness for his decision. • Demonstrate his capability for the responsibility and Accountability • Show Effective verbal communication with clarity and must be characterized with the following interpersonal attributes; (verbal communication, Non-verbal communication, good listening for the others, questioning, good manners, problem-solving, social awareness,self-management, responsibility, and accountability) • Enhancing the ability of students to use computers and the internet. • Interpret the laboratory data. • Know how to write a report.	- Seminars presentation - Practical during carryout the experiments in the lab.	- Evaluation of the role of each student in lab group assignment - Evaluation of students presentations

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Assignats, Problem set, Projects		10%
2	Miderm 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 :
4hrs office hours

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Brock Biology of Microorganisms, Twelfth edition by Madigan, Martinko, Dunlap and Clark; Publisher: Pearson Prentice-Hall, ISBN: 0132324601 (2008). Benson, H.J. (2002). Microbiological Applications. Laboratory Manual in General Microbiology, eighth edition.
Essential References Materials	Saad Zaky Mahmoud (1988). Practical Applied Microbiology, Egyptian Anglo. Larry McKane & Judy Kandel (1996) Microbiology–Essential and Applications, International Edition. Prescott, L., Harley, J. and Klien, D. (2005). Microbiology, MacGraw
Electronic Materials	
Other Learning Materials	Handout PowerPoint Slides

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• Class room with data show • laboratories
Technology Resources (AV, data show, Smart Board, software, etc.)	• Computer lab • Data show • Smart Board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	• Incubators, autoclaves, measuring equipment, water bath, digital balances, pH meters, safety facilities. • Availability of some reference bacterial strains • Cultural media and all chemical that needed

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	
Reference No.	
Date	

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	Genetics
Course Code:	
Program:	BSc Biology (Zoology and Botany Tracks)
Department:	Biology Department
College:	Science
Institution:	Umm Al-Qura University

Table of Contents

A. Course Identification

1. Credit hours: 4 Credits
2. Course type **a.** University ☐ College ☐ Department ■ Others ☐ **b.** Required ■ Elective ☐
3. Level/year at which this course is offered: 2nd Year / 5th level
4. Pre-requisites for this course (if any)**:** Biochemistry (2nd Year / 4th level)
5. Co-requisites for this course (if any)**:** Biostatistics (2nd Year / 5th level)

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

Genetics will provide students with a broad genetics background and understanding of biological inheritance, and will cover topics ranging from understanding the flow of genetic information within single-celled organisms to how genes and gene products function within multicellular organisms. Its contents focus on an overview of basic genetics: an introduction to Mendelian and non-Mendelian inheritance, variation in chromosome structure and number, DNA recombination, DNA and chromosome structure, Mutations, and quantitative and population genetics.

2. Course Main Objective

The goal of this course is to provide an understanding of biological inheritance and describe the basic principles of inheritance at the molecular, cellular, organismal, and population levels.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Students will understand the concepts of classical, molecular, and population genetics	K1, K2, K3
1.2	Students will understand the genetic information can change, leading to modified physical or physiological traits, which is the basis for variation, adaptation, and evolution	K1, K2, K3
1.3	Students will be able to define basic genetics terms, and use these terms to explain fundamental concepts in genetics.	K1, K2
2	**Skills :**	
2.1	Students will solve genetics problems.	S1, S2, S3
2.2	Design and carryout genetics experiments, and participate in the generation and evaluation of genetic knowledge.	S1, S2, S3
2.3	Connect genetics with concepts/knowledge from other courses	S1, S2, S3
3	**Values:**	
3.1	Articulate the importance of genetics to societal, medical, and personal issues	V1, V2, V3
3.2	Interact with others regarding the impact and use of genetics and genetic information on society.	V1, V2, V3
3.3	Students will make connections between genetics, their lives and other disciplines.	V1, V2, V3

C. Course Content

No	List of Topics	Contact Hours
1	**Introduction** • Genetics in the twenty first century	2
2	**Mendel's Principles of Heredity** • The Puzzle of Inheritance • Genetic Analysis According to Mendel • Mendelian Inheritance in Humans	3
3	**Extensions to Mendel's Laws** • Extensions to Mendel for Single-Gene Inheritance • Extensions to Mendel for Two-Gene Inheritance • Extensions to Mendel for Complex Trait Inheritance • A Comprehensive Example: Dog Coat Color Genes	3
4	**Chromosomes and Inheritance** • Chromosomes: The Carriers of Genes • Mitosis: Cell Division that Preserves Chromosome Number • Meiosis: Cell Divisions that Halve Chromosome Number	3
5	**Sex Chromosomes** • Sex Chromosomes and Sex Determination • Gametogenesis • Sex Linkage	3

	• Sex-Linked and Sexually Dimorphic Traits in Humans • Human Intersexuality	
6	**Linkage, Recombination, and Gene Mapping** • Gene Linkage and Recombination • Recombination: A Result of Crossing-Over During Meiosis • Mapping: Locating Genes Along a Chromosome • The Chi-Square Test and Linkage Analysis • Tetrad Analysis in Fungi • Mitotic Recombination and Genetic Mosaics	3
7	**Variation and Selection in Populations** • The Hardy-Weinberg Law: Predicting Genetic Variation in "Ideal" Populations • What Causes Allele Frequencies to Change in Real Populations?	3
8	**Genetic Analysis of Complex Traits** • Heritability: Genetic Versus Environmental Influences on Complex • Traits Mapping Quantitative Trait Loci (QTLs)	3
9	**Organellar Inheritance** • Mitochondria and Their Genomes • Chloroplasts and Their Genomes • The Relationship Between Organellar and Nuclear Genomes • Non-Mendelian Inheritance of Mitochondria and Chloroplasts • Mutant Mitochondria and Human Disease	3
10	**What Genes Are and What They Do** • Experimental Evidence for DNA as the Genetic Material • The Watson and Crick Double Helix Model of DNA • Genetic Information in Nucleotide Sequence • DNA Replication • Homologous Recombination at the DNA Level • Site-Specific Recombination • Mutation • What Mutations Tell Us About Gene Structure • What Mutations Tell Us About Gene Function • A Comprehensive Example: Mutations that Affect Vision	4
Total		30

No	Practical Topics	Contact Hours
1	Introduction, Lab Notebook, Basic Genetics Laboratory Equipment	**3**
2	Introduction to Genetics • Probability, Mendelian Genetics, chi-square and measurements	**3**
3	Monohybrid and Dihybrid Crosses • Fruit fly (Drosphila) genetics Lab	**3**
4	Cell division: Mitosis and Miosis • Recombination and genetic crosses	**3**
5	Cytogenetics and Karyotyping • Chromosomal alterations and human disease	**3**

6	Population Genetics • Human blood type frequencies Lab	**3**
7	Simulating Population Genetic Processes • Genetic drift, mutation, gene flow, natural selection	**3**
8	UV Mutagenesis	**3**
9	DNA Isolation	**3**
10	Intro to PCR and DNA Electrophoresis	**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**		
1.1	Students will understand the concepts of classical, molecular, and population genetics	Lectures	Quiz. Final and mid-term exam. Assignments and activities
1.2	Students will understand the genetic information can change, leading to modified physical or physiological traits, which is the basis for variation, adaptation, and evolution	Lectures Lab work	Quiz. Final and mid-term exam. Assignments and activities
1.3	Students will be able to define basic genetics terms, and use these terms to explain fundamental concepts in genetics.	Lectures	Quiz. Final and mid-term exam. Assignments and activities
2.0	**Skills**		
2.1	Students will solve genetics problems.	Lab activities	Quiz. Final and mid-term exam. Assignments and activities
2.2	Design and carryout genetics experiments, and participate in the generation and evaluation of genetic knowledge.	Lab activities	Quiz. Final and mid-term exam. Assignments and activities.
2.3	Connect genetics with concepts/knowledge from other courses	Case studies	Quiz. Final and mid-term exam. Assignments and activities
3.0	**Values**		
3.1	Articulate the importance of genetics to societal, medical, and personal issues	Lab activities Projects	Quiz. Final and mid-term exam.

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
			Assignments and activities
3.2	Interact with others regarding the impact and use of genetics and genetic information on society.	Discussions Case studies	Evaluation of the topics prepared by students
3.3	Students will make connections between genetics, their lives and other disciplines.	Lectures Projects	Quiz. Final and mid-term exam. Projects assessment

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Assignats, Problem set, Projects		10%
2	Midarm Exam (Lecture)		20%
3	Midterm Exam (Lab)		10%
4	Final Exam (Lab)		20%
5	Final Exam (Lecture)		40%
6	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	**Genetics: From Genes to Genomes**, Michael Goldberg and Janice Fischer and Leroy Hood and Leland Hartwell, McGraw Hill, 2021, ISBN: 9781260575828; 1260575829
Essential References Materials	**Concepts of Genetics** 12th Edition, by William Klug, Michael Cummings, Charlotte Spencer, Michael Palladino, Darrell Killian,ISBN-13: 978-0134604718
Electronic Materials	Learn Genetics: http://learn.genetics.utah.edu/ Understanding Genetics: http://www.thetech.org/genetics/#
Other Learning Materials	Videos and websites on the internet that are relevant to the topics of the course

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms and laboratories

Item	Resources
Technology Resources (AV, data show, Smart Board, software, etc.)	Data shows and computers in all classrooms and laboratories
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Handouts and Lecture notes Microsoft office package. Multi- media associated with the textbook and the relevant websites.

G. Course Quality Evaluation

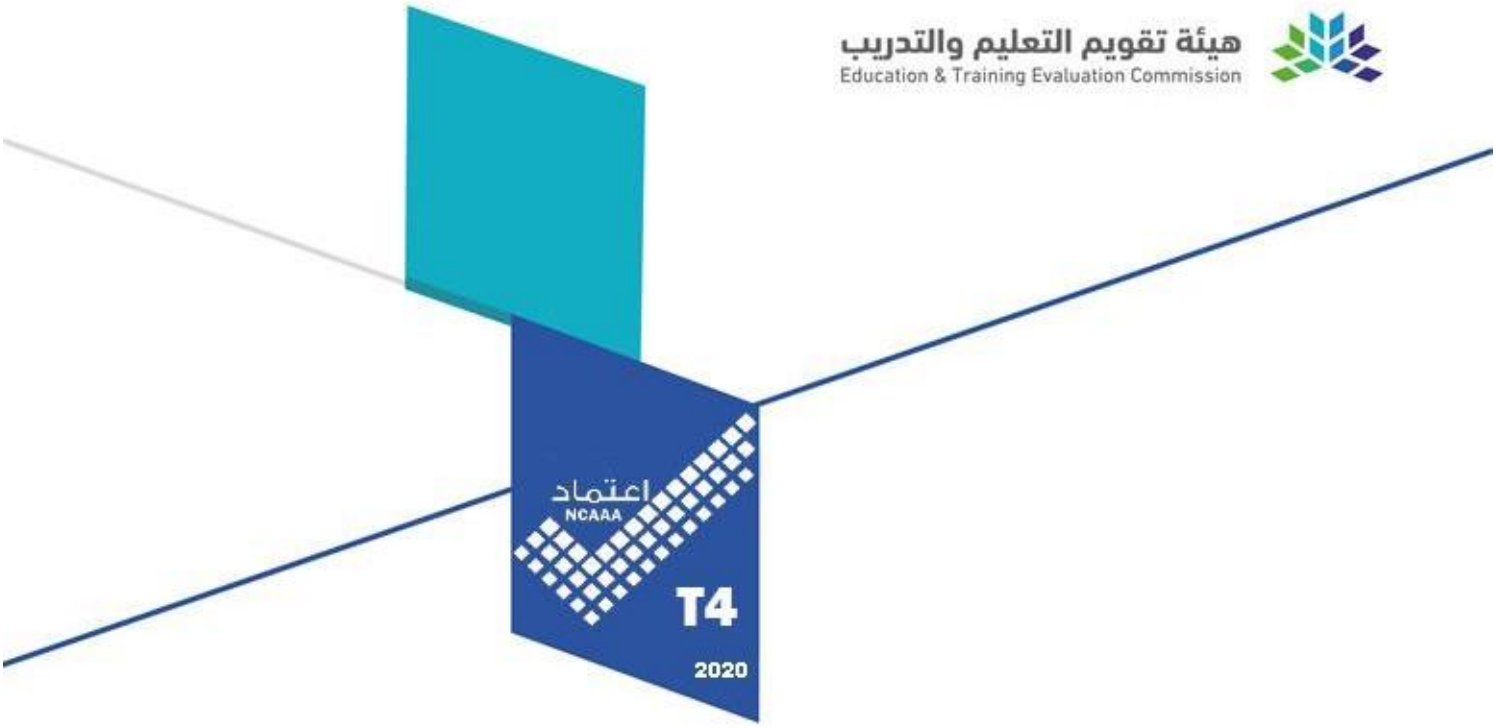
Evaluation Areas/Issues	Evaluators	Evaluation Methods
Annual review of course by departmental course planning committee	Faculty, Program Leaders, Peer Reviewer	Direct
Updating the course with latest curriculum developments in the field.	Faculty, Program Leaders, Peer Reviewer	Direct
Updating course curriculum using internet materials	Faculty, Program Leaders, Peer Reviewer	Direct
Effectiveness of teaching and assessment	Students	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	
Reference No.	
Date	

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	Introduction to Calculus
Course Code:	MTH1101-4
Program:	BSc. in Mathematics
Department:	Mathematical sciences
College:	sciences
Institution:	Umm Al-Qura University

Table of Contents

A. Course Identification

1. Credit hours:	**4**
2. Course type	
a.	University ☐ College ☐ Department ☒ Others ☐
b.	Required ☒ Elective ☐
3. Level/year at which this course is offered:	**First level/First year**
4. Pre-requisites for this course (if any)**:**	**None**
5. Co-requisites for this course (if any)**:**	**Not applicable**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	**Four hours/week**	**%100**
2	**Blended**	0	0
3	**E-learning**	0	0
4	**Distance learning**	0	0
5	**Other**	0	0

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	**36**
2	**Laboratory/Studio**	**0**
3	**Tutorial**	**0**
4	**Others** (Exam, Quizzes, Activities,…)	**6**
	Total	**40**

B. Course Objectives and Learning Outcomes

1. Course Description

This introductory calculus course covers differentiation and integration of functions of one variable. It is the first in a three-course sequence of calculus. Key topics of the course include precalculus, limits and continuity, derivatives, integrals.

2. Course Main Objective

The primary objective of the course is to introduce students to the concepts of calculus and to develop the student's confidence and skill in dealing with mathematical expressions. To achieve this goal, the course will help the student understand the following basic concepts: limits, continuity , derivatives and integration involving real-valued functions of one variable (including algebraic and trigonometric functions).

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding: by the end of this course, the student is expected to be able to**	

CLOs		Aligned PLOs
1.1	Recognize the characteristics of a function expressed in symbolic or graphic form.	
1.2	Outline the definitions of limits and continuity of a single-variable function and related theorems.	
1.3	Define the basic concept of a derivative of a single-variable function and learn the different rules, formulas and theorems for computing the derivative of a function in calculus.	
1.4	Define the basic concepts and techniques of integration of polynomial, rational, and trigonometric functions.	
2	**Skills: by the end of this course, the student is expected to be able to**	
2.1	Analyze functions represented in a variety of ways: graphical, numerical or analytical	
2.2	Determine the limits of functions and their continuity at points or on intervals.	
2.3	Calculate the derivative of various type of functions using the rules and techniques of differentiation.	
2.4	Evaluate integrals of real functions using basic rules and techniques of integration.	
3	**Values: by the end of this course, the student is expected to be able to**	
3.1	Apply the computational and conceptual principles of calculus to the solutions of various mathematical problems.	
3.2	Justify the choice of different steps in problem resolution procedure.	
3.3	Solve problems using a range of formats and approaches in basic science.	
3.4	Show the ability to work independently and within groups.	

C. Course Content

No	List of Topics	Contact Hours
1	**Pre Calculus:** (i) Exponents and Radicals. (ii) Solving Equations. (iii)Inequalities and Absolute Values. (iv)Lines	8
2	**Functions** (i) Functions: Definition, Graphs and Operations (ii) Trigonometric Functions and Identities.	4
3	**Limits and Continuity:**	8

	(i) Introduction to Limits (ii) Theorems on limits (iii) Limit at infinity and infinite limits (iv) Continuity	
4	**Differentiation** (i) Definition of Derivative (Using Limits) (ii) Rules and Theorems for Finding Derivatives (iii)Derivative of Trigonometric Function (iv)Chain Rule (v) Higher Order Derivatives	10
5	**Integration** (i) Antiderivatives. (ii) Fundamental Theorems of Calculus.	4
6	**Others** Preprimaries, Quizzes, Activities …	6
Total		40

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**		
1.1	Recognize the characteristics of a function expressed in symbolic or graphic form.	Lecture and Tutorials	Exams, quizes
1.2	Outline the definitions of limits and continuity a single-variable function and related theorems.	Lecture and Tutorials	Exams, quizes
1.3	List the different rules, formulas and theorems for computing derivatives of functions.	Lecture and Tutorials	Exams, quizes
1.4	Define the basic concepts and techniques of integration of polynomial, rational, and trigonometric functions.	Lecture and Tutorials	Exams, quizes
2.0	**Skills**		
2.1	Analyze functions represented in a variety of ways: graphical, numerical or analytical.	Lecture/Individual or group work	Exams, quizes
2.2	Determine the limits of functions and their continuity at points or on intervals.	Lecture/Individual or group work	Exams, quizes
2.3	Calculate the derivative of various type of functions using the rules and	Lecture/Individual or group work	Exams, quizes

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	techniques of differentiation.		
2.4	Apply the concept of derivative to completely analyze graph of a function.	Lecture/Individual or group work	Exams, quizes
2.5	Evaluate integrals of real functions using basic rules and techniques of integration.	Lecture/Individual or group work	Exams, quizes
3.0	**Values**		
3.1	Apply the computational and conceptual principles of calculus to the solutions of various mathematical problems.	Lecture/Individual or group work	Exams, quizes
3.2	Justify the choice of different steps in problem resolution procedure.	Lecture/Individual or group work	Exams, quizes
3.3	Solve problems using a range of formats and approaches in basic science.	Lecture/Individual or group work	Exams, quizes
3.4	Show the ability to work independently and within groups.	Lecture/Individual or group work	Exams, quizes

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	mixetmM tdiM	kideh **ttt**S	30%
2	skiotQ ihx hzMttzmSQ	rkmihm QtMtQetm	20%
3	mihil tdiM	rhx zm QtMtQetm	50%

***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 :

All faculty members are required to be in their offices outside teaching hours. Each member allocates at least 4 hours per week to give academic advice to students and to better explain the concepts seen during the lectures.

Students are required to complete the homework problems. Students are welcome to work together on homework. However, each student must turn in his or her own assignments, and no copying from another student's work is permitted. Deadline extensions for homework will not be given. Students are encouraged to discuss with professor about homework problems.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• Calculus (9th Edition), Dale Varberg, Edwin Purcell and Steven Rigdon, Prentice Hall (2006).
Essential References Materials	• Thomas' Calculus (14th Edition), George B. Thomas • Precalculus: Mathematics for Calculus (6th Edition), James Stewart

Electronic Materials	None
Other Learning Materials	None

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms
Technology Resources (AV, data show, Smart Board, software, etc.)	Data Show, Smart Board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	ezht

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students	Direct
Quality of learning resources	Students	Direct
Extent of achievement of course learning outcomes	Faculty Member	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	
Reference No.	
Date	

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	Marine Biology
Course Code:	
Program:	BSc Biology (Zoology and Botany Tracks)
Department:	Biology Department
College:	Science
Institution:	Umm Al-Qura University

Table of Contents

A. Course Identification

1. Credit hours: 3hrs
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: 2nd Year / 5thLevel
4. Pre-requisites for this course (if any)**:** Principle of Ecology 2nd Year / 4th Level
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**	50 hrs.	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20
2	**Laboratory/Studio**	30
3	**Tutorial**	
4	**Others** (specify) office hours	30
	Total	80

B. Course Objectives and Learning Outcomes

1. Course Description

This course provides a foundation in modern marine biology science, including marine ecology; marine pollution; and human's impact on the marine environment. This course covers different aspects of marine biology and explores the applications of marine biology to marine resource development and marine environmental protection.

2. Course Main Objective

The course aims to introduce students to the marine biology and train student in the applied aspects of marine resource exploitation and protection.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and understanding**	
1.1	Describe the biological component of modern marine sciences and of its relevance to other marine disciplines and to the sustainable management of the oceans and coastal waters and estuaries.	K1, K2
1.2	Understand areas of marine biology and related marine and environmental sciences including marine fauna and flora, marine environments and their habitat ecology, oceanography and other relevant physical disciplines, marine and coastal environmental management and conservation, marine resource development, and marine biotechnology.	K1, K2
1.3	Understanding of the relevance of the sustainable management of the marine environment and of marine resources on our daily lives.	K1, K2, K3
2	**Skills:**	
2.1	Understanding the role of marine biologists in professional fields including research and development, quality assurance and public health and especially in organizations connected with environmental management and conservation.	S1, S2
2.2	Taking responsibility for personal and professional development.	S2
2.3	Effective working and time management both as an individual and part of a group.	S2, S3
2.4	An awareness of safe practices in marine, biological and environmental sciences.	S3
2.5	Development of critical analytical, numerical and IT skills, both general and subject-specific.	S3
2.6	Effective communication, both written and oral, at all levels.	S3
3	**Values:**	
3.1	Appraise the value of critical judgment through constructive criticism among colleagues.	V1
3.2	Demonstrate personal integrity, reliability, honesty, trustworthiness, teamwork, and ethical behavior toward others in the community.	V1, V2, V3

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to the Science of Marine Biology	2
2	Marine Ecology and Geology	2
3	Marine Biodiversity - Seaweeds and Plants	2
4	Marine Biodiversity - Animals	2
5	The Sea Floor	2
6	Marine Microbiology and Bioremediation.	2
7	The Impact of Humans on the Marine Environment.	2
8	Marine Pollution and Marine Conservation.	2
9	Marine Environmental Biotechnology - Marine Natural Products (Economies)	2
10	Aquaculture and Marine Environmental Monitoring	2
Total		20 hrs.

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**		
1.1	Describe the biological component of modern marine sciences and of its relevance to other marine disciplines and to the sustainable management of the oceans and coastal waters and estuaries.	- Interactive lectures - Group discussions	▪ Written exams ▪ Assignment ▪ Open-book exam ▪ Quizzes
1.2	Understand areas of marine biology and related marine and environmental sciences including marine fauna and flora, marine environments and their habitat ecology, oceanography and other relevant physical disciplines, marine and coastal environmental management and conservation, marine resource development, and marine biotechnology.		
1.3	Understanding of the relevance of the sustainable management of the marine environment and of marine resources on our daily lives.		
2.0	**Skills**		
2.1	Understanding the role of marine biologists in professional fields including research and development, quality assurance and public health and especially in organisations connected with environmental management and conservation.	- Interactive lectures - Practical work	▪ Written exams ▪ Assignment ▪ Open-book exam ▪ Quizzes
2.2	Taking responsibility for personal and professional development.		
2.3	Effective working and time management both as an individual and part of a group.		
2.4	An awareness of safe practices in marine, biological and environmental sciences.		
2.5	Development of critical analytical, numerical and IT skills, both general and subject-specific.		
2.6	Effective communication, both written and oral, at all levels.		
3.0	**Values**		
3.1	Appraise the value of critical judgment through constructive criticism among colleagues.	- Practical work	- Lab demonstration - Assignments

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
3.2	Demonstrate personal integrity, reliability, honesty, trustworthiness, teamwork, and ethical behavior toward others in the community.	- Small group - Discussion	

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Project, Problem Sets	-	10%
2	Midterm Exam (Lab)	6	10%
3	Exam Midterm (Lecture)	6	20%
4	Final Exam (Lab)	11	20 %
5	Final Exam (Lecture)	12	40%
6	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:

Teaching staff are available for office hours , 3 a week.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Marine Biology, Peter Castro, Michael E. Huber, William C. Ober, Claire E. Ober, 11, illustrated, McGraw-Hill Education, 2018, 992 pages.
Essential References Materials	Marine Biology Journal of Marine Sciences Journal of Experimental Marine Biology and Ecology
Electronic Materials	Fundamentals of Biology. ALISON – online learning website. https://alison.com/course/fundamentals-of-biology-revised
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	➢ Lecture room ➢ Laboratory
Technology Resources (AV, data show, Smart Board, software, etc.)	➢ Computers ➢ Internet access ➢ Smart Board ➢ Projector

Item	Resources
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	➢ Display screen ➢ White board ➢ SDS electrophoresis tanks and its contents ➢ DNA electrophoresis tanks and its contents ➢ PCR Thermocycler ➢ UV rays for DNA visualization

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students	➢ Written feedback by individuals. ➢ Satisfaction survey at the end of each semester.
Extent of achievement of course learning outcomes	Course instructor Peer reviewer Program director	➢ Course development according to the analysis of student feedback. ➢ Monitoring students' performance throughout the semester using formative assessment. ➢ Analyzing students' progress. ➢ Using statistics to analyze students' achievement at the end of each semester and implement data comparison. ➢ Peer evaluation of the instructor.
Quality of learning resources	Course instructor	➢ Attending staff development workshops and programs. ➢ Continuous education. ➢ Implementing student feedback. ➢ Variations of teaching strategies including tutorials, PBL and more emphasizing on the practical sessions

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	
Reference No.	
Date	

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	Microscopic Techniques
Course Code:	
Program:	BSc Biology (Zoology and Botany Tracks)
Department:	Biology Department
College:	Science
Institution:	Umm Al-Qura University

Table of Contents

A. Course Identification

1. Credit hours: 3hrs
2. Course type **a.** University ☐ College ☐ Department ■ Others ☐ **b.** Required ■ Elective ☐
3. Level/year at which this course is offered: 2nd Year / 6th Level
4. Pre-requisites for this course (if any)**:** Basic Biological laboratory skills (1stYear / 2nd level) Cell Biology (2nd Year / 5thlevel)
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**	50 hrs	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20 hrs
2	**Laboratory/Studio**	30 hrs
3	**Tutorial**	
4	**Others** (specify) / office hours	30 hrs
	Total	80 hrs

B. Course Objectives and Learning Outcomes

1. Course Description

This comprehensive course on microscopy techniques introduces students to both the theory and practical use of modern microscopes. The course features lectures on the basic physical principles behind the most common modern microscopy techniques. We cover introduction to optics, principles of image formation, light microscopy techniques, principles of fluorescence, digital imaging, confocal microscopy, electron microscopy (SEM, TEM), and X-ray microscopy/micro CT. The lectures are reinforced with the laboratory sessions featuring extensive demonstrations and hands-on exercises on a wide variety of microscopes.

2. Course Main Objectives

This course is designed to provide students a comprehensive and practical introduction to modern microscopy techniques and a background in modern optical research tools.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Knowledge about microscopic structures and different types of lenses	K1, K2
1.2	Knowledge about the laboratory rules and the general methods of microscopic preparations.	K1, K2
1.3	Knowledge about the different types of Lab microscopes, theories, advantages, and disadvantages	K1, K2
1.4	Understanding the Light Microscopy Advanced Techniques; Darkfield, Phase Contrast, Polarized , Fluorescence , confocal , electron microscopes)	K1, K2, K3
2	**Skills:**	
2.1	The student able to prepare different types of microscopic preparations.	S2
2.2	Perform full preparations and dying plant and animal cells and some cell organelles.	S2
2.3	Dealing well with different parts of different types of microscopes.	S1, S2, S3
2.4	The ability to interpret microscopical information.	S, S3
3	**Values:**	
3.1	The ability to deal with some minor malfunctions related to working with the microscope and the best way to maintain the microscope	V1, V2, V3
3.2	Work well in team and with internet.	V1, V2, V3

C. Course Content

No	List of Topics	Contact Hours
1	History of Microscopy, Overview of Current Microscopy Techniques	2
2	Introduction to Optics (Geometric and Wave)	2
3	Components of a Light Microscope, Compound Light Microscope, and Its Variations, Brightfield, Darkfield, Phase Contrast, Polarized, DIC	2
4	Light Microscopy Advanced Techniques 1: Wide Field Fluorescence, Sample Prep. and Confocal Microscopy.	2
5	Light Microscopy Advanced Techniques 2: Detectors, Deconvolution, Structured Illumination, Two Photon Fluorescence, Second Harmonic Generation, fluorescence microscopy techniques (FRAP, FLIP, FLAP, FRET, and FLIM)	2
6	Transmission Electron Microscopy (TEM), STEM	2
7	Scanning Electron Microscopy (SEM)	2
8	X-ray Microscopy and Micro-Computed Tomography (CT)	2
9	The general methods of microscopic preparations.	2
10	Preparation of microscopic slides and how to dye tissue and cellular preparations.	2

Total	20 hrs

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**		
1.1	Knowledge about microscopic structures and different types of lenses	1.In-class lecturing where the previous knowledge is linked to the current and future topics. 2.Homework assignments. 3.On hand work (connecting what they learn in the class and applying this information in laboratory). 4. Handout of lecture notes for each topic.	1. Term tests • Mid-term • Final exam 2. Assignments 3. Course activities 4. On-hand exercise
1.2	Knowledge about the laboratory rules and the general methods of microscopic preparations.		
1.3	Knowledge about the different types of Lab microscopes, theories, advantages and disadvantages		
1.4	Understanding the Light Microscopy Advanced Techniques ; Darkfield, Phase Contrast, Polarized , Fluorescence , confocal , electrone microscopes)		
2.0	**Skills**		
2.1	The student able to prepare different types of microscopic preparations.	1. 1.Students will receive credit for these activities based on their responses to the questions 2. and assignments. These will include reading summaries, reflective questions, quizzes 3. On-hand work 4. Demonstrations	1-Evaluation of the topics prepared by students according to the content, arrangement, and covering of the topic. 2-Midterm and final exams. 3-Checking the homework assignments. 4-Course work reports. 5- On-hand exercises
2.2	Performe full preparations and dying plant and animal cells and some cell organelles .		
2.3	Dealing well with different parts of different types of microscopes.		
2.4	The ability to interprite micoscopical informations		
3.0	Values		
3.1	The ability to deal with some minor malfunctions related to working with the microscope and the best way to maintain the microscope	1-Engage student in carrying out internet search. 2-The ability to debate the scientific basis of microscopic techniques	1-Oral exams. 2-Evaluation of student essays assignments and search work.

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
3.2	Work well in team and deals well with the Internet	3-Writing group reports. 4-Solving problems in groups during tutorial. 5-Checking the homework assignments in groups during discussion. 6-Cooperative learning and application of scientific method in thinking the scientific problem solving. 7-Work as part of a team. 8-Conducting group experiments and writing group reports.	3-Observation of student ethical and moral behavior. 4-Students' attendance is recorded during lectures. 5-Assessment of the student reports. 6-Grading homework assignments.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
5	Quizzes, Project, Problem Sets	-	10%
	Midterm Exam (Lab)	6	10%
	Exam Midterm (Lecture)	6	20%
6	Final Exam (Lab)	11	20 %
7	Final Exam (Lecture)	12	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 :

3 office hours per week

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Fundamentals of Light Microscopy and Electronic Imaging" 2012, by Douglas B. Murphy and Michael W. Davidson (ISBN: 047169214X) Transmission Electron Microscopy: A Textbook for Materials Science (4 Vol. set)" 2009, by David B. Williams and C. Barry Carter ,Springer. (ISBN: 0387765026)
Essential References Materials	Physical Principles of Electron Microscopy: An Introduction to TEM, SEM, and AEM" 2016, by Ray F. Egerton , Springer. (ISBN: 1441938370) Imaging: A Laboratory Manual, 2010, by Rafael Yuste (First Edition), Cold Spring Harbor Laboratory Press ISBN: 0879699361)
Electronic Materials	

Other Learning Materials	Handouts and Lecture notes Microsoft office package. Multi- media associated with the text book and the relevant websites.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms Laboratories equipped with many biological apparatuses and microscopes, demonstration rooms
Technology Resources (AV, data show, Smart Board, software, etc.)	AV, data show, Smart Board, software
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Different types of biological dyes, staining tools

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Strategies for Obtaining Student Feedback on Effectiveness of Teaching	Students	Direct
Quality of learning resources	Staff and Students	Direct
Degree of conviction and application efficiency	Staff, Students , related persons	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	
Reference No.	
Date	

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	Molecular Biology
Course Code:	
Program:	BSc Biology (Zoology and Botany Tracks)
Department:	Biology Department
College:	Science
Institution:	Umm Al-Qura University

Table of Contents

A. Course Identification

1. Credit hours:	4 Credits
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	2nd Year / 6th Level
4. Pre-requisites for this course (if any)**:**	Genetics (2nd Year / 5th level)
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	100hrs

B. Course Objectives and Learning Outcomes

1. Course Description

Molecular biology is the study of biological systems at the molecular level. Molecular biology deals with nucleic acids and proteins and how these molecules interact within the cell to promote proper growth, division, and development.

2. Course Main Objective

This course is designed to provide students with a background in molecular genetics. The two main learning objectives of this course are; the development of an understanding of gene expression and gene regulation, and the familiarization of students with the experimental approaches used in molecular biology.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Students should be able to understand biological processes at a molecular level.	K1, K2, K3
1.2	Relate molecular techniques to discoveries in molecular biology.	K1, K2, K3
1.3	Relate DNA structure and manipulation to the function and control of genes.	K1, K2, K3
1.4	Identify DNA structure and replication, transcription, translation, and gene expression.	K1, K2, K3
1.5	Explain how recent genomics and functional genomics advances are altering our views of molecular biology in, for example, eukaryotic transcription and chromatin function.	K1, K2, K3
2	**Skills :**	
2.1	The ability to locate, analyze, evaluate, and synthesize information from a wide variety of sources in a planned and timely manner.	S1, S2, S3
2.2	An ability to apply effective, creative, and innovative solutions, both independently and cooperatively, to current and future problems.	S1, S2, S3
2.3	A proficiency in the appropriate use of contemporary technologies.	S1, S2, S3
2.4	Skills of a high order in interpersonal understanding, teamwork, and communication.	S1, S2, S3
3	**Values:**	
3.1	A commitment to the highest standards of professional effort and the ability to take a leadership role in the community.	V1, V2
3.2	An awareness of ethical, social, and cultural issues within a global context and their importance in the exercise of professional skills and responsibilities.	V1
3.3	A commitment to continuous learning and the capacity to maintain intellectual curiosity throughout life.	V3

C. Course Content

No	List of Topics	Contact Hours
1	**Genomes and the flow of biological information (Ch.1)** 1.1 The roots of biology 1.2 The genome: a working blueprint for life 1.3 Bringing genes to life: gene expression 1.4 Cellular infrastructure and gene expression 1.5 Expression of the genome 1.6 Evolution of the genome and the tree of life	2
2	**Biological molecules (Ch.2)** 2.1 Atoms, molecules, and chemical bonds 2.2 Life in aqueous solution 2.3 Non-covalent interactions 2.4 Nucleotides and nucleic acids 2.5 The structure of DNA 2.6 Chemical properties of RNA 2.7 RNA folding and structure 2.8 The RNA world and its role in the evolution of modern-day life	3

3	**Chromosome structure and function (Ch.4)** 4.1 Organization of chromosomes 4.2 The cell cycle and chromosome dynamics 4.3 Packaging chromosomal DNA 4.4 Variation in chromatin structure 4.10 The centromere 4.11 The telomere 4.12 Chromosome architecture in the nucleus	3
4	**Transcription (Ch.8)** 8.1 Overview of transcription - Transcription: core components 8.2 RNA polymerase core enzyme - Transcription: mechanism 8.3 Promoter recognition in bacteria and eukaryotes 8.4 Initiation of transcription and transition to an elongating complex 8.5 Transcription elongation 8.6 Transcription termination	3
5	**Transcription: regulation (Ch.9)** 9.7 Principles of transcription regulation 9.8 DNA-binding domains in transcriptional regulators 9.9 Mechanisms for regulating transcription in bacteria 9.10 Competition between cI and Cro and the fate of bacteriophage lambda 9.11 Mechanisms for modulating eukaryotic transcription 9.12 Combinatorial regulation of eukaryotic transcription 9.13 Signaling cascades and regulation of transcription 9.14 Regulation of elongation and termination by RNA and proteins 9.15 Transcriptional silencing	3
6	**RNA processing (Ch.10)** 10.1 Overview of RNA processing 10.4 mRNA capping and polyadenylation 10.5 RNA splicing 10.6 Eukaryotic mRNA splicing by the spliceosome 10.7 Exon definition and alternative splicing 10.8 RNA editing 10.9 Degradation of normal RNAs 10.10 Degradation of foreign and defective RNAs 10.11 RNA-binding domains in proteins	3
7	**Translation (Ch.11)** 11.1 Overview of translation - Translation: core components 11.2 Transfer RNA and the genetic code 11.3 Aminoacyl-tRNA synthetases 11.4 Structure of the ribosome - Translation: mechanism 11.5 The translation cycle: the ribosome in action 11.7 Translation initiation (mostly in bacteria) 11.8 Translation initiation in eukaryotes 11.9 Translation elongation: decoding, peptide bond formation, and translocation 11.10 Translation termination and re-initiation - Translation: regulation 11.11 Recoding: programmed stop codon read-through and frameshifting 11.13 Global regulation of initiation in bacteria and eukaryotes	4
8	**DNA replication (Ch.6)** 6.1 Overview of DNA replication - DNA replication: core components 6.2 DNA polymerases: structure and function 6.5 DNA helicases: unwinding of the double helix 6.6 The sliding clamp and clamp loader - DNA replication: mechanism 6.7 Origins and initiation of DNA replication 6.8 Leading and lagging strand synthesis 6.9 The replication fork 6.10 Termination of DNA replication 6.11 The end-replication problem and telomerase	4

	DNA replication: regulation 6.13 Regulation of initiation of replication in E. coli 6.14 Regulation of replication initiation in eukaryotes	
9	**DNA damage and Repair (Ch.15)** 12.1 Types of DNA damage 12.2 Post-replication mismatch repair 12.3 Repair of DNA damage by direct reversal 12.4 Repair of DNA damage by base excision repair 12.7 The DNA damage response 12.10 DNA damage and cell death in mammalian cells	3
10	**Genomics and genetic variation (Ch.18)** 18.1 Genome sequences and sequencing projects 18.2 Finding functions in a genome	2
Total		30

Lab Content

No	List of Topics	Contact Hours
1	Lab Safety & Basic molecular biology laboratory skills	3
2	Model organisms	3
3	Detection of biological molecules	3
4	Separation and isolation of biological molecules	3
5	Detection of specific DNA sequences	3
6	Detection of specific RNA molecules	3
7	Detection of specific proteins	3
8	Detection of interactions between molecules	3
9	Imaging cells and molecules	3
10	Molecular structure determination	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**		
1.1	Students should be able to understand biological processes at a molecular level.	Lectures	Quiz. Final and mid-term exam.
1.2	Relate molecular techniques to discoveries in molecular biology.	Lectures Lab work	Quiz. Final and mid-term exam.
1.3	Relate DNA structure and manipulation to the function and control of genes.	Lectures Lab work Web based study	Quiz. Final and mid-term exam Assignments and activities
1.4	Identify DNA structure and replication, transcription, translation, and gene expression.	Lectures Lab work	Quiz Final and mid-term exam
1.5	Explain how recent genomics and functional genomics advances are	Lectures Research activity	Quiz Final and mid-term

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	altering our views of molecular biology in, for example, eukaryotic transcription and chromatin function.	Web based study	exam Assignments and activities
2.0	**Skills**		
2.1	The ability to locate, analyze, evaluate, and synthesize information from a wide variety of sources in a planned and timely manner.	Lab work Research activity Web based study Library	Quiz Final and mid-term exam Assignments and activities
2.2	An ability to apply effective, creative, and innovative solutions, both independently and cooperatively, to current and future problems.	Lab work Research activity Web based study Library	Homework Quiz Final and mid-term exam Assignments and activities
2.3	A proficiency in the appropriate use of contemporary technologies.	Lab work	Lab exam
2.4	Skills of a high order in interpersonal understanding, teamwork, and communication.	Lab work Research activity Group project	Evaluation of students work and lab report
3.0	**Values**		
3.1	A commitment to the highest standards of professional effort and the ability to take a leadership role in the community.	Lectures Projects Lab experiments	Homework, Quiz Final and mid-term exam, assignments and class activities
3.2	An awareness of ethical, social, and cultural issues within a global context and their importance in the exercise of professional skills and responsibilities.	Lectures Projects Lab experiments	Homework, Quiz Final and mid-term exam, assignments and class activities
3.3	A commitment to continuous learning and the capacity to maintain intellectual curiosity throughout life.	Lectures Projects Lab experiments	Homework, Quiz Final and mid-term exam, assignments and class activities

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, problem sets, assignment	-	%10
2	Midterm exam (Theoretic)	6	%20
3	Mid Term Exam (practical)	6	%10
4	Final Practical Exam	11	%20
5	Final Exam	12	%40

***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 hrs. per week

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Molecular Biology: Principles of Genome Function, 2nd Edition, Craig et al., Oxford.
Essential References Materials	Molecular Biology, 5th Edition (or above), by Robert Weaver ISBN-13: 978-0073525327 ISBN-10: 0073525324
Electronic Materials	https://www.coursera.org/learn/Biology https://www.edx.org
Other Learning Materials	Handouts and Lecture notes Microsoft office package. Multi- media associated with the text book and the relevant websites.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• Classroom • Biology laboratory
Technology Resources (AV, data show, Smart Board, software, etc.)	• Data show
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Molecular biology techniques equipment (PCR, electrophoresis, UV-transilluminators)

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	
Reference No.	
Date	

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد NCAAA T4 2020

Course Specifications

Course Title:	Organic Chemistry
Course Code:	
Program:	BSc Biology (Zoology and Botany Tracks)
Department:	Biology Department
College:	Science
Institution:	Umm Al-Qura University

Table of Contents

A. Course Identification

1. Credit hours: 4hrs
2. Course type **a.** University [ ] College [ ] Department [√] Others [ ] **b.** Required [√] Elective [ ]
3. Level/year at which this course is offered: 1st Year/3rd Level
4. Pre-requisites for this course (if any)**:** **General Chemistry** 1st Year/1st Level
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**	20hrs
2	**Laboratory/Studio**	30hrs
3	**Tutorial**	--
4	**Others** (specify) office hours	40hrs
	Total	80hrs

B. Course Objectives and Learning Outcomes

1. Course Description

This course is designed to provide background in the fundamentals of nomenclature, mechanisms, structures, and synthesis of carbon-based compounds. This course is designed for biology and environmental science majors who desire a general rather than a detailed knowledge of the compounds of carbon.

2. Course Main Objective

By the end of this course student will be familiar with the basic principles of organic chemistry including nomenclature, physical, chemical properties, and preparations of different families of organic compounds and biomolecules in addition to an introduction to isomerism and stereochemistry.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Name and classify the organic compounds.	K1
1.2	Recognize the physical, chemical properties and applications of organic compounds.	K2
1.3	Explain the mechanism of reactions of organic compounds and their transformations based on the theoretical background.	K2
2	**Skills:**	
2.1	Apply the IUPAC rules for nomenclature of organic compounds.	S1
2.2	Predict the expected product and mechanism of different reactions of aliphatic compounds.	S2
2.3	Explain the different strategies for preparation of organic compounds.	S1
2.4	Practice chemical processes and techniques for identification and investigation of different classes of organic compounds.	S3
2.5	Use computers and internet to find all information related to organic biomolecules and their importance.	S3
3	**Values:**	
3.1	Write and present a chemical report related to the importance of organic compound.	V1
3.2	Work individually and in a team to perform a specific experiment or preparing a report on the environmental impact of organic compounds.	V2

C. Course Content

No	List of Topics	Contact Hours
1	Structure, bonding and reactivity in organic molecules.	2
2	Nomenclature, physical, chemical properties, and preparations of different classes of aliphatic and aromatic hydrocarbons and their biological importance.	4
3	Introduction to isomerism and stereochemistry.	2
4	Nomenclature, reactivity and used of organic halogen compounds.	4
5	Nomenclature, physical, chemical properties, and preparations of different families according to functional groups including alcohols, ethers, amines, carbonyl compounds, carboxylic acids and their derivatives	4
	Nomenclature, physical, chemical properties, and preparations of different families of biomolecules including carbohydrates, lipids, amino acids and proteins.	4
Total		20

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**		
1.1	Name and classify the organic compounds.	• Lectures	• Quiz. • Final and mid-term exam.
1.2	Recognize the physical, chemical properties and applications of organic compounds.	• Lectures • Lab work	• Quiz. • Final and mid-term exam. • Lab exam
1.3	Explain the mechanism of reactions of organic compounds and their transformations based on the theoretical background.	• Lectures	• Quiz. • Final and mid-term exam.
2.0	**Skills**		
2.1	Apply the IUPAC rules for nomenclature of organic compounds.	• Lectures • Web based study.	• Quiz. • Final and mid-term exam. • Assignments and activities
2.2	Predict the expected product and mechanism of different reactions of aliphatic compounds.	• Lectures	• Quiz. • Final and mid-term exam.
2.3	Explain the different strategies for preparation of organic compounds.	• Lectures	• Quiz. • Final and mid-term exam. • Lab exam
2.4	Practice chemical processes and techniques for identification and investigation of different classes of organic compounds.	• Lectures • Lab work	• Quiz. • Final and mid-term exam. • Lab exam
2.5	Use computers and internet to find all information related to organic biomolecules and their importance.	• Lectures • Web based study.	• Quiz. • Final and mid-term exam. • Assignments and activities
3.0	**Values**		
3.1	Write and present a chemical report related to the importance of organic compound.	• Lab work • Library visit.	• Quiz. • Lab report
3.2	Work individually and in a team to perform a specific experiment or preparing a report on the environmental impact of organic compounds.	• Lab work • Library visit.	• Assignments and activities

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework or activities.	--	10 %
2	First Periodic Exam.	6	20 %

#	Assessment task*	Week Due	Percentage of Total Assessment Score
3	Practical Exam.	11	30 %
4	Final Exam.	12	40 %
5	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 :

- We have faculty members to provide counselling and academic advice.
- 4 hours per week as office hours are available for discussion with the students.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• John McMurry's "Organic Chemistry, 8th edition, International Edition" 2011, Brooks/Cole. • Amit Arora "Introductory Organic Chemistry" 2006, Discovery Publishing House New Delhi • John McMurry's "Organic Chemistry, 8th edition, International Edition" 2011, Brooks/Cole. • T. W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder "Organic Chemistry, 11th Edition, International Student Version" 2013, John Wiley & Sons.
Essential References Materials	• Lecture Handouts available on the coordinator website
Electronic Materials	• http://www.chemweb.com • http://www.sciencedirect.com • http://www.rsc.org
Other Learning Materials	• Microsoft Power Point, Excel and Microsoft Word • Professional standards or regulations and software • Computer-based programs/CD

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• Classrooms capacity (30) students. • Providing hall of teaching aids including computers and projector.
Technology Resources (AV, data show, Smart Board, software, etc.)	• Room equipped with computer and projector and TV
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	------

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	Students	Indirect (Online survey at the end of the semester (Program survey, Experience survey &course evaluation) and graduates survey.
Effectiveness of teaching	Faculty members	Direct (classroom observation using the Teaching Observation Concepts and Teaching Observation Proforma
Achievement of course learning outcomes.	Faculty members	Direct (60% of the students achieved ≥ 70% of the degree assigned to the course learning outcome).
Assessment of faculty members	Department head	Direct (Performance Assessment of faculty Indirect (feedback from faculty and students).
Quality of learning resources	Students	Direct (feedback from faculty). Indirect (online survey at the end of the semester (Program survey, Experience survey & course evaluation) and graduates survey.
Effectiveness of teaching Strategies for Learning Outcomes.	Faculty members	Direct (Comments of course instructors regarding evaluation of teaching strategies for learning outcomes mentioned in course report).

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	
Reference No.	
Date	02.04.2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	Plant Biology
Course Code:	
Program:	BSc Biology (Zoology and Botany Tracks)
Department:	Biology Department
College:	Science
Institution:	Umm Al-Qura University

Table of Contents

A. Course Identification

1. Credit hours: 3hrs
2. Course type **a.** University ☐ College ☐ Department ■ Others ☐ **b.** Required ■ Elective ☐
3. Level/year at which this course is offered: 1st Year / 3rd Level
4. Pre-requisites for this course (if any)**:** General Biology 1st Year / 1st Level
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**	50	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20hrs
2	**Laboratory/Studio**	30hrs
3	**Tutorial**	-
4	**Others** (specify) Office hours	30hrs
	Total	80 hrs

B. Course Objectives and Learning Outcomes

1. Course Description

This course is an introductory plant biology course that focuses on plants and how they profoundly influence all life on Earth and present an in-depth overview of plant structure, function, development, ecology and evolution. The goals of this course are for students to understand what makes a plant a plant and to appreciate the ways in which plants make life possible for humans and life on Earth in general.

2. Course Main Objective

This course is designed to provide a foundation for more advanced courses in plant biology and related sciences. The main objective of this course is to introduce the student, who is majoring in biology, to comprehensive coverage of plant cells, organs, growth, reproduction, anatomy, morphology, taxonomy, genetics, and ecology.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	To introduce students to the basic features of plant cells with a specific emphasis on plant specific organelles, including an introduction to plant tissues.	K1, K2
1.2	Recognize the distinctive features of plants and be able to determine how a plant is constructed	K1, K2
1.3	Analyze how plants photosynthesize and generate energy and discuss ideas about how to improve or enhance this capacity;	K1, K2
1.4	Recognize the major groups of plants and assess their relationships	K1, K2
1.5	Describe the the movement of substances into and out of cells	K1, K2
2	**Skills :**	
2.1	Be able to describe the scientific method in plant biology.	S1, S2, S3
2.2	Understand how to grow plants and what their nutritional requirements.	S1, S2, S3
2.3	Identify several ways plants are used by people	S1, S2, S3
3	**Values:**	
3.1	Student will demonstrate critical thinking.	V1, V2
3.2	Student will demonstrate communication and teamwork skills.	V1, V2
3.3	Student will have personal responsibility in academic values.	V1

C. 1 Course Content

No	List of Topics	Contact Hours
1	General Introduction: What is a plant? What are the basic groups of plants? How do you recognize and describe plants? (Ch. 1, Ch. 12)	2
2	Plant organization: Cells (Ch. 3) - What features or structures are unique to plant cells? - What is endosymbiosis? - How does the cell wall allow materials to move in and out of cells?	2
3	Cell connections, communication, and chemistry: (Ch. 2, Ch. 4 pp. 82-90, pp. 497-498) - Are plants aggregations of cells or simply one much-compartmentalized cell? - What are the major compounds found in plants? - What is the difference between primary and secondary metabolites, and what are the functions of these compounds? - What is co-evolution?	2
4	Mitosis and cytokinesis in plants; begin Movement across membranes: (Ch. 3 pp. 62-74, Ch. 4 to p. 80) - Review mitosis and determine 2-3 ways plant cells differ from animal cells in structure or process during mitosis	2
5	Turgor, cell elongation, and cell differentiation: (Ch. 4, Ch. 22, Ch. 23) • Why is turgor so important in plants? • What are plasmodesmata and what is their importance? • What happens when a plant wilts?	2

6	**Building a plant/How plants work**: The primary plant body – roots, begin shoots (Ch. 24, Ch. 25 to p. 590) - What are the major cells and tissues in a root, a shoot? - How do they differ? - What are the major cells and tissues in a shoot, a leaf? - How do they differ? - Is a tree trunk a shoot? - leaves and reproductive structures - How are flowers and leaves similar?	2
7	Secondary growth (Ch. 26) - When does secondary growth occur? - Where in the plant does it occur? - What tissues are produced? - What is the significance of these tissues to plants? to humans?	2
8	Transport of water and photosynthate in plants (Ch. 30, Ch. 27, Ch. 28, pp. 604) - How do materials move around in plants? Begin Growth and Development: Hormones part 1 - What is a hormone? a plant growth regulator? - Do plants have glands? - What are some of the main controls of growth and development in plants? Hormones part 2; Light induced reactions - Define tropism, circadian rhythm, day-neutral before coming to class - What is the ABCDE model of flowering?	2
9	Growing plants well: plant nutrition and soils (Ch. 29) - Why is it important to have the correct type of soil when growing plants	2
10	Metabolism: Plants' major contribution to the biosphere (Photosynthesis) Ch. 5, Ch.7) - How do plants counteract the tendency toward entropy? - What is/are the essence(s) of the photosynthetic processes? C4, CAM, adaptations - How and to what are these types of photosynthesis adaptations?	2
Total		20

C. 2 Laboratory Content

No	LabTopics	Contact Hours
1	Arboretum visit- introduction to plants and plant parts	3
2	Plant Cells	3
3	Seeds and Seedlings	3
4	Roots and Shoots	3
5	Leaves, Inflorescences and Flowers	3
6	Secondary Tissues, Herbarium tour - what is an herbarium, how is it important to science and society?	3
7	Experiments in Water transport	3
8	Growth and Propagation	3

9	Final Project	3
10	Final Project	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**		
1.1	To introduce students to the basic features of plant cells with a specific emphasis on plant specific organelles, including an introduction to plant tissues.	Lectures	Homework, Quiz Final and mid-term exam
1.2	Recognize the distinctive features of plants and be able to determine how a plant is constructed	Lectures Lab experiments	Homework, Quiz Final and mid-term exam.
1.3	Analyze how plants photosynthesize and generate energy and discuss ideas about how to improve or enhance this capacity;	Lectures Projects Lab experiments	Homework, Quiz Final and mid-term exam, assignments and class activities
1.4	Recognize the major groups of plants and assess their relationships	Lectures Lab experiments	Homework, Quiz Final and mid-term exam, assignments and class activities
1.5	Describe the the movement of substances into and out of cells	Lectures Lab experiments	Homework, Quiz Final and mid-term exam, assignments and class activities
2.0	**Skills**		
2.1	Be able to describe the scientific method in plant biology.	Lab experiments	Homework, Quiz Final and mid-term exam, assignments and class activities
2.2	Understand how to grow plants and what their nutritional requirements.	Lectures Projects Lab experiments	Homework, Quiz Final and mid-term exam, assignments and class activities
2.3	Identify several ways plants are used by people		
2.4	Be able to describe the scientific method in plant biology.	Lectures Projects Lab experiments	Homework, Quiz Final and mid-term exam, assignments and class activities
3.0	**Values**		
3.1	Student will demonstrate critical thinking.	Lectures Projects Lab experiments	Homework, Quiz Final and mid-term exam, assignments and class activities

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
3.2	Student will demonstrate communication and teamwork skills.	Lectures Projects Lab experiments	Homework, Quiz Final and mid-term exam, assignments and class activities
3.3	Student will have personal responsibility in academic values.	Lectures Projects Lab experiments	Homework, Quiz Final and mid-term exam, assignments and class activities

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Project, Problem Sets	-	10%
2	Midterm Exam (Lab)	6	10%
3	Exam Midterm (Lecture)	6	20%
4	Final Exam (Lab)	11	20 %
5	Final Exam (Lecture)	12	40%
7	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:

- 3 Office Hours with course's instructor
- Academic Advisor

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• Raven's Biology of Plants, R. Evert, and S. Eichorn. 2013. 8th edition. Freeman and Worth, publishers. ISBN-13: 978-1464117800, ISBN-10: 1464117802 • Lab manual
Essential References Materials	Botany: An Introduction to Plant Biology, James D. Mauseth 7th Edition ISBN-13: 978-1284157352, ISBN-10: 1284157350
Electronic Materials	Multi- media associated with the textbook and the relevant websites.
Other Learning Materials	Reading assignments Handouts and Lecture notes

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms and laboratories
Technology Resources (AV, data show, Smart Board, software, etc.)	Data shows and computers in all classrooms and laboratories
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Plant samples, Laboratory instruments & equipment: centrifuge, pH meters, flasks, beakers, screw capped tubes, slides and tips and chemicals kits.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students	Direct
Extent of achievement of course learning outcomes	Course instructor Peer reviewer Program director	Direct
Quality of learning resources	Course instructor	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	
Reference No.	
Date	

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	Principles of Ecology
Course Code:	
Program:	BSc Biology (Zoology and Botany Tracks)
Department:	Biology Department
College:	Science
Institution:	Umm Al-Qura University

Table of Contents

A. Course Identification

1. Credit hours:	3hrs
2. Course type	
a.	University ☐ College ☐ Department ☒ Others ☐
b.	Required ☒ Elective ☐
3. Level/year at which this course is offered:	2nd Year / 5thLevel
4. Pre-requisites for this course (if any)**:**	Animal Biology (1st Year / 2nd Level) Plant Biology (1st Year / 3rd Level)
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**	80hrs	100 %
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20hrs
2	**Laboratory/Studio**	30hrs
3	**Tutorial**	-
4	**Others** (specify) office hours	30hrs
	Total	80hrs

B. Course Objectives and Learning Outcomes

1. Course Description

Introduction to ecology - its concept - field and relations to other sciences. The history and role of Arab and Muslim scientists in the field of ecology. The components of ecosystem, its types and changes. The distribution of organisms and their relationships within ecosystems. Scientific trips to different environmental areas of Saudi Arabia. The course is an introduction to the factors determining the distribution and patterns of abundance of organisms, and which relate plant and animal populations to their environment. It includes the physiological ecology of plants and animals, the life history strategies by which organisms adapt to their environments, trophic ecology and the ecological significance of the niche, biodiversity and co-existence. The course provides a comprehensive treatment of the subject from the first principles of ecology to a reflection of our understanding of ecology in the 21st century.

2. Course Main Objective

The main objective of this course is to introduce students to the concept of ecology, its divisions, and components and the relationships within the ecosystem, and the negative and positive role of man towards the environment.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Demonstrate a broad knowledge of the defining principles of ecology and understand the factors controlling the abundance and distribution of organisms globally.	K1, K2
1.2	Demonstrate a broad knowledge of the ecological theory explaining patterns of spatial and temporal variations in species numbers in both terrestrial and marine environments.	K1, K2
1.3	Understand and use introductory statistics; hypothesis testing, basic experimental design and field sampling.	K1, K2,K3
1.4	Carry out a scientific research project related to an ecological question: formulate clear, precise and potentially answerable questions, collect unbiased data and test hypotheses.	K3
2	**Skills :**	
2.1	Identify and clearly interpret key ecological processes at population, community and ecosystem levels.	S1, S2, S3
2.2	Relate ecological concepts to real-life field situations and environmental management.	S1, S2, S3
2.3	Determine methods of studying and measuring species behavior, interactions and dynamics; and	S2, S3
2.4	Critically examine conceptually complex ecological thought in both written and spoken form.	S3
3	**Values:**	
3.1	Knowing the importance of values: honesty, sincerity, loyalty and transparency in the scientific, practical and community life.	V1, V2, V3
3.2	Respecting and understanding the value of teamwork and working within the group.	V1, V2
3.3	Understand the value and importance of time and work. .	V1, V2

C. Course Content

No	List of Topics	Contact Hours
1	The nature of ecology	2
2	Functional Ecology	2
3	The physical and chemical environment	2
4	The organism and its environment	2
5	Population and community ecology	2
6	Metapopulation and metacommunity ecology	2
7	Biodiversity	2
8	Ecosystem ecology (decomposition, nutrient cycling, biogeochemistry)	2
9	Terrestrial, freshwater and marine ecosystems	2
10	Environmental pollution, Global change	2
Total		**20**

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**		
1.1	On completion of this course, the student will be able to: Demonstrate a broad knowledge of the defining principles of ecology and understand the factors controlling the abundance and distribution of organisms globally.	data show to explain the topics scheduled - Showing some documentaries that relate to course-identify. Lectures. Video tapes, CDs and DVDs (audiovisuals) .Assignments (essays and oral presentation).Tutorials. Accelerated learning (learning by fun). Mind maps. -The methodology includes a combination of lectures by the lecturer, seminar presentation by the students and web-interactions. - At the end of the programme, students will be divided into groups for seminar presentation on important areas of the course to assess their understanding and comprehension of the course. - All students will be involved in on-line learning process and each student is required to create an E-mail address to facilitate student web interactions. - Using images and movies	-Quarterly and final tests(objective tests and essay and oral). - Reports. - Projects. - Debates and questions.
1.2	Demonstrate a broad knowledge of the ecological theory explaining patterns of spatial and temporal variations in species numbers in both terrestrial and marine environments.		
1.3	Understand and use introductory statistics; hypothesis testing, basic experimental design and field sampling.		
1.4	Carry out a scientific research project related to an ecological question: formulate clear, precise and potentially answerable questions, collect unbiased data and test hypotheses.		
2.0	**Skills**		
2.1	The student will be able to: Identify and clearly interpret key	**Cognitive Skills:** Discussions and	- Quarterly periodic tests and final.

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	ecological processes at population, community and ecosystem levels.	periodic tests during the theoretical lectures - joint research work between the students and make some individual duties- Practical application of the topics scheduled in the lab – the periodic exams during practical lessons**.** Practical studies. Browsing in internet. Self-studies to be included in exams. Homework. Presentations by students. Lectures. **Interpersonal Skills and Responsibility:** Participate in groups to research work. The implementation of all of the students assigned to the tasks and duties during the theoretical and practical lessons**.** Oral presentation lecture about the project presented by students and discussed with them after distributing the students into groups to encourage the teamwork. - Full essay about the project, group work. **Numerical and Communication Skills:** Communication via the World Wide Web with the professor to present research and movies. The use of laboratory equipment. The use of different computer programs**.**	- Evaluation of short research - Evaluation of offers. - Required activities and duties -Giving additional marks for the students they have accurate laboratory results and good seminar presentation -Practical exam. -Semi- periodic examinations and productive discussions. -Assess the students in practical lessons. -Home business to assess and discuss the students. -Assess the skills of preparing research. -Evaluation of the students in the indirect decision of the syllabus.
2.2	Relate ecological concepts to real-life field situations and environmental management.		
2.3	Determine methods of studying and measuring species behaviour, interactions and dynamics; and		
2.4	Critically examine conceptually complex ecological thought in both written and spoken form.		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		Students are asked to prepare and present a lecture about subject related to the course using a power point programme. Students are asked to write a short essay about subject related to the course, which will encourage them to search for the knowledge in the proper references in form of (scientific books or journals and internet sites). - Lectures -Brain storming -Discussion. - Follow up students the students in lab and during carryout all the laboratory experiments	
3.0	**Values**		
3.1	Knowing the importance of values: honesty, sincerity, loyalty and transparency in the scientific, practical and community life.	giving students examples of the importance of these values and their role in strengthening relationships in scientific, practical and societal life	Observing students during work and dealing with each other and tests.
3.2	Respecting and understanding the value of teamwork and working within the group.	Distributing students into groups and emphasizing that teamwork gives better payoff from individual work and promotes progress	Observing students during work and dealing with each other and tests.
3.4	Understand the value and importance of time and work. .	Distributing students into groups and emphasizing that teamwork gives better payoff from individual work and promotes progress	Observing students while working in theoretical and practical groups

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Project, Problem Sets	-	10 %
2	Mid Term Exam (lecture)	6	20 %
3	Mid Term Exam (Lab)	6	10 %
4	Final Practical Exam	12	20 %
5	Final Exam	13	40 %
Total Marks			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 :

Faculty and teaching staff are always available for individual student counseling and academic advice.

-Course lecturers are happy to answer all students' quires during or after the lectures, and they can be reached by personal meeting or emails.

-All students have the e-mail of the course lecturer.

-Office hours for the course organizer and lecturer of the course are given to students, this is 3 hours per week.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Begon, M., Townsend, C. R. & Harper, J. L. (2006). Ecology (4th edn). Blackwell Science, Oxford
Essential References Materials	Townsend, C.R., Begon, M. and Harper, J.L. (2014). Essentials of Ecology (2nd Edition). Wiley. Grime, J. P., & Pierce, S. (2012). The evolutionary strategies that shape ecosystems. John Wiley & Sons. Molles, M. (2015). Ecology: concepts and applications. McGraw-Hill Education.
Electronic Materials	
Other Learning Materials	Power Point is of high scientific value and craftsmanship made by the lecturer

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms, laboratories
Technology Resources (AV, data show, Smart Board, software, etc.)	data show, Smart Board

Item	Resources
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	-Continuous Excitation Chlorophyll Fluorescence -Plant Canopy Analyzer -Digital Plant Moisture System -Portable Photosynthesis System IRGA and stomatal conductance -Weather station with below sensors

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching	Students	Direct
2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department	Instructor or by the Department	Direct
3. Processes for Improvement of Teaching: -Preparing the course as PPT. -Using scientific movies. -Coupling the theoretical part with laboratory part -Periodical revision of course content…. etc.	Students	Direct
4. Processes for Verifying Standards of Student Achievement	Peer Reviewer	Direct
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.	Program Leaders	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	
Reference No.	
Date	

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد NCAAA T4 2020

Course Specifications

Course Title:	**Animal Anatomy**
Course Code:	
Program:	**BCs. Biology (Zoology)**
Department:	**Biology**
College:	**Faculty of Sciences**
Institution:	**Umm Al-Qura University**

Table of Contents

A. Course Identification

1. Credit hours: 3 Credit
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: 3th Year / 7th Level
4. Pre-requisites for this course (if any)**: Animal biology**
5. Co-requisites for this course (if any)**: Non**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	30hrs	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20 hrs
2	**Laboratory/Studio**	30 hrs
3	**Tutorial**	-
4	**Others** (specify) / 4 office hrs / week	30 hrs
	Total	**70 hrs**

B. Course Objectives and Learning Outcomes

1. Course Description

This course will focusing on fundamental principles of animal structure. These principles will be illustrated by selected examples from both vertebrates and invertebrates. It includes general anatomical directions and nomenclature , anatomy of the Integumentary system.The methods used to anesthetize and kill animals.The general anatomical directions and nomenclature. Anatomy of the Integumentary system. Anatomy of the skeletal system. Anatomy of the muscular system. Anatomy of the cardiovascular system. Anatomy of the nervous system. Anatomy of the digestive system. Anatomy of the excretory system. Anatomy of the reproductive system (male + female). Anatomy of the endocrine system. Anatomy of the immune system.The laboratory portion of the course will be more “hands-on”. This will involve some inspection/dissection of specimens, based on anatomicaly-based “wet” and computer labs demonstrating animal structure.

2. Course Main Objective

Provide the students with anatomical terminology and principle information about the general anatomy and different developmental stages of domestic animals that will enable them to gain skills for comparative anatomy of the different body organs, beside it also provide the students with the basic information about the fowl and fish anatomy.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Anesthetise and kill animals for anatomical purposes.	K3
1.2	know the anatomical direction and terms.	K2
1.3	know anatomy of the different body systems in animals and human .	K3
1.4	Develop the anatomical drawing of body systems .	K3
1.5	know the characters and types of meristematic and permanent tisuues.	K2
2	**Skills :**	
2.1	Description of cognitive skills to be developed The ability to :	S1
2.2	To know anatomical characteristics of living organisms.	S2
2.3	To recognize an overview of the tissues anatomy.	S3
2.4	To refer different organs of different systems.	S3
2.5	To dissect experimental animals, and identify various systems.	S3
2.6	To know anatomical nomenclature and terms.	S1
2.7	To describe the disorders arise after any organ injury.	S2
2.8	To use computer and internet.	S3
3	**Values:**	
3.1	Developing oral presentations.	V1
3.2	Communicating personal ideas and thoughts.	V2
3.3	Work independently and as part of a team to finish some assignments.	V3
3.4	Communicate results of work to others	V3

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to the course • General anatomical directions and nomenclature.	3
2	Anatomy of the Integumentary system.	3
3	Anatomy of the skeletal system	3
4	Anatomy of the muscular system.	3
5	Anatomy of the cardiovascular system	3
6	Anatomy of the nervous system.	3
7	Anatomy of the digestive system	3
8	Anatomy of the excretory system	3
9	Anatomy of the reproductive system (male + female).	3
10	Anatomy of the endocrine system.	3
Total		**30 hrs**

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**		
1.1	Anesthetise and kill animals for anatomical purposes.	1. In-class lecturing where the previous knowledge is linked to the current and future topics. 2. Homework assignments. 3. Discussions (connecting what they learn in the class and applying this information in laboratory). 4. Handout of lecture notes for each topic.	1- homework and quizzes. 2- Midterm and final written exams (theoretical and practical). 3- Evaluation of reports. 4- Oral presentation. 5- Course work reports.
1.2	know the anatomical direction and terms.		
1.3	Anatomy of the different body systems in animals and human .		
1.4	Develop the anatomical drawing of body systems .		
1.5	know the characters and types of meristematic and permanent tisuues.		
2.0	**Skills**		
2.1	- To know anatomical characteristics of living organisms.	1- Application of essential scientific techniques through lectures, classes and essays. 2- Small group discussion. 3- Ask the students to make small search project during the semester. 4- Making connections between different topics across the course. 5- Class discussions (Engage students in interaction with questions and answers). 6- Homework assignments. 7- Use of microscopic illustrations. 8- Laboratory training. 9- Activities and homework 10- .	1- Evaluation of the topics prepared by students according to the content, arrangement, and covering of the topic. 2- Midterm and final exams. 3- Checking the homework assignments. 4- Course work reports.
2.2	- To recognize an overview of the tissues anatomy.		
2.3	- To refer different organs of different systems.		
2.4	- To dissect experimental animals, and identify various systems.		
2.5	- To know anatomical nomenclature and terms.		
2.6	- To describe the disorders arise after any organ injury.		
2.7	- To use computer and internet.		
3.0	**Values**		
3.1	- Developing oral presentations.	1- Engage student in carrying out internet search. 2- The ability to debate the scientific basis of physiological mechanisms of body systems. 3- Writing group reports. 4- Solving problems in groups during tutorial. 5- Checking the homework assignments in groups during discussion. 6- Cooperative learning and application of scientific method in thinking the scientific problem solving. 7- Work as part of a team.	1- Oral exams. 2- Evaluation of student essays assignments and search work. 3- Observation of student ethical and moral behavior. 4- Students' attendance is recorded during lectures. 5- Assessment of the student reports. 6- Grading homework assignments.
3.2	- Communicating personal ideas and thoughts.		
3.3	- Work independently and as part of a team to finish some assignments.		
3.4	- Communicate results of work to others		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		8- Conducting group experiments and writing group reports. Dividing students into groups to cooperate with each other during the experiments.	

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Periodical Exam(s)	3	10%
2	Mid Term Exam (Theoretic)	6	20%
3	Mid Term Exam (practical)	5	10%
4	Reports and essay	7	5%
5	Final Practical Exam	11	15%
6	Final Exam	12	40%
	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 :

- Four office hours per week

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	1. Handbook Of General Anatomy 6Ed (Pb 2020), by CHAURASIA B.D , CBS; 6th edition , ISBN-10 : 8194125413
Essential References Materials	2. Human Anatomy , 4 Volume Set , 1 January 2019, by Chaurasia , CBS Publishers & Distributors; 8th edition . 3. Hand book of Osteology , by S.Poddar (Author), AJAY BHAGAT (Author), scientific book company; FOURTEENTH EDITION (1 January 2018)
Electronic Materials	• Related web sites
Other Learning Materials	1. Handouts and Lecture notes 2. Microsoft office package. 3. Multi- media associated with the text book and the relevant websites.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	1. Lecture room suitable for 35 students equipped with a black board and Data show. 2. Dissecting tables and dissecting instruments 3. Instructors use their own laptop.

Item	Resources
Technology Resources (AV, data show, Smart Board, software, etc.)	1. Computers or internet connection. 2. Active Board. 3. Data show is required in every room.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	1. Anatomical Laboratory instruments & equipment 2. Related videos films

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching	Students	Questionnaires
2. Quality of learning resources	Staff and Students	Questionnaires

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	لجنة تحديث برنامج ألحياء – قسم ألحياء – كلية العلوم التطبيقية
Reference No.	
Date	02.04.2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	**Animal behavior**
Course Code:	
Program:	**BCs. Biology (Zoology)**
Department:	**Biology**
College:	**Faculty of Sciences**
Institution:	**Umm Al-Qura University**

Table of Contents

A. Course Identification

1. Credit hours: 3 Credits
2. Course type **a.** University ☐ College ☐ Department ■ Others ☐ **b.** Required ■ Elective ☐
3. Level/year at which this course is offered: 4th Year / 10th Level
4. Pre-requisites for this course (if any)**:** Animal Physiology
5. Co-requisites for this course (if any)**:** **NA**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	30 hrs	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20 hrs
2	**Laboratory/Studio**	30 hrs
3	**Tutorial**	-
4	**Others** (specify) / 4 office hrs / week	30 hrs
	Total	**80 hrs**

B. Course Objectives and Learning Outcomes

1. Course Description

Animal Behavior course look at the responses of animals to their environment from an evolutionary perspective: the course will demonstrate the questions "how did this behaviorevolve?" and "how does this behavior contribute to survival and reproduction?". In this course we will consider a wide variety of behaviors (group formation & social behavior, predator-prey interactions, foraging decisions, mate choice, parental care, life history strategies, territoriality, altruism) as the product of evolution.

2. Course Main Objective

1. To appreciate the interplay of genes, the developmental process, the nervous system, and the environment that produces behaviors.
2. To understand animal behaviors as adaptations that maximize the probability that an individual will survive and reproduce.
3. To apply Tinbergen's "four questions" to a variety of different behaviors.
4. To discover the role that behavioral flexibility plays in maximizing individual fitness.
5. To investigate hypothesis testing and experimental design in behavioral ecology.
6. To use our understanding of behavioral ecology to answer new questions.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	By the end of the course the student will be able to: Form hypotheses about how and why organisms display particular behaviors.	K1
1.2	Assess the influence of genetics and environment in the development and expression of behavior.	K2
1.3	Understand the relationship between hormones and behavior	K3
2	**Skills :**	
2.1	Make predictions about behavior based on information about an individual's environment.	S1
2.2	Depict the sensory world of a particular animal and explain how that sensory world shapes its behavior.	S2
2.3	Justification of the different behavior of the animal and its relationship to hormonal changes	S3
3	**Values:**	
3.1	Connect the outcomes of particular behaviors with survival and reproduction.	V1
3.2	Describe the experimental approaches and techniques used to study behavior.	V2
3.3	Dealing with animal behavioral changes on a scientific basis	V3

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to Animal Behavior and Development of Behavior/ Biological Rhythms	3
2	The Nervous System • How does the nervous system act to control behavior? • What are some ways that the nervous system can provide information about the environment? • How does the interaction between the nervous system and environmental cues produce behavior?	3
3	Behavioral Motivation and Organization • What factors motivate behavior? • How do biological clocks act to organize behavior? • How do environmental cues affect the organization of behavior?	3
4	The Development of Behavior • What role do genes play in determining behavior? • How do internal and external environments interact with genes to create behavior? • How are innate and learned behaviors different?	3
5	Communication and Social Behavior • How do animals share information?	3

	• What determines the kind of communication that can occur between individuals? • How does communication increase fitness?	
6	Foraging Behavior • What decisions do foraging animals make? • How do foraging animals maximize their food intake while minimizing other risks and costs? • How are models used to predict foraging behavior?	3
7	Predator-Prey Behaviors • What behaviors help prey avoid being predated? • What behaviors help predators catch prey? • How have prey and predator behaviors interacted throughout their evolution?	3
8	Reproductive Behavior • How do male and female mating strategies differ? • How do individuals choose their mates? • How does the environment influence the mating system of a particular species?	3
9	Cooperation and Altruism • Why is cooperative behavior an "evolutionary challenge"? • What behavioral adaptations allow for cooperation? • How do we determine whether behaviors are selfish or altruistic?	3
10	Hormones & Behavior	3
Total		**30 hrs**

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**		
1.1	Form hypotheses about how and why organisms display particular behaviors.	1. In-class lecturing where the previous knowledge is linked to the current and future topics. 2. Homework assignments. 3. Discussions (connecting what they learn in the class and applying this information in laboratory). 4. Handout of lecture notes for each topic.	1.homework and quizzes. 2.Midterm and final written exams (theoretical and practical). 3.Evaluation of reports. 4.Oral presentation. 5-Course work reports.
1.2	Assess the influence of genetics and environment in the development and expression of behavior.		
1.3	Understand the relationship between hormones and behavior		
2.0	**Skills**		
2.1	Make predictions about behavior based on information about an individual's environment.	1-Application of essential scientific techniques through lectures, classes and essays. 2-Small group discussion.	1-Evaluation of the topics prepared by students according to the content,
2.2	Depict the sensory world of a particular animal and explain		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	how that sensory world shapes its behavior.	3-Ask the students to make small search project during the semester. 4-Making connections between different topics across the course. 5-Class discussions (Engage students in interaction with questions and answers). 6-Homework assignments. 7-Use of microscopic illustrations. 8-Laboratory training. 9-Activities and homework.	arrangement, and covering of the topic. 2-Midterm and final exams. 3-Checking the homework assignments. 4-Course work reports.
2.3	Justification of the different behavior of the animal and its relationship to hormonal changes		
3.0	**Values**		
3.1	Connect the outcomes of particular behaviors with survival and reproduction.	1-Engage student in carrying out internet search. 2-The ability to debate the scientific basis of physiological mechanisms of body systems. 3-Writing group reports. 4-Solving problems in groups during tutorial. 5-Checking the homework assignments in groups during discussion. 6-Cooperative learning and application of scientific method in thinking the scientific problem solving. 7-Work as part of a team. 8-Conducting group experiments and writing group reports. Dividing students into groups to cooperate with each other during the experiments.	1-Oral exams. 2-Evaluation of student essays assignments and search work. 3-Observation of student ethical and moral behavior. 4-Students' attendance is recorded during lectures. 5-Assessment of the student reports. 6-Grading homework assignments.
3.2	Describe the experimental approaches and techniques used to study behavior.		
3.3	Dealing with animal behavioral changes on a scientific basis		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Project, Problem Sets	-	10%
2	Midterm Exam (Lab)	6	10%
3	Exam Midterm (Lecture)	6	20%
4	Final Exam (Lab)	11	20 %
5	Final Exam (Lecture)	12	40%
6	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 :

Teaching staff are available 1 hour / day, (Sun-Thu from 12:00 to 1:00 p.m)

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	1. Michael D. Breed, 2015 , Animal Behavior , Academic Press , ISBN 978-0128015322 2. Shawn Nordell,2017, Animal Behavior:Concepts,Methods, and Applications, Oxford University Press ,ISBN 978-0199737598
Essential References Materials	1.Crocker-Buta, S. P., & Leary, C. J. (2018). Hormonal and social correlates of courtship signal quality and behaviour in male green treefrogs. Anim Behav, 146, 13-22.
Electronic Materials	https://avsab.org/
Other Learning Materials	1.Handouts and Lecture notes 2.Microsoft office package. 3.Multi- media associated with the text book and the relevant websites.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	1.Lecture room suitable for 35 students. 2.Lecture room equipped with a interactive board and Data show. 3.Instructors use their own laptop.
Technology Resources (AV, data show, Smart Board, software, etc.)	AV, data show, Smart Board, software
Other Resources	Related videos films

Item	Resources
(Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching	Students	Questionnaires
2. Quality of learning resources	Staff and Students	Questionnaires
3. Degree of conviction and application efficiency	Staff , Students , related persons	Questionnaires

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	لجنة تحديث برنامج الأحياء – قسم الأحياء – كلية العلوم التطبيقية
Reference No.	
Date	02.04.2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	**Animal physiology**
Course Code:	
Program:	**BCs. Biology (Zoology)**
Department:	**Biology**
College:	**Faculty of Sciences**
Institution:	**Umm Al-Qura University**

Table of Contents

A. Course Identification

1. Credit hours: 3 Credit
2. Course type **a.** University ☐ College ☐ Department ■ Others ☐ **b.** Required ■ Elective ☐
3. Level/year at which this course is offered: 3th Year / 7th Level
4. Pre-requisites for this course (if any)**: Animal Biology**
5. Co-requisites for this course (if any)**:Non**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	30 hrs	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20 hrs
2	**Laboratory/Studio**	30 hrs
3	**Tutorial**	-
4	**Others** (specify) / 4 office hrs / week	30 hrs
	Total	**80 hrs**

B. Course Objectives and Learning Outcomes

1. Course Description

This course introduces students to the complexity of organisms by studying how their different organ systems strive to maintain internal homeostasis in the face of different environmental demands. Some of the topics to be covered include coordinated body functions (circulation, respiration,osmoregulation, digestion , muscles and locomotion). All systems studied will be integrated by analyzing how different organisms adapt to living in normal and extreme environments (deserts, high altitude).

2. Course Main Objective

1. Simplify the science of physiology starting from the basic vocabulary of physiology.
2. Studying the molecular, cellular, tissue, organ, organ system and organismal levels of structure and function for all organ systems.
3. Interpret the interplay between different organ systems and cellular responses to environmental change.
4. Analyze the interrelationships of body organ systems, homeostasis, and the complementarity of structure and function as they relate to the integumentary, musculoskeletal, nervous and endocrine systems.
5. Synthesize information, think independently and reason through new material in a way that not only reflects facts learned about a particular topic but also an understanding of the overall structure and function of the body organ systems.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Explore the functions of the human body emphasizing homeostasis at biochemical, cellular, organ, and system levels.	K1
1.2	understanding the main physiological processes concerned with different systems that how these systems co -operate to maintain our body stability	K2
1.3	Apply these basic physiological principles to strategies for the solution of current and emerging relevant environmental issues.	K3
1.4	Identify and explain the basic physiological processes (e.g., energetics, thermoregulation, sensory systems) that allow animals to survive in different habitats	K2
2	**Skills :**	
2.1	Explain and discuss the significance of these principles in interaction with a broad spectrum of public health professionals	S1
2.2	Use and discuss of functional principles at cellular and organ levels to describe the concepts of integrated systems physiology in animals.	S2
2.3	Apply the scientific method to studies of animal physiology by conceiving and designing an experimental approach for studying specific physiological processes	S3
2.4	Improve scientific literacy by critically evaluating scientific literature and articulating the key questions, hypotheses, methods, results, and conclusions	S3
3	**Values:**	
3.1	Evaluate and compare different approaches for applying physiological principles to practical applications in the lab and field to answer physiological questions (e.g., guest lectures)	V1
3.2	Collaborate with peers to communicate and share scientific ideas using appropriate scientific language	V2
3.3	Connect physiological principles to other scientific disciplines (e.g., ecology, behavior, morphology)	V3
3.4	Develop learning strategies for mastering scientific principles that can be applied to other classes and contexts	V3

C. Course Content

No	List of Topics	Contact Hours
1	**Introduction to Physiology:** ▪ Homeostasis. ▪ Negative and positive Feedback System.	3
2	▪ Body Fluids and Compartments ▪ Organ Systems of the Human Body	3
3	**Digestive System:** ▪ Functions of associated organs of alimentary canal. ▪ Digestion in mouth, stomach small intestine, large intestine. ▪ Metabolism of carbohydrate, protein & fat.	3
4	**Cardiovascular System** ▪ Function of Heart. ▪ Types of blood vessels ▪ Blood circulations (systemic & pulmonary) ▪ Physiology of circulation. ▪ Function of capillaries (Capillary exchange mechanism).	3
5	**Blood (Plasma , RBCs, WBCs and Platelets).** ▪ Formation of blood ▪ Components of blood. ▪ Functions of blood. ▪ Functions of components. **Erythrocytes:** ▪ Functions of RBCs count &life span. ▪ Hemoglobin & its function.	3
6	**Leucocytes:** ▪ Functions of WBCs. ▪ Count & life span. **Platelets:** ▪ Functions of platelets ▪ Total count &life span **Blood Grouping**	3
7	**Respiratory System:** ▪ Mechanism of Breathing. ▪ Internal & external Respiration ▪ Respiratory Membrane. ▪ Respiratory volumes & capacities. ▪ Control of Respiration. ▪ Chemical regulation of respiration..	3
8	**Muscular System (Nerve & Muscle):** ▪ Nerve, stimuli, impulse definition & mechanism. ▪ membrane potential briefly function of neuron & neuroglia. ▪ Physiology of Muscle Contraction ▪ Types of Muscle. ▪ Neuromuscular transmission.	3
9	**Urinary System:** ▪ Main components of urinary system ▪ Function of kidneys. ▪ Nephrons	3

	▪ Process of urine formation & composition of urine. ▪ Regulation of blood pH. ▪ Hormonal regulation of kidneys.	
10	**Reproductive System.** ▪ function of reproductive organs ▪ Mechanism of formation of sperm and ova. ▪ Ovarian cycle hormones & its relationship with menstrual Cycle.	3
Total		**30 hrs**

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**		
1.1	Explore the functions of the human body emphasizing homeostasis at biochemical, cellular, organ, and system levels.	1. **In-class lecturing** where the previous knowledge is linked to the current and future topics. 2. **Homework assignments**. 3. **Discussions** (connecting what they learn in the class and applying this information in laboratory). 4. **Handout of lecture** notes for each topic.	1- homework and quizzes. 2- Midterm and final written exams (theoretical and practical). 3- Evaluation of reports. 4-Oral presentation. 5-Course work reports.
1.2	understanding the main physiological processes concerned with different systems that how these systems co -operate to maintain our body stability		
1.3	Apply these basic physiological principles to strategies for the solution of current and emerging relevant environmental issues.		
1.4	Identify and explain the basic physiological processes (e.g., energetics, thermoregulation, sensory systems) that allow animals to survive in different habitats		
2.0	**Skills**		
2.1	Explain and discuss the significance of these principles in interaction with a broad spectrum of public health professionals	1- Application of essential scientific techniques through lectures, classes and essays. 2- Small group discussion. 3-Ask the students to make small search project during the semester. 4- Making connections between different topics across the course. 5- Class discussions (Engage students in interaction with questions and answers). 6- Homework assignments. 7-Use of microscopic illustrations. 8- Laboratory training. 9- Activities and homework.	1- Evaluation of the topics prepared by students according to the content, arrangement, and covering of the topic. 2- Midterm and final exams. 3- Checking the homework assignments. 4- Course work reports.
2.2	Use and discuss of functional principles at cellular and organ levels to describe the concepts of integrated systems physiology in animals.		
2.3	Apply the scientific method to studies of animal physiology by conceiving and designing an experimental approach for studying specific physiological processes		
2.4	Improve scientific literacy by critically evaluating scientific literature and articulating the key questions, hypotheses, methods, results, and conclusions		
3.0	**Values**		
3.1	Evaluate and compare different approaches for applying physiological principles to practical applications in the lab and field to		1- Oral exams. 2- Evaluation of student essays assignments and search work.

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	answer physiological questions (e.g., guest lectures)	1-Engage student in carrying out internet search. 2-The ability to debate the scientific basis of neural mechanisms of body systems. 3-Writing group reports. 4-Solving problems in groups during tutorial. 5-Checking the homework assignments in groups during discussion. 6-Cooperative learning and application of scientific method in thinking the scientific problem solving. 7-Work as part of a team. 8-Conducting group experiments and writing group reports. 9.Dividing students into groups to cooperate with each other during the experiments.	3-Observation of student ethical and moral behavior. 4-Students' attendance is recorded during lectures. 5-Assessment of the student reports. 6-Grading homework assignments.
3.2	Collaborate with peers to communicate and share scientific ideas using appropriate scientific language		
3.3	Connect physiological principles to other scientific disciplines (e.g., ecology, behavior, morphology)		
3.4	Develop learning strategies for mastering scientific principles that can be applied to other classes and contexts		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Project, Problem Sets	-	10%
2	Midterm Exam (Lab)	6	10%
3	Exam Midterm (Lecture)	6	20%
4	Final Exam (Lab)	11	20 %
5	Final Exam (Lecture)	12	40%
6	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/week

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	1. **Introduction to Animal Physiology**, by Ian Kay, CRC Press; **2020,** ISBN: 9781000102284 2. **Animal Physiology** , **2019**, by N Arumugam (Author), A Mariakuttikan (Author), Saras Publication; 12th edition (1 January 2019), ISBN-10 : 9386519577
Essential References Materials	1. **Principles of Animal Physiology**, **2016**,by Moyes/Schulte (Author), Pearson Education India; Second edition (29 July 2016), ISBN-10 : 9332577471
Electronic Materials	▪ https://www.nature.com/subjects/animal-physiology
Other Learning Materials	▪ Computer-based programs/CD, ▪ Professional standards or regulations and software.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms, laboratories, demonstration rooms/labs, etc.)
Technology Resources (AV, data show, Smart Board, software, etc.)	All classrooms and laboratories are equipped with data show and Smart Board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	1.Handouts and Lecture notes 2.Microsoft office package. 3.Multi- media associated with the text book and the relevant websites.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching	Students	Questionnaires
2. Quality of learning resources	Staff and Students	Questionnaires
3. Processes for Improvement of Teaching	Students	Questionnaires
4. Processes for Verifying Standards of Student Achievement	independent member teaching staff	check marking of a sample of student work or a sample of assignments .

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	لجنة تحديث برنامج الأحياء – قسم الأحياء – كلية العلوم التطبيقية
Reference No.	
Date	02.04.2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	**Animal Taxonomy and Fauna**
Course Code:	
Program:	**BCs. Biology (Zoology)**
Department:	**Biology**
College:	**Faculty of Science**
Institution:	**Umm Al-Qura university**

Table of Contents

A. Course Identification

1. Credit hours:	**3 Credits**
2. Course type	
a.	University ☐ College ☐ Department ■ Others ☐
b.	Required ■ Elective ☐
3. Level/year at which this course is offered:	3th Year / 8th Level
4. Pre-requisites for this course (if any)**:**	Animal anatomy
5. Co-requisites for this course (if any)**:**	None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	30 hrs	80%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	20 hrs	20%

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20 hrs
2	**Laboratory/Studio**	30 hrs
3	**Tutorial**	-
4	**Others** (specify) / 4 offfice hrs / week	30 hrs
	Total	**80 hrs**

B. Course Objectives and Learning Outcomes

1. Course Description

The course is described based on coverage of the following topics: The course gives the student a clear idea about the wildlife of most wild animals including marine animals and birds in Saudi Arabia, and ability to adapt to different environments in the Kingdom, with special emphasis on the external characteristics of these animals and breeding periods and seasons.

2. Course Main Objective

After completing this course, students should be able to:

- Define the principles and concepts of biodiversity (representative marine and terrestrial species).
- Surveys the deferent ecosystems, habitats, distribution within the wildlife, endemic and endangered species in the western region of Saudi Arabia.
- Students will learn applied techniques through a combination of lectures, labs, and field trips.

- Students will collect and describe the morphological and morphometric parameters of the collected samples belonging to different animal families to design simple identification key to classify the collecting samples.
- Consideration of biological taxonomic systems and consideration of both vegetative features and reproductive features associated with local fauna.
- Students will train to work in team and gain experience about collection skills, using traps and other tools during collection.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and understanding**	
1.1	Identify the unknown species using morphological characters and the main taxonomic basis that studied in previous courses (invertebrate and vertebrate).	K1
1.2	Employ recent communication and information technologies effectively in different tasks related to animal ecology.	K1
1.3	Learn the morphological and specific internal structures the different species that collected or observed in different Saudi a habitats.	K1
1.4	Distinguish the diversity and distribution of obtained species in their habitats. Then Be aware about the proper and applied ways deal with the sample collection from terrestrial and aquatic environments.	K1, K2
1.5	Be able to clearly and concisely speak about and write about the morphological, morphometric parameters to identify the proper classification of the collected species, in addition, comments, record and describe specific internal structures (palatal and pharyngeal teeth, gill rakers, swim bladder, stomach and intestinal food) to know their habitat, types and nature of their food.	K1, K2 & K3
1.6	Learn how to Apply or design and identification key for orders, families or species diversity, as well as, interpret and discuss the obtained data as presentation.	K2 & K3
1.7	Draw the collected species and write the specific terms and measurements for each body region to calculate the mean organ-somatic indices for the collected samples such as: diameter of eye wings, legs, bills or the diameter of ear opening and total body length. In special cases, it is necessary to investigate and describe some anatomical structure that help in classification.	K2 & K3
1.8	Comprehend the methods and application of collection and record distribution map of collected sample for each habitat.	K2 & K3
1.9	Enumerate the characteristics of different wild or aquatic habitats in Arabian Peninsula.	K1
2	**Skills:**	
2.1	**Cognitive Skills:** - Using the morphology and morphometric to diagnose the systematic position of collected samples. - Identify collecting samples according to the published keys of vertebrate classes, orders and families, then use the to develop a special key for Arabian species. - Distinguish the common characters of orders, families and species and apply them to configure an accurate key to orders, families or	S1, S2, & S3

CLOs		Aligned PLOs
	species represented in an ecosystem. - Define the distribution of different samples in their habitat. - Apply a strategy to study animal fauna of local regions. - Employ recent communication and information technologies effectively to investigate biodiversity in local habitat of Makkah regions. - Discuss the distribution and relationships between animal fauna and their environments. - Team work activities: Draw, Describe the collected, then discuss this field work as a presentation activity. - Use the personal skills, tools and traps to collect terrestrial or aquatic samples.	
2.2	**Interpersonal Skills and Responsibility:** At the end of the course, the student will be able to: - Be involved in self-directed learning. - Succeed in team Works. - Share and discuss results with others. - Be involved in a simple research project. - Evaluate answers and positively criticize them.	S1, S2, & S3
2.3	**Communication, Information Technology and Numerical Skill** The student can propose solutions to some problems**:** - Use information and communication technology. - Use IT and communication technology in gathering and interpreting information and ideas. - Use the internet as a means of communication and a source of information. - Encourage students to use internet for searching certain electronic journals regarding topics of the course. - Scientific writing. - Use his/her observations to solve problems. - Doing research and conduct searches for restoring information. - Able to calculate and discuss the facts and logical propose methods to solve the difficulties.	S1, S2, & S3
2.4	**Psychomotor Skills (if applicable)** -Enhancing the ability of students to use computers and internet to prepare a research article. - Interpret the laboratory data**.**	S1, S2, & S3
3	**Values:**	
3.1	Developing oral presentations.	V3
3.2	Communicating personal ideas and thoughts.	V1
3.3	Work independently and as part of a team to finish some assignments.	V2
3.4	Communicate results of work to others.	V1 &V3

C. Course Content

No	List of Topics	Contact Hours
1	-The concept of biodiversity. The study of the topography, the climate and site of geographical. - Animal species of KSA in terms of their characteristics, geographic distribution and densities.	3
2	A brief summary to explain the basic fauna and rare animals that resident and migratory, exotic and endangered.	3
3	Morphology of representative marine fauna, in term of special structure that will be used to classify the obtained species form field. Field trip to collect marine fauna during weak end.	3
4	How to design simple identification key to identify marine fauna. Apply key steps to classify the collected species.	3
5	Morphology of representative terrestrial invertebrate fauna, in term of special structure that will be used to classify the obtained species form field.	3
6	***Mid-Term Exam.***	
7	How to design simple identification key for terrestrial invertebrate fauna. Apply key steps to classify the collected species.	3
8	Morphology of representative vertebrate fauna, in term of special structure that will be used to classify the obtained species form field. Field trip 2 during the week end.	3
9	How to design simple identification key for Arabian vertebrate fauna. Apply key steps to classify the collected species.	3
10	How to design and apply keys to orders of Arabian Fishes, amphibians	3
11	How to design and apply keys to orders of Arabian reptiles, birds and mammals.	3
12	***Final Examination.***	
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**		
1.1	Identify the unknown species using morphological characters and the main taxonomic basis that studied in previous courses (invertebrate and vertebrate).	1. Lectures and student research papers. 2. The using of visual display such as PowerPoint. 3. Homework assignments.	- Homework and Quizzes. - Midterm and final written exams. - Evaluation of reports.
1.2	Employ recent communication and information technologies effectively in different tasks related to animal ecology.		
1.3	Learn the morphological and specific internal structures the different species		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	that collected or observed in different Saudi a habitats.	Discussions (connecting what they learn in the class and applying this information in laboratory).	- Group discussions and participation in the lecture. Course work reports.
1.4	Distinguish the diversity and distribution of obtained species in their habitats. Then Be aware about the proper and applied ways deal with the sample collection from terrestrial and aquatic environments.		
1.5	Be able to clearly and concisely speak about and write about the morphological, morphometric parameters to identify the proper classification of the collected species, in addition, comments, record and describe specific internal structures (palatal and pharyngeal teeth, gill slits, swim bladder, stomach and intestinal food) to know their habitat, types and nature of their food.		
1.6	Learn how to Apply or design and identification key for orders, families or species diversity, as well as, interpret and discuss the obtained data as presentation.		
1.7	Draw the collected species and write the specific terms and measurements for each body region to calculate the mean organo-somatic indices for the collected samples such as: diameter of eye wings, legs, bills or the diameter of ear opening and total body length. In special cases, it is necessary to investigate and describe some anatomical structure that help in classification.		
1.8	Comprehend the methods and application of collection and record distribution map of collected sample for each habitat.		
1.9	Enumerate the characteristics of different wild or aquatic habitats in Arabian Peninsula.		
2.0	**Skills**		
2.1	**Cognitive Skills** -The ability to know the general characteristics of marine vital areas. -The ability to be aware of the environmental factors - chemical,	1. Interactive lectures. 2. Seminars.	- Exam must contain questions that can measure these skills. - Quiz and exams.

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	physical and biological - which affect the marine environment. -The ability to be aware of nektonic and benthic communities in the marine environment. -The ability to understand the interrelationships between animals and the marine environment -The ability to identify and classify marine organisms. -The ability to know the equipment used in collecting the local marine fauna. -Ability to evaluate field trips and related experiences. -The ability to comprehend the economic importance of the natural resources of the sea. -The ability to develop an understanding of the human impact on the balance of nature in marine environments.	3. Participation of students in discussions during the lecture. 4. Trying to explain the issues in regular and motivated manner. Follow up the students in lab and during carryout all analytical techniques.	- Discussions after the lecture. Practical exam.
2.2	**Interpersonal Skills & Responsibility** Tackle sufficient practical skills appropriate to the discipline under study to ensure competence.	- Lecture and Assignments.	-Quizzes Student evaluation by teacher.
2.3	**Communication, Information Technology, Numerical** - Employ the internet and electronic databases as a source of information and a mean of communication.	Lecture , Assignments and group discussions.	-Evaluating the problems solutions. -Evaluating the oral discussions in the class. -Assessment the laboratory written reports and presentation.
2.4	**Psychomotor:** -Enhancing the ability of students to use computers and internet to prepare a research article. - Interpret the laboratory data**.**	-Follow up students the students in lab and during carryout all the laboratory experiments	-Evaluating the laboratory written reports. -Evaluating the community participation.
3.0	**Values**		
3.1	- Use information and communication technology.	-Oral presentations. -Internet search assignments and essays. -Incorporating the use	-Evaluation of student essays and assignments. -Marks given to for good reports and
3.2	-Use IT and communication technology in gathering and interpreting information and ideas.		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
3.3	-Use the internet as a means of communication and a source of information.	and utilization of computer in the course requirements. -Students will be asked for delivering a summary regarding certain topics related to the course.	presentations -Evaluating during the discussion in lecture and reports. -Part of the grad is put for student's written participation.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Project, Problem Sets	-	10%
2	Midterm Exam (Lab)	6	10%
3	Exam Midterm (Lecture)	6	20%
4	Final Exam (Lab)	11	20 %
5	Final Exam (Lecture)	12	40%
6	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:

Teaching staff are available 1 hour / day, (Sun-Thu from 12:00 to 1:00 p.m)

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	1-Adnan Mohamed Haji ,Introduction to the fauna of Saudi Arabia, Al Safa Press, 1413 AH. 2 -A series of folders fauna of Saudi Arabia, Meteorology and Environmental Protection, Ministry of Defence and Aviation. 3 -Nabil Zaki Zahid, Khaled Bakr Kamal, and Gerald Groemer, General Zoology , vertebrate and invertebrate ,1426 4- Mohammad Hassan Hamoud, ,Vertebrate Biology: the national center of publication and distribution, Jordan
Essential References Materials	
Electronic Materials	Scientific search engines on the internet.
Other Learning Materials	Web sites, U Tubes. Scientific videos and films.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• Class rooms are already provided with data show. • Laboratory necessity. • Reduce the number of students in class rooms. • Computer laboratory might be used for software applications (homework's and design problem).
Technology Resources (AV, data show, Smart Board, software, etc.)	A combination of white board use, hand-outs, PowerPoint slide presentations, and interactive class discussions will be used. Open discussions are favored as they encourage students to participate and exchange and enhance the overall learning process.
Other Resources (Specify, e.g., if specific laboratory equipment is required, list requirements or attach a list)	- Microscopes - Animal dissection tools - Animal dissection board - Microscope slides and strips - Alcohol, formaldehyde and cotton - A site visit may be arranged during the course.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
-Strategies for Obtaining student feedback on Effectiveness of teaching.	-The instructor or by the department.	Distribution of questionnaires for course evaluation by students. Students- faculty meetings.
- Other Strategies for Evaluation of teaching.	- The instructor or by the department.	-Data show is required in every room. -Smart Board departmental plan committee. -Peer consultation by departmental specialized committee. -Self-evaluation of the program by the departmental studying plan committee.

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	لجنة تحديث برنامج الأحياء – قسم الأحياء – كلية العلوم التطبيقية
Reference No.	
Date	02.04.2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	**Animal Tissue Culture**
Course Code:	
Program:	**Biology (Zoology)**
Department:	**Biology**
College:	**Faculty of Sciences**
Institution:	**Umm Al-Qura University**

Table of Contents

A. Course Identification

1. Credit hours: 3 Credits
2. Course type **a.** University ☐ College ☐ Department ■ Others ☐ **b.** Required ■ Elective ☐
3. Level/year at which this course is offered: 4th Year / 12th Level
4. Pre-requisites for this course (if any)**:** Applied Animal Biotechnology
5. Co-requisites for this course (if any)**:** None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	30 hrs	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20 hrs
2	**Laboratory/Studio**	30 hrs
3	**Tutorial**	-
4	**Others** (specify) / 4 office hrs / week	30 hrs
	Total	**80 hrs**

B. Course Objectives and Learning Outcomes

1. Course Description

This course provides students with the skills and knowledge to work in a modern biological research laboratory making use of cell culture techniques. Emphasis is placed on aseptic techniques for animal cell culture, the requirements for cell growth in vitro, mechanisms underlying cellular differentiation, immunohistochemistry and in situ hybridization, and the expression of transfected DNA in cultured animal cells.

2. Course Main Objective

Upon completion of course students will acquire the following :

1. Understand and demonstrate sterile techniques in tissue culturing
2. Be able to culture on a long term basis primary and secondary cells
3. Carry out primary literature searches, read critically scientific articles relating to tissue culturing
4. Be able to apply tissue culture techniques in different fields of biology.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Learn basic techniques and applications of cell culture for biotechnology.	K1
1.2	Understand the biology of cultured cells and its application in biotechnology.	K2
1.3	Learn the application of equipment, lab design and lay out, aseptic technique, and safety.	K3
1.4	Learn the Contamination, cytotoxicity, and cyropreservation.	K2
2	**Skills :**	
2.1	Able for Preparation and sterilization of lab equipment, culture vessels, and media.	S1
2.2	Able for Culture of cell lines and primary cell culture and quantitation of cells.	S2
2.3	Able for Cell separation, selection, and cloning.	S3
2.4	Able for Characterization, differentiation and transformation of cells.	S3
3	**Values:**	
3.1	Able to apply tissue culture techniques in different fields of biology	V1
3.2	Carry out primary literature searches, read critically scientific articles relating to tissue culturing	V2
3.3	Problem solving	V3
3.4	Able to work in team	V3

C. Course Content

No	List of Topics	Contact Hours
1	Introduction: Background and advantages of cell and tissue culture, and biology of cultured cells	3
2	Cell culture media and requirements	3
3	Serum-free media	3
4	Primary Cell culture	3
5	Subculture and Cell lines	3
6	Cell separation and characterization	3
7	Cloning and Selection	3
8	Cell Differentiation	3
9	Transformation, immortalization, contamination and cryopreservation	3
10	Cell Quantitation	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**		
1.1	Learn basic techniques and applications of cell culture for biotechnology.	1.In-class lecturing where the previous knowledge is linked to the current and future topics. 2.Homework assignments. 3.Discussions (connecting what they learn in the class and applying this information in laboratory). 4.Handout of lecture notes for each topic.	1-homework and quizzes. 2-Midterm and final written exams (theoretical and practical). 3-Evaluation of reports. 4-Oral presentation. 5-Course work reports.
1.2	Understand the biology of cultured cells and its application in biotechnology.		
1.3	Learn the application of equipment, lab design and lay out, aseptic technique, and safety.		
1.4	Learn the Contamination, cytotoxicity, and cyropreservation.		
2.0	**Skills**		
2.1	Able for Preparation and sterilization of lab equipment, culture vessels, and media.	1-Application of essential scientific techniques through lectures, classes and essays. 2-Small group discussion. 3-Ask the students to make small search project during the semester. 4-Making connections between different topics across the course. 5-Class discussions (Engage students in interaction with questions and answers). 6-Homework assignments. 7-Use of microscopic illustrations. 8-Laboratory training. 9-Activities and homework.	1-Evaluation of the topics prepared by students according to the content, arrangement, and covering of the topic. 2-Midterm and final exams. 3-Checking the homework assignments. 4-Course work reports.
2.2	Able for Culture of cell lines and primary cell culture and quantitation of cells.		
2.3	Able for Cell separation, selection, and cloning.		
2.4	Able for Characterization, differentiation and transformation of cells.		
3.0	**Values**		
3.1	Able to apply tissue culture techniques in different fields of biology	1-Engage student in carrying out internet search.	1-Oral exams. 2-Evaluation of student essays assignments and search work.
3.2	Carry out primary literature searches, read critically		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	scientific articles relating to tissue culturing	2-The ability to debate the scientific basis of neural mechanisms of body systems. 3-Writing group reports. 4-Solving problems in groups during tutorial. 5-Checking the homework assignments in groups during discussion. 6-Cooperative learning and application of scientific method in thinking the scientific problem solving. 7-Work as part of a team. 8-Conducting group experiments and writing group reports. 9.Dividing students into groups to cooperate with each other during the experiments.	3-Observation of student ethical and moral behavior. 4-Students' attendance is recorded during lectures. 5-Assessment of the student reports. 6-Grading homework assignments.
3.3	Problem solving		
3.4	Able to work in team		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Project, Problem Sets	-	10%
2	Midterm Exam (Lab)	6	10%
3	Exam Midterm (Lecture)	6	20%
4	Final Exam (Lab)	11	20 %
5	Final Exam (Lecture)	12	40%
6	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 :

Teaching staff are available 1 hour / day, (Sun-Thu from 12:00 to 1:00 p.m)

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	1. **Animal Tissue Culture** , 2011, by A Wilson Aruni (Author), P Ramadass (Author) , MJP Publishers, ISBN-13 : 978-8180940569 2. **Animal Cell Culture** ,2014, by Mohamed Al-Rubeai , Springer, Cham , ISBN978-3-319-10320-4

Essential References Materials	1. **Principles and Practice of Animal Tissue Culture** , 2010,by Sudha Gangal (Author), Orient Black Swan; Second 2nd Edition, ISBN-10 : 8173717192
Electronic Materials	https://link.springer.com/book/10.1007/978-3-319-10320-4 https://www.sigmaaldrich.com/SA/en/products/cell-culture-and-analysis
Other Learning Materials	▪ Computer-based programs/CD, ▪ Professional standards or regulations and software.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	▪ Classrooms ,Tissue culture laboratories, demonstration rooms/labs, etc.)
Technology Resources (AV, data show, Smart Board, software, etc.)	▪ All classrooms and laboratories are equipped with data show and Smart Board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	1.Handouts and Lecture notes 2.Microsoft office package. 3.Multi- media associated with the text book and the relevant websites.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching	Students	Questionnaires
2. Quality of learning resources	Staff and Students	Questionnaires
3. Processes for Improvement of Teaching	Students	Questionnaires
4. Processes for Verifying Standards of Student Achievement	independent member teaching staff	check marking of a sample of student work or a sample of assignments .

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	لجنة تحديث برنامج الأحياء – قسم الأحياء – كلية العلوم التطبيقية
Reference No.	
Date	02.04.2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	**Applied Animal Biotechnology**
Course Code:	
Program:	**B.Sc. Biology (Zoology track)**
Department:	**Biology**
College:	**Faculty of Sciences**
Institution:	**Umm Al-Qura University**

Table of Contents

A. Course Identification

1. Credit hours: 3 Credits
2. Course type **a.** University ☐ College ☐ Department ■ Others ☐ **b.** Required ■ Elective ☐
3. Level/year at which this course is offered: 4th Year / 11th Level
4. Pre-requisites for this course (if any)**: General Biotechnology**
5. Co-requisites for this course (if any)**:** **NA**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	30 hrs.	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20 hrs.
2	**Laboratory/Studio**	30 hrs
3	**Tutorial**	10 hrs.
4	**Others** (specify) / Discussion	10 hrs.
	Total	70 hrs.

B. Course Objectives and Learning Outcomes

1. Course Description

Applied animal biotechnology introduces applications of animal biotechnology and implications for human health and welfare. It begins with an introduction to animal cell cultures and genome sequencing analysis and provides students with a review of available cell and molecular tools. This course examines the application of biological technologies to improve the health or productivity of animals. In addition, regulatory, ethical and safety aspects of technologies will be considered.

2. Course Main Objective

By the completion of this course, students should be able to:

- Understand how knowledge of biological processes supports development of technologies to improve animal health and production.
- Understand the basic concepts involved in animal cloning, genetic selection, molecular and recombinant DNA technologies including genetic modification of organisms, plants and animals.
- Understand basic concepts of innate and acquired immunity and vaccination technologies.
- Understand the practical, ethical, environmental, social and economic considerations associated with biological technology development and commercialization.
- Encourage students to participate in continuing and emerging animal biotechnological matters.
- Enhance the essential laboratory skills for the students. Training will include generic skills such as scientific method.
- Enhance the skills of self-directed learning and investigation of scholarly articles.
- Motivate students to participate in research activities and projects.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Aquired a detailed knowledge and understanding of animal biosciences.	K1
1.2	Provide students with practical experience in a range of animal science techniques.	K2
1.3	Develop an increased understanding and awareness of the application of scientific principles to the study of animal biosciences.	K1 & K3
2	**Skills:**	
2.1	Able to apply scientific knowledge and technical skills in research.	S1, S2
2.2	Able to utilise effective and modern methods for interpreting, analysing and describing scientific data.	S1, S2
2.3	Able to communicate, in writing and verbally, scientific results and information in research.	S3
2.4	Ensure an understanding of animal biosciences, to enable the undertaking of independent research.	S1, S2 & S3
2.5	Develop proper scholarly searching skills through scientific references.	S1, S2 &S3
3	**Values:**	
3.1	Appraise the value of critical judgment through constructive criticism among colleagues.	V1
3.2	Demonstrate personal integrity, reliability, honesty, trustworthiness, teamwork, and ethical behavior toward others in the community.	V2, V3
3.3	Communicate effectively both orally and in writing for data analysis and consultation.	V1, V2

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to animal biotechnology: • Animal Model for Biotechnologists • Animal Models for human Disease • Animal Tissue Culture: Principles and Applications.	3
2	Recombinant DNA, Vector Design, and Construction DNA Modification DNA Vectors • DNA Vectors for Animal Transformation • Components for Efficient Gene Expression in Animal Greater Demands Lead to Innovation • "Modern" Cloning Strategies Vector Design • Vectors for High-Throughput Functional Analysis • Expression Vectors • Vectors for Multigenic Traits Targeted Transgene Insertions	3
3	Animal Biotechnology: Tools and Techniques - Animal Tissue Culture: Principles and Applications - Concepts of Tissue Engineering - Molecular Markers: Tool for Genetic Analysis - Gene Expression: Analysis and Quantitation - Next Generation Sequencing and Its Applications - Biomolecular Display Technology.	3+3
4	Animal Biotechnology: Applications: • Transgenic Animals and their Applications • Creating Transgenic Animals (Genetic Modification-Microinjection - Embryonic Stem (ES) Cells Method) • Transgenic Animals as Disease Models • Transgenic Animals as Biological Models • Transgenic Animals as Xenotransplanters • Transgenic Animals as Food Sources • Transgenic Animals for Drug and Industrial Production • Transgenic Animals' Impact on the Environment	3+3
5	Animal Biotechnology: Concerns : - Transgenic Animals and their Applications - Antibodies and their Applications - Vaccines: Present Status and Applications - Biotechnological Exploitation of Marine Animals - In vitro Fertilization - Animal Cloning - Animal Models for Enteric Diseases - Biosafety - Animal Experimentation: Issues and Non-Issues - Biopharming - Organ Transplantation	3+3

6	Nanotechnology and Its Applications to Animal Biotechnology: - Examples of Nanotechnology Applications.	3
7	Ethical considerations in using animal models and Intellectual Property Right in Animal Biotechnology.	3
Total		**30 hrs.**

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**		
1.1	Provide students with a detailed knowledge and understanding of animal biosciences.	- Interactive lectures - Group discussions - Tutorials	▪ Written exams including: - Short answers - MCQs - EMQs - SAQs - LAQs ▪ Assignment ▪ Open-book exam ▪ Quizzes
1.2	Provide students with practical experience in a range of animal science techniques.		
1.3	Develop an increased understanding and awareness of the application of scientific principles to the study of animal biosciences.		
2	**Skills :**		
2.1	Develop the ability to apply scientific knowledge and technical skills in research.	- Interactive lectures - Tutorials - Practical work	▪ Written exams including: - Short answers - MCQs - EMQs - SAQs - LAQs ▪ Assignment ▪ Open-book exam ▪ Quizzes ▪ OSPE
2.2	Establish the ability to utilise effective and modern methods for interpreting, analysing and describing scientific data.		
2.3	Enhance the ability to communicate, in writing and verbally, scientific results and information in research.		
2.4	Ensure an understanding of animal biosciences, to enable the undertaking of independent research.		
2.5	Communicate effectively both orally and in writing for data analysis and consultation.		
2.6	Develop proper scholarly searching skills through scientific references.		
3	**Values:**		
3.1	Appraise the value of critical judgment through constructive criticism among colleagues.	- Tutorials - Practical work - Small group - Discussion	- Lab demonstration - Assignments - OSPE
3.2	Demonstrate personal integrity, reliability, honesty, trustworthiness, teamwork, and ethical behavior toward others in the community.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Project, Problem Sets	-	10%
2	Midterm Exam (Lab)	6	10%
3	Exam Midterm (Lecture)	6	20%
4	Final Exam (Lab)	11	20 %
5	Final Exam (Lecture)	12	40%
	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:

Teaching staff are available: 7 Office hrs / week

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Applied Animal Biotechnology https://www.elsevier.com/search-results?query=Applied%20Animal%20Biotechnology&page=1
Essential References Materials	Animal Biotechnology Journal of Animal Science and Biotechnology Animal Science
Electronic Materials	Biotechnology in animal science. ALISON – online learning website. https://alison.com/topic/learn/97702/biotechnology-in-animal-science
Other Learning Materials	Animal Biotechnology https://www.tandfonline.com/journals/labt20

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	➢ Lecture room = 30 students ➢ Laboratory for practical = 15 students
Technology Resources (AV, data show, Smart Board, software, etc.)	➢ Computers ➢ Internet access ➢ Smart Board (preferred) ➢ Projector
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	➢ Display screen ➢ White board ➢ SDS electrophoresis tanks and its contents

Item	Resources
	➢ DNA electrophoresis tanks and its contents ➢ PCR Thermocycler ➢ UV rays for DNA visualization

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment.	Students	➢ Class discussion. ➢ Written feedback by individuals. ➢ Satisfaction survey at the end of each semester.
Extent of achievement of course learning outcomes.	Course instructor Peer reviewer Program director	➢ Course development according to the analysis of student feedback. ➢ Monitoring students' performance throughout the semester using formative assessment. ➢ Analyzing students' progress. ➢ Using statistics to analyze students' achievement at the end of each semester and implement data comparison. ➢ Department council discussion. ➢ Peer evaluation of the instructor.
Quality of learning resources	Course instructor	➢ Attending staff development workshops and programs. ➢ Continuous education. ➢ Implementing student feedback. ➢ Variations of teaching strategies including tutorials, PBL and more emphasizing on the practical sessions

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	لجنة تحديث برنامج الأحياء – قسم الأحياء – كلية العلوم التطبيقية
Reference No.	
Date	02.04.2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	**Bio-Informatics**
Course Code:	
Program:	**BCs. Biology (Zoology)**
Department:	**Biology**
College:	**Sciences**
Institution:	**Umm Al Qura University**

Table of Contents

A. Course Identification

1. Credit hours: 3 Credits
2. Course type **a.** University ☐ College ☐ Department ■ Others ☐ **b.** Required ■ Elective ☐
3. Level/year at which this course is offered: 4th Year / 11th Level
4. Pre-requisites for this course (if any)**:** Molecular biology& Biostatistics
5. Co-requisites for this course (if any)**:** **NA**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	30 hrs	80%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**	20	20%

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20 hrs
2	**Laboratory/Studio**	30 hrs
3	**Tutorial**	-
4	**Others** (specify) / 4 office hrs / week	30 hrs
	Total	**80 hrs**

B. Course Objectives and Learning Outcomes

1. Course Description

This course teaches the bioinformatics skills used in academic, biotech, and pharmaceutical laboratories for analyzing individual DNA and protein sequences. The focus is extensive hands-on experience using mainstream web-based bioinformatics tools. Students learn how to evaluate data sources and choose the correct paths to solutions. Throughout the semester, interesting biological questions are addressed by analyzing sequences, searching databases, using sophisticated software, and interpreting results.

2. Course Main Objective

The use of computer technologies in organizing biological information for a variety of applications, including determining the functions of genes and proteins, establishing evolutionary relationships, and predicting the three-dimensional shapes of proteins through their design and modelling.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Describe the basic principles used in the field of bioinformatics.	K1
1.2	Define the important bioinformatics techniques and related processes.	K1 & K2
1.3	Recognize the various applications utilizing bioinformatics methods.	K2 & K3
2	**Skills :**	
2.1	Having a good skill set and extensive experience using common sequence analysis tools and databases	S2
2.2	Having a good exposure to a variety of sequence analysis problems and understand how to solve them	S2 & S3
2.3	Knowing how to convey what they have learned in clearly composed documents or brief demonstrations	S3 & S5
2.4	Having a solid understanding of the field of bioinformatics sequence analysis and many topics of molecular biology	S4
3	**Values:**	
3.1	Appraise the value of critical judgment through constructive criticism among colleagues.	V2
3.2	Demonstrate personal integrity, reliability, honesty, trustworthiness, teamwork, and ethical behavior toward others in the community.	V1& V3 & V4

C. Course Content

No	List of Topics	Contact Hours
1	Prologue to Bioinformatics	3
2	Advanced Biological References and Internet Resources	3
3	Bioinformatics Databases	3
4	Nucleic Acid Sequencing	3
5	Amino Acid Sequencing	3
6	Sequence Alignment	3
7	Sequence Alignment	3
8	Molecular Designing and Modelling	3
9	Phylogenetic Analysis	3
10	Applications in Bioinformatics	3
11	Review	3
Total		30 hrs.

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**		
1.1	Describe the basic principles used in the field of bioinformatics.	- Interactive lectures - Group discussions - Tutorials	▪ Written exams including: - Short answers - MCQs - EMQs - SAQs - LAQs ▪ Assignment ▪ Open-book exam ▪ Quizzes
1.2	Define the important bioinformatics techniques and related processes.		
1.3	Recognize the various applications utilizing bioinformatics methods.		
2.0	**Skills**		
2.1	Having a good skill set and extensive experience using common sequence analysis tools and databases	-Interactive lectures - Tutorials - Practical work	▪ Written exams including: - Short answers - MCQs - EMQs - SAQs - LAQs ▪ Assignment ▪ Open-book exam ▪ Quizzes ▪ OSPE
2.2	Having a good exposure to a variety of sequence analysis problems and understand how to solve them		
2.3	Knowing how to convey what they have learned in clearly composed documents or brief demonstrations		
2.4	Having a solid understanding of the field of bioinformatics sequence analysis and many topics of molecular biology		
3.0	**Values**		
3.1	Appraise the value of critical judgment through constructive criticism among colleagues.	- Tutorials - Practical work - Small group -Discussion	- Lab demonstration - Assignments - OSPE
3.2	Demonstrate personal integrity, reliability, honesty, trustworthiness, teamwork, and ethical behavior toward others in the community.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Project, Problem Sets	-	10%
2	Midterm Exam (Lab)	6	10%
3	Exam Midterm (Lecture)	6	20%
4	Final Exam (Lab)	11	20 %
5	Final Exam (Lecture)	12	40%
6	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: Teaching staff are available 1 hour / day, (Sun-Thu from 12:00 to 1:00 p.m)

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Lesk A (2019) Introduction to Bioinformatics, 5th edition. Oxford University Press, Oxford, United Kingdom
Essential References Materials	1. Mount DW (2004) Bioinformatics: Sequence and Genome Analysis, Second Edition, 2nd edition. Cold Spring Harbor Laboratory Press, Cold Spring Harbor, N.Y 2. Zvelebil M, Baum J (2007) Understanding Bioinformatics, 1st edition. Garland Science, New York
Electronic Materials	1. Information NC for B, Pike USNL of M 8600 R, MD B, Usa 20894 National Center for Biotechnology Information. https://www.ncbi.nlm.nih.gov/. Accessed 8 Apr 2022
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	➢ Lecture room = 30 students ➢ Laboratory for practical = 15 students
Technology Resources (AV, data show, Smart Board, software, etc.)	➢ Computers ➢ Internet access ➢ Smart Board (preferred) ➢ Projector
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	➢ Display screen ➢ White board ➢ SDS electrophoresis tanks and its contents ➢ DNA electrophoresis tanks and its contents ➢ PCR Thermocycler ➢ UV rays for DNA visualization

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students	➢ Class discussion. ➢ Written feedback by individuals. ➢ Satisfaction survey at the end of each semester.
Extent of achievement of course learning outcomes	Course instructor Peer reviewer Program director	➢ Course development according to the analysis of student feedback. ➢ Monitoring students' performance throughout the semester using formative assessment. ➢ Analyzing students' progress. ➢ Using statistics to analyze students' achievement at the end of each semester and implement data comparison. ➢ Department council discussion. ➢ Peer evaluation of the instructor.
Quality of learning resources	Course instructor	➢ Attending staff development workshops and programs. ➢ Continuous education. ➢ Implementing student feedback. ➢ Variations of teaching strategies including tutorials, PBL and more emphasizing on the practical sessions

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	لجنة تحديث برنامج الأحياء – قسم الأحياء – كلية العلوم التطبيقية
Reference No.	
Date	02.04.2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	**Cancer biology**
Course Code:	
Program:	**Biology (Zoology)**
Department:	**Biology**
College:	**Faculty of Sciences**
Institution:	**Umm Al-Qura University**

Table of Contents

A. Course Identification

1. Credit hours: 3 Credits
2. Course type **a.** University ☐ College ☐ Department ■ Others ☐ **b.** Required ■ Elective ☐
3. Level/year at which this course is offered: 4th Year / 10th Level
4. Pre-requisites for this course (if any)**:** Cell Biology & Animal Physiology
5. Co-requisites for this course (if any)**:** None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	30 hrs	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other / case study**	10 hrs	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20 hrs
2	**Laboratory/Studio**	30 hrs
3	**Tutorial** / Group discussion	10 hrs
4	**Others** (specify) / 4 office hrs / week	30 hrs
	Total	**90 hrs**

B. Course Objectives and Learning Outcomes

1. Course Description

The course is designed to present the basic biology of cancer, including the cellular processes, whose alteration leads to uncontrolled cell proliferation. Topics include the pathology and the genetic basis of cancer, role of infectious agents and environmental carcinogens in the disease process. The epidemiological patterns of cancer, therapies, and prevention strategies are integrated into the discussion.

2. Course Main Objective

1. Recognize the stages of initiation, promotion, and progression in terms of carcinogenesis
2. Compare and contrast normal and pathogenic processes (from microscopic to macroscopic states) leading toward cancer
3. Appreciate the diversity of cancer by reviewing select individual cancers and recalling their causes and symptoms
4. Distinguish between different types of carcinogens and chemotherapeutics by their structure, function, and source
5. Understand how cancer is diagnosed, treated, followed, and finally recognize when and why treatment options vary.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Describe how cancer arises at the cellular and genetic levels	K1
1.2	explain how cancer spreads	K2
1.3	Recognize cell cycle regulation, cell death, and cell signaling mechanisms in normal and tumor cells	K3
1.4	Explain the specific kinds of genes altered in tumors, including oncogenes and tumor suppressor genes	K2
2	**Skills :**	
2.1	Analyze how current genetic developments in cancer biology could influence cancer management	S1
2.2	Debate ethical and social implications of cancer research and therapies	S3
2.3	Learn how cancer cells escape cell death, and explain current approaches in cancer treatment.	S2
3	**Values:**	
3.1	Interpret patterns of disease	V1
3.2	Identify causes of cancer	V2
3.3	Write and present a research paper on a specific type of cancer	V3

C. Course Content

No	List of Topics	Contact Hours
1	Cancer: Introductory Overview • Incidence and Mortality • Benign and Malignant Tumors • Cancer Differences	3
2	Cancer Cell Profile • Growth Factors and Cell Cycle • Apoptosis • DNA Damage and Repair • Tumor Immunology	3
3	How Cancers Spread • Tumor Angiogenesis • Invasion and Metastasis	3
4	Identifying the Causes of Cancer • Epidemiology • Causes of Human Cancer	3
5	Chemical Carcinogens	3
6	Radiation and Cancer	3
7	Infectious agents and Cancer	3
8	Heredity and Cancer	3
9	Oncogenes	3
10	Tumor Suppressor Genes	3
Total		**30 hrs**

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**		
1.1	Describe how cancer arises at the cellular and genetic levels	1. In-class lecturing where the previous knowledge is linked to the current and future topics. 2. Homework assignments. 3. Discussions (connecting what they learn in the class and applying this information in laboratory). 4. Handout of lecture notes for each topic.	1- homework and quizzes. 2- Midterm and final written exams (theoretical and practical). 3- Evaluation of reports. 4- Oral presentation. 5-Course work reports.
1.2	explain how cancer spreads		
1.3	Recognize cell cycle regulation, cell death, and cell signaling mechanisms in normal and tumor cells		
1.4	Explain the specific kinds of genes altered in tumors, including oncogenes and tumor suppressor genes		
2.0	**Skills :**		
2.1	Analyze how current genetic developments in cancer biology could influence cancer management	1- Application of essential scientific techniques through lectures, classes and essays. 2- Small group discussion. 3- Ask the students to make small search project during the semester. 4- Making connections between different topics across the course. 5- Class discussions (Engage students in interaction with questions and answers). 6- Homework assignments. 7- Use of microscopic illustrations. 8- Laboratory training. 9- Activities and homework.	1- Evaluation of the topics prepared by students according to the content, arrangement, and covering of the topic. 2- Midterm and final exams. 3- Checking the homework assignments. 4- Course work reports.
2.2	Debate ethical and social implications of cancer research and therapies		
2.3	Learn how cancer cells escape cell death, and explain current approaches in cancer treatment.		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
3.0	**Values:**		
3.1	Interpret patterns of disease	1- Engage student in carrying out internet search. 2- The ability to debate the scientific basis of physiological mechanisms of body systems. 3- Writing group reports. 4- Solving problems in groups during tutorial. 5- Checking the homework assignments in groups during discussion. 6- Cooperative learning and application of scientific method in thinking the scientific problem solving. 7- Work as part of a team. 8- Conducting group experiments and writing group reports. Dividing students into groups to cooperate with each other during the experiments.	1- Oral exams. 2- Evaluation of student essays assignments and search work. 3- Observation of student ethical and moral behavior. 4- Students' attendance is recorded during lectures. 5- Assessment of the student reports. 6- Grading homework assignments.
3.2	Identify causes of cancer		
3.3	Write and present a research paper on a specific type of cancer		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Project, Problem Sets	-	10%
2	Midterm Exam (Lab)	6	10%
3	Exam Midterm (Lecture)	6	20%
4	Final Exam (Lab)	11	20 %
5	Final Exam (Lecture)	12	40%
6	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 :

Teaching staff are available 1 hour / day, (Sun-Thu from 12:00 to 1:00 p.m)

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	1. Cancer: Principles and Practice of Oncology Primer of Molecular Biology in Cancer ,3rd Edition , 2020 , by Vincent T. DeVita Jr. , Theodore S. Lawrence , Steven A. Rosenberg , LWW publisher , ISBN-13 : 978-1975149116 2. DeVita VT Jr, Lawrence TS, Rosenberg SA. 2015. Cancer: Principles & Practice of Oncology: Primer of the Molecular Biology of Cancer. Ed. 2, Wolters Kluwer Health and Lippincott Williams & Wilkins.
Essential References Materials	1. The Biology of Cancer, 2nd Edition, by Robert A. Weinberg, publisher: W. W. Norton & Company; 2013 , ISBN-13 : 978-0815342205
Electronic Materials	1. International Agency for Research on Cancer. 2014. World Cancer Report 2014. (BW Stewart & CP Wild) World Health Organization Press, Lyon, France.
Other Learning Materials	1. Handouts and Lecture notes 2. Microsoft office package. 3. Multi- media associated with the text book and the relevant websites.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	1. Lecture room suitable for 35 students. 2. Lecture room equipped with interactive board and Data show.
Technology Resources (AV, data show, Smart Board, software, etc.)	3. Computers and internet connection. 4. Active smart Board.Data show is required in every room.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	5. Software and related videos

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching	Students	Questionnaires
2. Quality of learning resources	Staff and Students	Questionnaires

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	لجنة برنامج الأحياء – قسم الأحياء – كلية العلوم التطبيقية
Reference No.	
Date	02.04.2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	**Endocrinology**
Course Code:	
Program:	**Biology (Zoology)**
Department:	**Biology**
College:	**Faculty of Sciences**
Institution:	**Umm Al-Qura University**

Table of Contents

A. Course Identification

1. Credit hours: 3 Credits
2. Course type **a.** University ☐ College ☐ Department ■ Others ☐ **b.** Required ■ Elective ☐
3. Level/year at which this course is offered: 4th Year / 10th Level
4. Pre-requisites for this course (if any)**:** Neurophysiology.
5. Co-requisites for this course (if any)**:** None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	30 hrs	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20 hrs
2	**Laboratory/Studio**	30 hrs
3	**Tutorial**	-
4	**Others** (specify) / 4 office hrs / week	30 hrs
	Total	**80 hrs**

B. Course Objectives and Learning Outcomes

1. Course Description

This course describes the study of endocrine hormones and of the organs involved in endocrine hormone release, this science also deals with the biosynthesis, chemistry and storage of hormones, the factors and mechanisms controlling hormonal secretion, the cellular mechanisms of hormone action, and the pathophysiology of endocrine system dysfunction.

2. Course Main Objective

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

1. The endocrine glands and their hormones.
2. The biosynthesis, chemistry and storage of the hormones.
3. The factors and mechanisms controlling hormonal secretion, and the cellular mechanisms of hormone action.
4. The pathophysiology of endocrine system dysfunction.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Knowing the chemical nature of hormones.	K1
1.2	Understanding the relationship between structure and function of hormones.	K2
1.3	Knowing the quantitative aspects of hormonal action in relation to endocrine disorder.	K3
1.4	Distinguish the role of hormones as a regulatory factor of a living system.	K2
1.5	Identify the neurotransmitters and their relation with some diseases and drug addiction.	K3
2	**Skills :**	
2.1	Able to Examine and describe endocrine glands.	S1
2.2	Able to Determine hormonal impact and syndromes.	S2
2.3	Able to draw sectors in the glands .	S3
2.4	Able to Use computers and internet. to search for the latest information in endocrinology and its applications.	S2
3	**Values:**	
3.1	Act as efficient team members.	V1
3.2	Perform self-directed learning.	V2
3.3	Participate in class discussion.	V3
3.4	Present a talk to their colleagues in the student seminars.	V2
3.5	Behave ethically in the lecture and practical classes with the staff, colleagues and environment like instruments, and laboratory.	V3

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to endocrinology, Hormone: nature , cycle and mode of action.	3hrs
2	Endocrine function of hypothalamus.	3hrs
3	Pituitary gland: hormones, action and regulation	3hrs
4	Pineal and thymus gland .	3hrs
5	Thyroid Gland : hormones , action and regulation .	3hrs
6	Parathyroid gland : hormones , action and regulation.	3hrs
7	Adrenal gland : hormones , action and regulation	3hrs
8	Endocrine function of pancrease , types of diabetes mellitus.	3hrs
9	Gastrointestinal hormones : Secreation , function and regulation.	3hrs
10	Gonadal hormones , Action and reglation	3hrs
Total		**30 hrs**

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**		
1.1	Knowing the chemical nature of hormones.	1. In-class lecturing where the previous knowledge is linked to the current and future topics. 2. Homework assignments. 3. Discussions (connecting what they learn in the class and applying this information in laboratory). 4. Handout of lecture notes for each topic.	1- homework and quizzes. 2- Midterm and final written exams (theoretical and practical). 3- Evaluation of reports. 4- Oral presentation. 5- Course work reports.
1.2	Understanding the relationship between structure and function of hormones.		
1.3	Knowing the quantitative aspects of hormonal action in relation to endocrine disorder.		
1.4	Distinguish the role of hormones as a regulatory factor of a living system.		
1.5	Identify the neurotransmitters and their relation with some diseases and drug addiction.		
2.0	**Skills**		
2.1	Able to Examine and describe endocrine glands.	1-Application of essential scientific techniques through lectures, classes and essays. 2-Small group discussion. 3-Ask the students to make small search project during the semester. 4-Making connections between different topics across the course. 5-Class discussions (Engage students in interaction with questions and answers). 6-Homework assignments. 7-Use of microscopic illustrations. 8-Laboratory training. 9-Activities and homework.	1- Evaluation of the topics prepared by students according to the content, arrangement, and covering of the topic. 2- Midterm and final exams. 3- Checking the homework assignments. 4- Course work reports.
2.2	Able to Determine hormonal impact and syndromes.		
2.3	Able to draw sectors in the glands .		
2.4	Able to Use computers and internet. to search for the latest information in endocrinology and its applications.		
3.0	**Values**		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
3.1	Act as efficient team members.	1-Engage student in carrying out internet search. 2-The ability to debate the scientific basis of neural mechanisms of body systems. 3-Writing group reports. 4-Solving problems in groups during tutorial. 5-Checking the homework assignments in groups during discussion. 6-Cooperative learning and application of scientific method in thinking the scientific problem solving. 7-Work as part of a team. 8-Conducting group experiments and writing group reports. 9.Dividing students into groups to cooperate with each other during the experiments.	1-Oral exams. 2-Evaluation of student essays assignments and search work. 3-Observation of student ethical and moral behavior. 4-Students' attendance is recorded during lectures. 5-Assessment of the student reports. 6-Grading homework assignments.
3.2	Perform self-directed learning.		
3.3	Participate in class discussion.		
3.4	Present a talk to their colleagues in the student seminars.		
3.5	Behave ethically in the lecture and practical classes with the staff, colleagues and environment like instruments, and laboratory.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Project, Problem Sets	-	10%
2	Midterm Exam (Lab)	6	10%
3	Exam Midterm (Lecture)	6	20%
4	Final Exam (Lab)	11	20 %
5	Final Exam (Lecture)	12	40%
6	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 :

Teaching staff are available 1 hour / day, (Sun-Thu from 12:00 to 1:00 p.m)

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	**1.Essential Endocrinology and Diabetes (Essentials) ,**by Richard I. G. Holt (Author), Neil A. Hanley (Author), Wiley-Blackwell; 7th edition (June 1, 2021), ISBN-13 : 978-1118763964 **2.Williams textbook of endocrinology**, 14th edition, by Shlomo Melmed; Richard J Auchus; Allison B Goldfine; Ronald Koenig; Clifford J Rosen , Philadelphia, PA : Elsevier, [2020] .
Essential References Materials	3.Harrison's Endocrinology, by J. Larry Jameson (Author), McGraw Hill / Medical; 4th edition (2016), SBN-13 : 978-1259835728
Electronic Materials	**www.reviewmedicalbooks.com** **www.wiley.com/buy/9781118763964**
Other Learning Materials	▪ Computer-based programs/CD, ▪ Professional standards or regulations and software.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms, laboratories, demonstration rooms/labs, etc.)
Technology Resources (AV, data show, Smart Board, software, etc.)	All classrooms and laboratories are equipped with data show and Smart Board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	1.Handouts and Lecture notes 2.Microsoft office package. 3.Multi- media associated with the text book and the relevant websites.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching	Students	Questionnaires
2. Quality of learning resources	Staff and Students	Questionnaires
3. Processes for Improvement of Teaching	Students	Questionnaires
4. Processes for Verifying Standards of Student Achievement	independent member teaching staff	check marking of a sample of student work or a sample of assignments .

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	لجنة برنامج الأحياء – قسم الأحياء – كلية العلوم التطبيقية
Reference No.	
Date	02.04.2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	**Immunology**
Course Code:	
Program:	**B.Sc. Biology (Zoology track)**
Department:	**Biology**
College:	**Science Collage**
Institution:	**Umm Al-qura University**

Table of Contents

A. Course Identification

1. Credit hours: 3 Credits
2. Course type **a.** University ☐ College ☐ Department ■ Others ☐ **b.** Required ■ Elective ☐
3. Level/year at which this course is offered: 3th Year / 8th Level
4. Pre-requisites for this course (if any)**:** General Microbiology
5. Co-requisites for this course (if any)**:** **NA**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	20	100
2	**Blended**	20	100
3	**E-learning**	20	100
4	**Distance learning**	20	100
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20 hrs.
2	**Laboratory/Studio**	30 hrs
3	**Tutorial**	10 hrs.
4	**Others** (specify) / Discussion	10 hrs.
	Total	70 hrs.

B. Course Objectives and Learning Outcomes

1. Course Description The course aim to make students ware of our immune system classification, and how the immune cells respond against pathogens.
2. Course Main Objective Explain how the immune system work against microbes.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Understanding Immune system	K1
1.2	Understanding Immune strategy	K1
1.3	Aware of how immune system work	K2
1.4	Know the different type of immune cells and their work strategy	K2 & k3
2	**Skills:**	
2.1	Able to define Immune system	S1
2.2	Able to define immune methods	S2 & S3
2.3	Describe suitable methods for characterizing the activity, function, and diversity.	S2 & S3
2.4	Communicate effectively both orally and in writing for data analysis and consultation.	S3
2.5	Perform accurate procedures used in the operation of related apparatuses.	S2 & S3
3	**Values:**	
3.1	Appraise the value of critical judgment through constructive criticism among colleagues.	V1 & V2
3.2	Demonstrate personal integrity, reliability, honesty, trustworthiness, teamwork, and ethical behavior toward others in the community.	V2 & V3

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to Immunology	6
2	Immune system	6
3	Antigens and Antibodies	3
4	Immune disease	3
5	Vaccines	3
6	Applied examples	9
Total		30 hrs

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**		
1.1	Understanding Immune system	- Interactive lectures - Group discussions - Tutorials	▪ Written exams including: - Short answers - MCQs - EMQs - SAQs - LAQs ▪ Assignment ▪ Open-book exam ▪ Quizzes
1.2	Understanding Immune strategy		
1.3	Aware of how immune system work		
1.4	Know the different type of immune cells and their work strategy		
2.0	**Skills**		
2.1	Able to define Immune system	- Interactive lectures - Tutorials - Practical work	▪ Written exams including: - Short answers - MCQs - EMQs - SAQs - LAQs ▪ Assignment ▪ Open-book exam ▪ Quizzes ▪ OSPE
2.2	Able to define immune methods		
2.3	Describe suitable methods for characterizing the activity, function, and diversity.		
2.4	Communicate effectively both orally and in writing for data analysis and consultation.		
2.5	Perform accurate procedures used in the operation of related apparatuses.		
3.0	**Values**		
3.1	Appraise the value of critical judgment through constructive criticism among colleagues.	- Tutorials - Practical work - Small group - Discussion	- Lab demonstration - Assignments - OSPE
3.2	Demonstrate personal integrity, reliability, honesty, trustworthiness, teamwork, and ethical behavior toward others in the community.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Project, Problem Sets	-	10%
2	Midterm Exam (Lab)	6	10%
3	Exam Midterm (Lecture)	6	20%
4	Final Exam (Lab)	11	20 %
5	Final Exam (Lecture)	12	40%
	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: Teaching staff are available: 7 Office hrs / week

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Textbook of microbiology for GNM students [By] Debata, Ashutosh - Delhi Jaypee brothers 2015 - 276 p.
Essential References Materials	
Electronic Materials	
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	➢ Lecture room = 30 students ➢ Laboratory for practical = 15 students
Technology Resources (AV, data show, Smart Board, software, etc.)	➢ Computers ➢ Internet access ➢ Smart Board (preferred) ➢ Projector
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	➢ Display screen ➢ White board ➢ SDS electrophoresis tanks and its contents ➢ DNA electrophoresis tanks and its contents ➢ PCR Thermocycler ➢ UV rays for DNA visualization

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students	➢ Class discussion. ➢ Written feedback by individuals. ➢ Satisfaction survey at the end of each semester.
Extent of achievement of course learning outcomes	Course instructor Peer reviewer Program director	➢ Course development according to the analysis of student feedback.

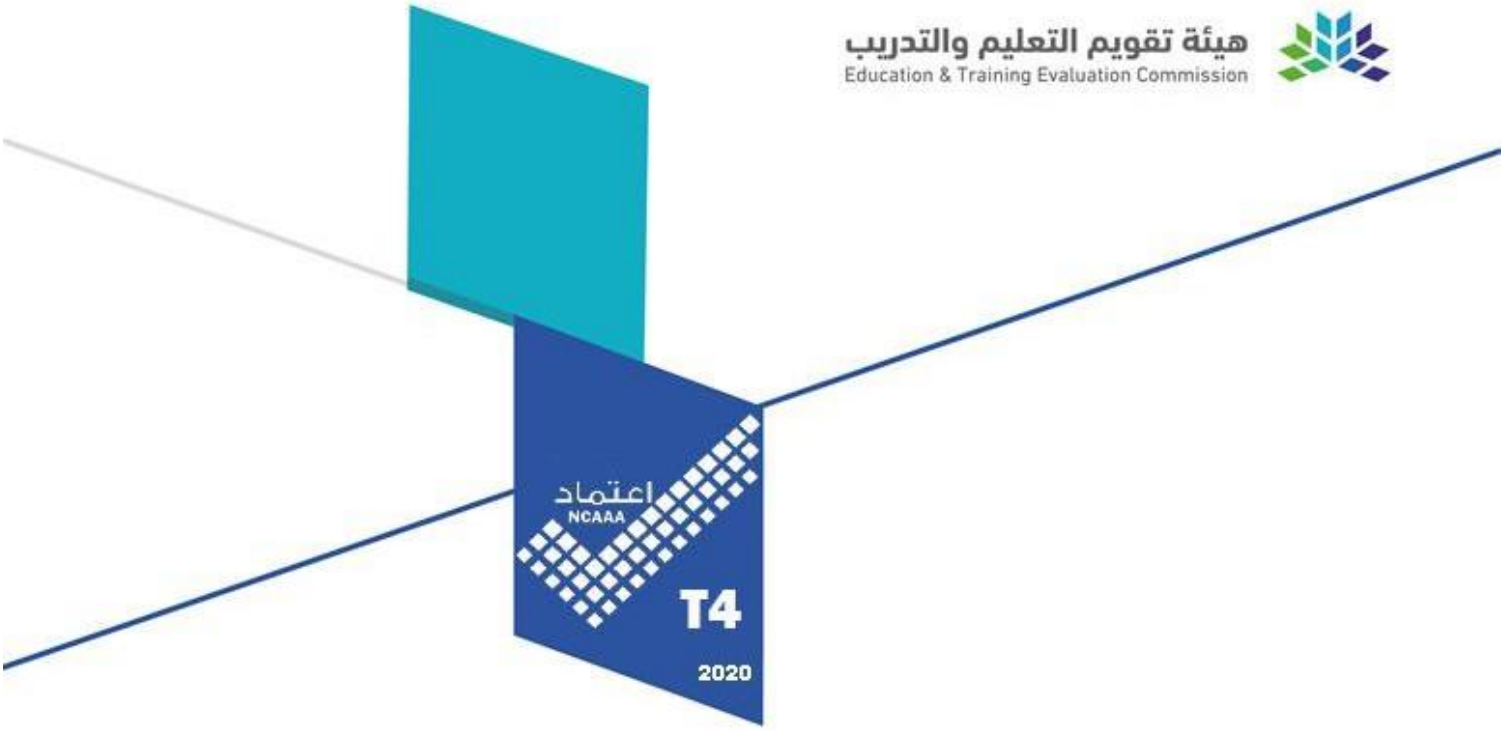
Evaluation Areas/Issues	Evaluators	Evaluation Methods
		➢ Monitoring students' performance throughout the semester using formative assessment. ➢ Analyzing students' progress. ➢ Using statistics to analyze students' achievement at the end of each semester and implement data comparison. ➢ Department council discussion. ➢ Peer evaluation of the instructor.
Quality of learning resources	Course instructor	➢ Attending staff development workshops and programs. ➢ Continuous education. ➢ Implementing student feedback. ➢ Variations of teaching strategies including tutorials, PBL and more emphasizing on the practical sessions

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	لجنة تحديث برنامج الأحياء – قسم الأحياء – كلية العلوم التطبيقية
Reference No.	
Date	02.04.2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	**Neurophysiology**
Course Code:	
Program:	**Biology (Zoology)**
Department:	**Biology**
College:	**Faculty of Sciences**
Institution:	**Umm Al-Qura University**

Table of Contents

A. Course Identification

1. Credit hours:	**3 Credits**
2. Course type	
a.	University ☐ College ☐ Department ■ Others ☐
b.	Required ■ Elective ☐
3. Level/year at which this course is offered:	3th Year / 8th Level
4. Pre-requisites for this course (if any)**:**	Animal Physiology
5. Co-requisites for this course (if any)**:**	None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	30 hrs	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other /** Case study	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20 hrs
2	**Laboratory/Studio**	30 hrs
3	**Tutorial** / Group discussion	10 hrs
4	**Others** (specify) / 4 office hrs / week	30 hrs
	Total	**90 hrs**

B. Course Objectives and Learning Outcomes

1. Course Description

This course will examine the nervous system from a functional and structural perspectives, basic neurophysiological activity of the nervous system , how ion channels and other components of nerve cells give rise to electrical excitability and synaptic function, and how those properties are then used for coding information and higher order function in the nervous system.

2. Course Main Objective

By the end of this course,the student will:

1. Identify the major structures of the nervous system.
2. Distinguish the primary function(s) of these major structures.
3. Describe basic neurophysiological activity of the nervous system.
4. Discuss the responses of sensory input mechanisms.
5. Summarize the primary functions of the hypothalamus and the autonomic nervous system.
6. Differentiate among the ascending and descending tracts of the spinal cord.
7. Categorize the input and output pathways of the major brain stem nuclei.
8. Diagram routes of the major sensory and motor pathways.
9. Explain the functions of major brain structures (such as the thalamus, cerebellum, basal ganglia, hippocampus, cortex).
10. Compare and contrast general cortical functions in terms of their interrelations and their interdependencies upon subcortical structures.
11. When given a behavioral description, justify a probable site (or sites) of nervous system involvement.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Identify the major structures of the nervous system.	K1
1.2	Distinguish the primary function(s) of these major structures.	K2
1.3	Describe basic neurophysiological activity of the nervous system.	K3
1.4	Discuss the responses of sensory input mechanisms	K2
2	**Skills :**	
2.1	Summarize the primary functions of the hypothalamus and the autonomic nervous system.	S1
2.2	Differentiate among the ascending and descending tracts of the spinal cord.	S2
2.3	Categorize the input and output pathways of the major brain stem nuclei.	S3
2.4	Diagram routes of the major sensory and motor pathways.	S3
3	**Values:**	
3.1	Able to Explain the functions of major brain structures (such as the thalamus, cerebellum, basal ganglia, hippocampus, cortex).	V1
3.2	Able to Compare and contrast general cortical functions in terms of their interrelations and their interdependencies upon subcortical structures.	V2
3.3	When given a behavioral description, able to justify a probable site (or sites) of nervous system involvement.	V3

C. Course Content

No	List of Topics	Contact Hours
1	Introduction and course overview – What is Neurophys	3
2	Structure and functions of CNS and PNS.	3
3	Membrane potential : Ions, channels, Nernst Equation	3
4	Electrical and chemical transmission: Gap junctions, crayfish escape system, frog neuromuscular junction.	3
5	Central synapses, small molecule transmitters and ionotropic receptors.	3
6	Transmitter types: Synthesis, transport, release, re-uptake and degradation.	3
7	Types of communication: Transmitters, neuromodulators, neurohormones.	3
8	Sensory transduction, modalities, coding principles.	3
9	Somatosensory and auditory coding	3
10	Visual and chemosensory coding , Motor coding: posture and movement control.	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**		
1.1	Identify the major structures of the nervous system.	1. In-class lecturing where the previous knowledge is linked to the current and future topics. 2. Homework assignments. 3. Discussions (connecting what they learn in the class and applying this information in laboratory). 4. Handout of lecture notes for each topic.	1- homework and quizzes. 2- Midterm and final written exams (theoretical and practical). 3- Evaluation of reports. 4- Oral presentation. 5- Course work reports.
1.2	Distinguish the primary function(s) of these major structures.		
1.3	Describe basic neurophysiological activity of the nervous system.		
1.4	Discuss the responses of sensory input mechanisms		
2.0	**Skills**		
2.1	Summarize the primary functions of the hypothalamus and the autonomic nervous system.	1- Application of essential scientific techniques through lectures, classes and essays. 2- Small group discussion. 3- Ask the students to make small search project during the semester. 4- Making connections between different topics across the course. 5- Class discussions (Engage students in interaction with questions and answers). 6- Homework assignments.	1- Evaluation of the topics prepared by students according to the content, arrangement, and covering of the topic. 2- Midterm and final exams. 3- Checking the homework assignments. 4- Course work reports.
2.2	Differentiate among the ascending and descending tracts of the spinal cord.		
2.3	Categorize the input and output pathways of the major brain stem nuclei.		
2.4	Diagram routes of the major sensory and motor pathways.		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		7-Use of microscopic illustrations. 8-Laboratory training. 9-Activities and homework.	
3.0	**Values**		
3.1	Able to Explain the functions of major brain structures (such as the thalamus, cerebellum, basal ganglia, hippocampus, cortex).	1-Engage student in carrying out internet search. 2-The ability to debate the scientific basis of neural mechanisms of body systems. 3-Writing group reports. 4-Solving problems in groups during tutorial. 5-Checking the homework assignments in groups during discussion. 6-Cooperative learning and application of scientific method in thinking the scientific problem solving. 7-Work as part of a team. 8-Conducting group experiments and writing group reports. 9.Dividing students into groups to cooperate with each other during the experiments.	1-Oral exams. 2-Evaluation of student essays assignments and search work. 3-Observation of student ethical and moral behavior. 4-Students' attendance is recorded during lectures. 5-Assessment of the student reports. 6-Grading homework assignments.
3.2	Able to Compare and contrast general cortical functions in terms of their interrelations and their interdependencies upon subcortical structures.		
3.3	When given a behavioral description, able to justify a probable site (or sites) of nervous system involvement.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Project, Problem Sets	-	10%
2	Midterm Exam (Lab)	6	10%
3	Exam Midterm (Lecture)	6	20%
4	Final Exam (Lab)	11	20 %
5	Final Exam (Lecture)	12	40%
6	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 :

Teaching staff are available 1 hour / day, (Sun-Thu from 12:00 to 1:00 p.m)

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	1. **Principles of Neural Science**, 6th Edition,by Eric Kandel *et a*l. McGraw Hill / Medical; 6th edition (March 29, 2021), ISBN-13 : 978-1259642234
Essential References Materials	2. **Neuroscience** ,by Dale Purves et al.,Oxford University Press; 6th edition , 2017, ISBN-13: 978-1605353807
Electronic Materials	3. https://www.springer.com/journal/11062 4. https://jnnp.bmj.com/content/74/10/1381
Other Learning Materials	5. Computer-based programs/CD, 6. Professional standards or regulations and software.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms, laboratories, demonstration rooms/labs, etc.)
Technology Resources (AV, data show, Smart Board, software, etc.)	All classrooms and laboratories are equipped with data show and Smart Board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	1.Handouts and Lecture notes 2.Microsoft office package. 3.Multi- media associated with the text book and the relevant websites.

G. Course Quality Evaluation

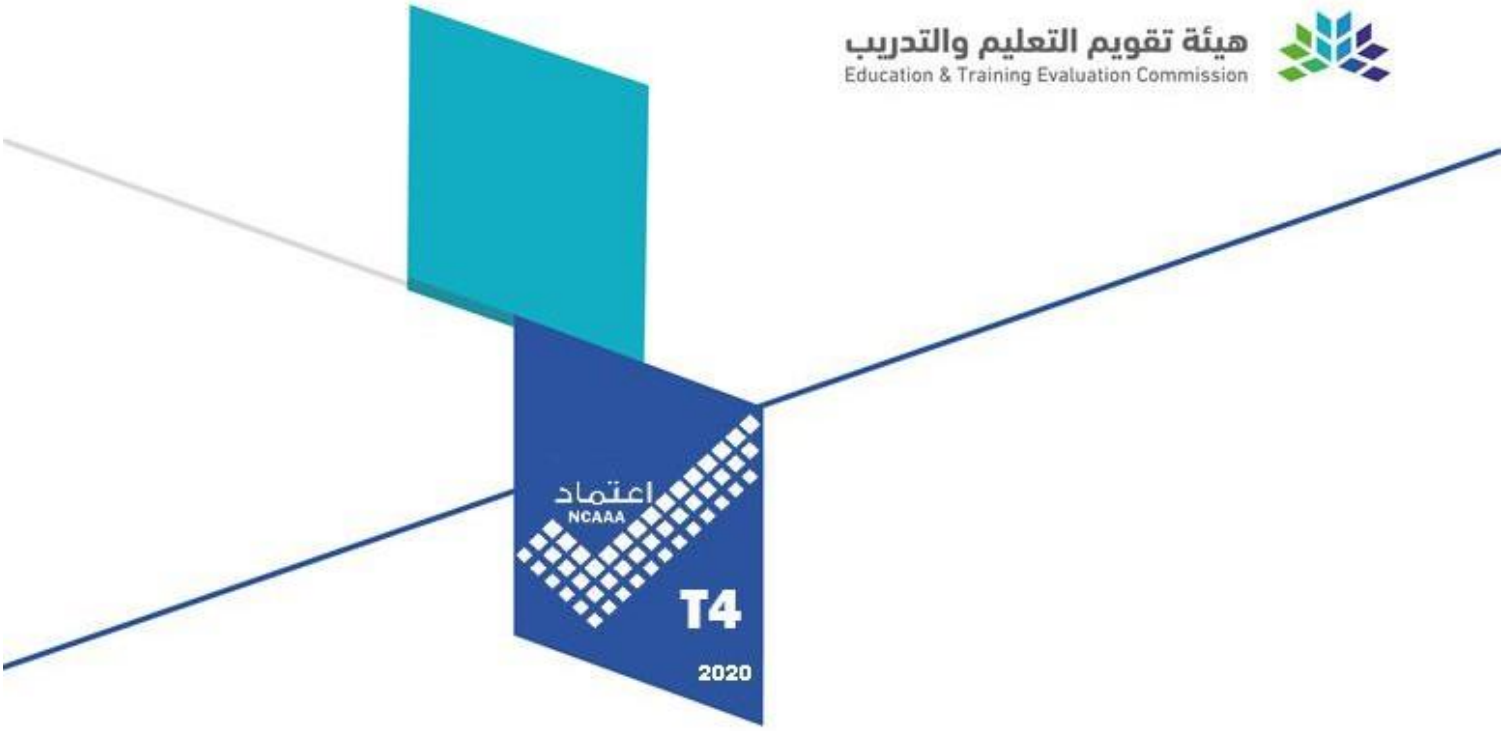
Evaluation Areas/Issues	Evaluators	Evaluation Methods
1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching	Students	Questionnaires
2. Quality of learning resources	Staff and Students	Questionnaires
3. Processes for Improvement of Teaching	Students	Questionnaires
4. Processes for Verifying Standards of Student Achievement	independent member teaching staff	check marking of a sample of student work or a sample of assignments .

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	لجنة تحديث برنامج ألحياء – قسم ألحياء – كلية العلوم التطبيقية
Reference No.	
Date	02.04.2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	**Parasitology**
Course Code:	
Program:	**BCs. Biology (Zoology)**
Department:	**Biology**
College:	**Sciences**
Institution:	**Umm Al-qura University**

Table of Contents

A. Course Identification

1. Credit hours: 3 Credits
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: 4th Year / 10th Level
4. Pre-requisites for this course (if any)**: Invertebrates**
5. Co-requisites for this course (if any)**: NA**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	30 hrs	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	20	

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20 hrs
2	**Laboratory/Studio**	30 hrs
3	**Tutorial**	-
4	**Others** (specify) / 4 offfice hrs / week	30 hrs
	Total	80 hrs

B. Course Objectives and Learning Outcomes

1. Course Description

This course presents general concepts of parasitology, knowledge of some parasitic diseases that could be transmitted between animals and man (zoonotic diseases), knowledge about how to protect man and domestic animals from parasites and their treatment in case of infection. Basic knowledge of parasitism, the different biological inter-relationships and the host parasite relationships

2. Course Main Objective

1. General concept of parasitology.
2. Knowledge of some parasitic diseases that could be transmitted between animals and man (Zoonotic diseases).
3. Knowledge how to protect man and domestic animals from parasites and their treatment.
4. Basic knowledge of parasitism, the different biological inter-relationships and the host parasite relationships.
5. Knowledge of different parasitic examples from all phyla (Protozoa & Metazoa), their morphology, biology, life cycles, diagnosis, treatment & control.
6. Dissemination of health awareness of these parasitic diseases.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1 1.2 1.3 1.4	• Identify parasitism, parasites and their examples. • Describe parasitic diseases and modes of diagnosis. • Trace control of parasitic infections. • Understand host-parasite relationship.	K1 &K3
2	**Skills :**	
2.1 2.2 2.3 2.4 2.5	• Right use of microscopes. • Identification and description of parasites. • Using computers and internet. • Characterize methods of resistance and appropriate treatment for each disease. • Conducting documentary about some parasites throughout the Kingdom.	S1, S2 & S3
3	**Values:**	
3.1 3.1 3.3	• Ability to work in a team to conduct a specific project. • Conducting a specific project with minimal supervision. • Communicating results of work to others.	V1, V2 & V3

C. Course Content

No	List of Topics	Contact Hours
1	An introduction to Parasitology, biological relationship, types of parasitism. General knowledge of parasites from the different phyla	3
2	Subkingdom Protozoa	3
3	Phylum Sarcomastigophora (*Entamoeba histolytica, Giardia, Trichomonas vaginalis, Trypanosoma, Leishmania*.	3
4	Ciliophora (*Balantidium coli*)	3
5	Apicomplexa (Plasmodium)	3
6	Subkingdom Metazoa	3
7	An Introduction to Helminths and their characters	3
8	Phylum Platyhelminthes (*Schistosoma mansoni, Schistosoma haematobium, Fasciola, Taenia saginata, Taenia solium, Echinococcus granulosus*)	3
9	Phylum Nemathelminthes (*Ascaris lumbricoides, Ancylostoma duodenale, Trichinella spiralis*)	3
10	Phylum Arthropoda (*Cimex lectularis, Chtenocephalides canis, Pules irritans, Pediculus humanus, Rhipicephalus sanguineus, Sarcoptes scabiei*).	3
Total		**30 hrs**

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**		
1	1. Identify parasitism, parasites and their examples. 2. Describe parasitic diseases and modes of diagnosis. 3. Trace control of parasitic infections. 4. Understand host-parasite relationship.	1. In-class lecturing (using PowerPoint and illustrations). 2. Activities and assignments. 3. Using social media (Facebook and Twitter) to raise awareness of health. for some parasites	1. Periodical exam and reports. 2. Mid- term exam. 3. Final exam.
2.0	**Skills**		
2	1. Right use of microscopes. 2. Identification and description of parasites. 3. Using computers and interne 4. Characterize methods of resistance and appropriate treatment for each disease. 5. Conducting documentary about some parasites throughout the Kingdom	1. Use of labeled drawings and illustrations. 2. Activities and 3. assignments.	1. Major and final exams. 2. Evaluation of lab reports. 3. Evaluation of Activities and assignments.
3.0	**Values**		
3.1	1- ValuesAbility to work in a team to conduct a specific project. 2- Conducting a specific project with minimal supervision. 3- Communicating results of work to others.	1. Work independently. 2. Work as part of a team. 3. Assessment of a page on the social networking sites to raise awareness of health for some arasites.	1. Assessment of group projects. 2. Evaluation of projects conducted individually.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Project, Problem Sets	-	10%
2	Midterm Exam (Lab)	6	10%
3	Exam Midterm (Lecture)	6	20%
4	Final Exam (Lab)	11	20 %
5	Final Exam (Lecture)	12	40%
6	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 :

- Office hours
- Email
- websites

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	1.Paniker's Textbook of Medical Parasitology (Step by Step) , January 2018,by C.K. Jayaram Paniker (Author), Sougata Ghosh (Author), Jaypee Brothers Medical Publishers; Eighth edition ,(1 January 2018), ISBN-10 : 9352701860
Essential References Materials	2.Parasitology: Conceptual Approach - 15 edition, by Eric S. Loker and Bruce V. Hofkin, Publisher: Garland Publishing ,Published: 2015, ISBN10: 0815344732
Electronic Materials	CDC website + Google + Wikipedia
Other Learning Materials	YouTube

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Class rooms, labs
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show – speakers – microscopes
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Samples – slides – teaching models

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Strategies for Obtaining Student Feedback on Effectiveness of Teaching	Students	Questionnaires
1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching	Students	Questionnaires

Evaluation Areas/Issues	Evaluators	Evaluation Methods
2. Quality of learning resources	Staff and Students	Questionnaires
3. Processes for Improvement of Teaching	Students	Questionnaires
4. Processes for Verifying Standards of Student Achievement	independent member teaching staff	check marking of a sample of student work or a sample of assignments .

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	لجنة تحديث برنامج االحياء – قسم االحياء – كلية العلوم التطبيقية
Reference No.	
Date	02.04.2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	**Research Skills in Animal Biology**
Course Code:	
Program:	**BSc Biology (Zoology Track)**
Department:	**Biology Department**
College:	**Science**
Institution:	**Umm Al-Qura University**

Table of Contents

A. Course Identification

1. Credit hours: 2 Credits
2. Course type **a.** University ☐ College ☐ Department ■ Others ☐ **b.** Required ■ Elective ☐
3. Level/year at which this course is offered: 4th Year / 11thLevel
4. Pre-requisites for this course (if any)**:** Biostatistics
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**	20 hrs	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20 hrs
2	**Laboratory/Studio**	30 hrs
3	**Tutorial**	-
4	**Others** (specify) / 4 office hrs / week	30 hrs
	Total	**80 hrs**

B. Course Objectives and Learning Outcomes

1. Course Description

This course develops students' ability to conduct independent research in the field of animal biology that goes far beyond textbooks and basic internet searches. they will learn how to gather information from a wide range of credible resources and how to structure the research process. They will learn about animal biology research tools and techniques and how to reference sources correctly.

2. Course Main Objective

This course is designed to enhance the undergraduate students research experience.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Discover the variety of information resources available	K1
1.2	Understanding the reference sources and how to cite them.	K1,K2
1.3	Demonstrate the use of modern animal biology research methods.	K2,K3
2	**Skills :**	
2.1	Gain skills to select appropriate sources of information	S1
2.2	Demonstrate efficient research skills	S2
2.3	Convey ideas, scientific knowledge and experimental outcomes through written and oral communication	S2,S3
3	**Values:**	
3.1	Learn to apply results to personal, educational, and career needs	V1
3.2	Use critical reading techniques	V2,V3
3.3	Convey your findings in a credible way	V2

C. Course Content

No	List of Topics	Contact Hours
1	WHAT IS GOOD RESEARCH? • Understanding the research process • Sources of Scientific Information • Using different search platforms • Learning how to refine your search • Learning techniques for evaluating resources	**2**
2	Searching for Scientific information • Library Technology • Electronic Searches	**2**
3	Primary Literature Searches • Reading scientific papers • Critical analysis of research results	**2**
4	Doing Science: Where do questions come from? • Science as asking questions • Basic considerations • The skill of asking questions • Where do questions come from?	**2**
5	Asking Questions: The art of framing hypotheses and predictions • Observation • Exploratory analysis • Forming hypotheses	**2**
6	Answering Questions: What do the results say? • Confirmatory analysis • What is statistical significance • Significance tests • Testing hypotheses • Testing predictions • Refining hypotheses	**2**

7	Presenting Information: How to communicate outcomes and conclusions • Presenting figures and tables • Presenting results • Writing reports	**2**
8	Planning for a research project • Learning how to define needed information • Understanding the importance of managing research time • Learning how to save and organize research notebook • Learning strategies for reading for different purposes	**2**
9	Referencing • Learning how to write your research up • Understanding academic honesty and research ethics • Learning how to reference sources and create a bibliography	**2**
10	Research proposal • Learning how to write your research proposal	**2**
Total		**20**

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	Discover the variety of information resources available	Lectures Project Web based study	Quiz. Final and mid-term exam.
K2	Understanding the reference sources and how to cite them.	Lectures Project Web based study	Quiz. Final and mid-term exam.
K3	Demonstrate the use of modern animal biology research methods.	Lectures Project Web based study	Quiz. Final and mid-term exam Assignments and activities
2.0	**Skills**		
S1	Gain skills to select appropriate sources of information	Research activity Web based study Library	Quiz Final and mid-term exam Assignments and activities
S2	Demonstrate efficient research skills	Research activity Web based study Library	Homework Quiz Final and mid-term exam Assignments and activities
S3	Convey ideas, scientific knowledge and experimental outcomes through written and oral communication	Research activity Web based study Library	Homework Exam Assignments and activities

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
3.0	**Values**		
V1	Learn to apply results to personal, educational, and career needs	Lectures Projects Web based study	Homework, Quiz Final and mid-term exam, assignments and class activities
V2	Use critical reading techniques	Lectures Projects Web based study	Homework, Quiz Final and mid-term exam, assignments and class activities
V3	Convey your findings in a credible way	Lectures Projects Web based study	Homework, Quiz Final and mid-term exam, assignments and class activities

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Project, Problem Sets	-	10%
2	Lab manual (logbook)	2-3	10%
3	Lab demonstration	3-10	30%
4	oral presentation & poster	11	10%
5	Final Report	12	40%
	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:

Teaching staff are available 1 hour / day, (Sun-Thu from 12:00 to 1:00 p.m)

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	- Handouts - Research Methods for the Biosciences 2nd Edition, by Debbie Holmes, Peter Moody, Diana Dine, ISBN-13: 978-0199545766 - Handbook of Biological Investigation - 7th edition, by Harrison W. Ambrose, ISBN13: 9780887253317
Essential References Materials	-
Electronic Materials	- Several Websites
Other Learning Materials	- Handouts and Lecture notes

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	1. Classrooms, 2. Computer lab
Technology Resources (AV, data show, Smart Board, software, etc.)	1. Computers 2. Smart Board. 3. Data show
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

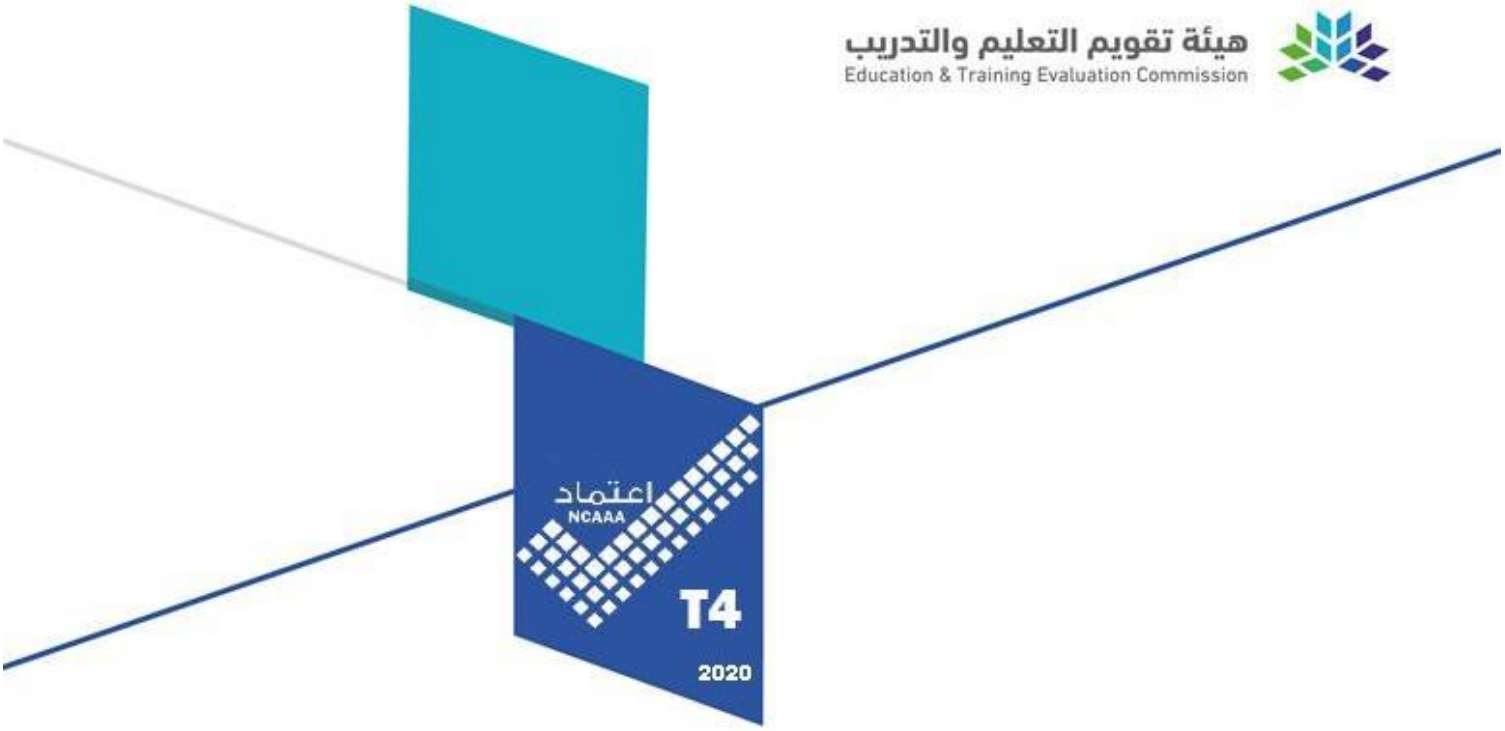
Evaluation Areas/Issues	Evaluators	Evaluation Methods
1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching	Students	Direct
2. Quality of learning resources	Staff and Students	Direct

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	لجنة تحديث برنامج الأحياء – قسم الأحياء – كلية العلوم التطبيقية
Reference No.	
Date	02.04.2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	**Vertebrates**
Course Code:	
Program:	**BCs. Biology (Zoology)**
Department:	**Biology**
College:	**Faculty of Sciences**
Institution:	**Umm Al-Qura University**

Table of Contents

A. Course Identification

1. Credit hours: 3 Credit
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: 3th Year / 8th Level
4. Pre-requisites for this course (if any)**: Invertebrates**
5. Co-requisites for this course (if any)**: Non**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	30 hrs	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20 hrs
2	**Laboratory/Studio**	30 hrs
3	**Tutorial**	-
4	**Others** (specify) / 4 office hrs / week	30 hrs
	Total	**80 hrs**

B. Course Objectives and Learning Outcomes

1. Course Description

The course covers a detailed study of vertebrate animals, their taxonomy, morphology and anatomy. The course follows up the evolution of morphological and anatomical features of body organs in protochordates and vertebrate classes. The course also describes different types of structural adaptation which are developed in the different body systems or organs as modes of adaption with the changes in the surrounding environment. Study samples were taken for each taxon as a model of study.

2. Course Main Objective

The course gives a clear idea about the evolution of anatomical and organo-systems of Amphioxus features of the different classes of chordates especially vertebrate animals including fishes and tetrapods that are the matter of study in this course. The course also focuses or contrasts on understanding the extent of development in the organs and body systems by transition from sect to sect.

- By the end of the course, the student should:
  - Learn the importance of recognizing taxonomic status of the living organism to distinguish it and facilitate their study.
  - Compare between specific characters of chordates classes using their representative examples.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Identify and summarize the morphological and anatomical features and basis of chordate classification.	K1
1.2	Know how to examine and describe representative species for chordate subphyla; such as Cephalochordata, Urochordata, Hemichordata, and Vertebrata.	K1 , K2
1.3	Learn basis of chordate reproduction, and basis of chordate development.	K1&K2
1.4	Understand the economic hazards or beneficial importance of Chordata.	K1
1.5	Draw and describe adult and larvae and anatomy of selected chordate samples, as well as, the life cycle of selected species.	K2 & K3
1.6	Chordate classification and general characters of chordate classed	K1
1.7	Specific Characters, morphology and internal anatomy of representative species of different classes of phylum Chordata.	K1 & K2
1.8	Discuss the habitat, Biology and life cycle of the selected species	K1 & K2
2	**Skills :**	
2.1	Summarize the special characters of chordate subphyla and apply them form scientific classification.	S1 & S2
2.2	Categorize and classify the chordate species according to their specific characters. Then define the scientific name of chordate samples.	S2 & S3
2.3	Differentiate between adult and larval stages of invertebrate samples.	S1
3	**Values:**	
3.1	Developing oral presentations and leadership activity	V3
3.2	Communicating personal ideas and thoughts	V1
3.3	Work independently, Self-learning and as part of a team,	V2
3...	To examine, describe, draw, dissect or contribute reports.	V2

C. Course Content

No	List of Topics	Contact Hours
1	Classification, general characters, anatomical features and of phylum Chordata.	3
2	General characters, morphology and anatomy of protochordates, cephalochordates, urochordates and hemichordates	3
3	Specific characters, morphology and anatomy of subphylum vertebrata, including agnatha, gnatha.	3
4	Study class Cyclostomes, morphology, anatomy, biology and reproduction of Lamprey and hagfish.	3
5	Class Chondrichthyes: classification, characters, morphology, anatomy, biology and reproduction of shark or dogfish Class Actinopterygii: classification, characters, morphology, anatomy, biology and reproduction of bony fish.	3
6	Class Amphibia: classification, characters, morphology, anatomy, biology and reproduction of amphibians. Study representative example from order Anura, toad, frogs, or hyla.	3
7	Study the specific characters, embryonic membranes of anamniotes and amniotes.	3
8	Class Reptilia: classification, characters, morphology, anatomy, biology and reproduction of class Reptilia. Study representative example from order Squamata, selected Lizard. Class Reptilia: Study representative example from order Squamata, selected Lizard.	3
9	Class Aves: classification, characters, morphology, anatomy, biology and reproduction of birds. Avian classifications Class Aves: Morphology and Anatomy of representative example from order Columbiformes, example: Pigeon.	3
10	Class Mammalia: classification, characters, morphology, anatomy, biology and reproduction of class Mammalia. Study representative example from order Lagomorpha, example: Rabbit.	3
Total		30 hrs.

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**		
1.1	Identify and summarize the morphological and anatomical features and basis of chordate classification.	- Interactive lectures - Group discussions - Tutorials	▪ Written exams including: - Short answers - MCQs - EMQs - SAQs - LAQs ▪ Assignment ▪ Open-book exam ▪ Quizzes
1.2	Know how to examine and describe representative species for chordate subphyla; such as Cephalochordata, Urochordata, Hemichordata, and Vertebrata.		
1.3	Learn basis of chordate reproduction, and basis of chordate development.		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.4	Understand the economic hazards or beneficial importance of Chordata.		
1.5	Draw and describe adult and larvae and anatomy of selected chordate samples, as well as, the life cycle of selected species.		
1.6	Chordate classification and general characters of chordate classed		
1.7	Specific Characters, morphology and internal anatomy of representative species of different classes of phylum Chordata.		
1.8	Study habitat, biology and life cycle of the selected species.		
2.0	Skills		
2.1	Summarize the special characters of chordate subphyla and apply them for scientific classification.	- Interactive lectures - Tutorials - Practical work	▪ Written exams including: - Short answers - MCQs - EMQs - SAQs - LAQs ▪ Assignment ▪ Open-book exam ▪ Quizzes ▪ OSPE
2.2	Describe the morphological and anatomical structure of selected representative chordate species.		
2.3	Define the scientific name of invertebrate samples and write their taxonomy.		
3.0	**Values**		
3.1	Appraise the value of critical judgment through constructive criticism among colleagues.	- Tutorials - Practical work - Small group - Discussion	- Lab demonstration - Assignments - OSPE
3.2	Demonstrate personal integrity, reliability, honesty, trustworthiness, teamwork, and ethical behavior toward others in the community.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Project, Problem Sets	-	10%
2	Midterm Exam (Lab)	6	10%
3	Exam Midterm (Lecture)	6	20%
4	Final Exam (Lab)	11	20 %
5	Final Exam (Lecture)	12	40%
	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:

Teaching staff are available 1 hour / day, (Sun-Thu from 12:00 to 1:00 p.m)

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	- Mohammad Hassan Hamoud , Biology of vertebrates (2005), first Arabic edition, to be eligible for publication and distribution, Jordan. - Abdel Raouf Gamal and Hassan Shehata (2003). Chordata, first edition, Publishing House, Riyadh, 2003. Mohamed Ismail Mohamed and others (2002). Fundamentals of Zoology, First Edition, Dar Al-Arab Thought, Cairo. Animal General, vertebrate and invertebrate: Zahid, Nabil Zaki, and Khaled Bakr Kamal, Al-Shegri Store book, 1426. Mahmoud Albanhawi, and others (2006). Text book of Zoology, tenth edition, Dar -Almaref, Egypt.
Essential References Materials	Leonard B. Radinsky (1987). The Evolution of Vertebrate Design 1st Edition. University of Chicago Press. Noriyuki Satoh (2016). Chordate Origins and Evolution: The Molecular Evolutionary Road to Vertebrates 1st Edition, Academic Press.
Electronic Materials	https://en.wikipedia.org/wiki/Chordate http://www.ucmp.berkeley.edu/chordata/chordata.html http://faculty.collegeprep.org/~bernie/sciproject/project/Kingdoms/Animal%20Kingdom%20-%205/Local%20copy/classification/chordata.html https://peda.net/kenya/css/subjects/biology/form three/classification-ii2/kingdom-animalia/phylum-chordata
Other Learning Materials	CD prepared by the staff members containing U-tube videos. Biological charts, field trips

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	➢ Lecture room = 30 students ➢ Laboratory for practical = 15 students
Technology Resources (AV, data show, Smart Board, software, etc.)	➢ Computers ➢ Internet access ➢ Smart Board (preferred) ➢ Projector
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	➢ Display screen ➢ White board ➢ SDS electrophoresis tanks and its contents ➢ DNA electrophoresis tanks and its contents ➢ PCR Thermocycler ➢ UV rays for DNA visualization

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students	➢ Class discussion. ➢ Written feedback by individuals. ➢ Satisfaction survey at the end of each semester.
Extent of achievement of course learning outcomes	Course instructor Peer reviewer Program director	➢ Course development according to the analysis of student feedback. ➢ Monitoring students' performance throughout the semester using formative assessment. ➢ Analyzing students' progress. ➢ Using statistics to analyze students' achievement at the end of each semester and implement data comparison. ➢ Department council discussion. ➢ Peer evaluation of the instructor.
Quality of learning resources	Course instructor	➢ Attending staff development workshops and programs. ➢ Continuous education. ➢ Implementing student feedback. ➢ Variations of teaching strategies including tutorials, PBL and more emphasizing on the practical sessions

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	لجنة تحديث برنامج ألحياء – قسم ألحياء – كلية العلوم التطبيقية
Reference No.	
Date	02.04.2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	**Animal Ecology and pollution**
Course Code:	
Program:	**BCs. Biology (Zoology)**
Department:	**Department of biology**
College:	**Faculty of Science**
Institution:	**Um Al-Qura University**

Table of Contents

A. Couíse Identification

1. Credit hours: 3 Credits
2. Course type **a.** University ☐ College ☐ Department ■ Others ☐ **b.** Required ■ Elective ☐
3. Level/year at which this course is offered: 3th Year / 7th Level
4. Pre-requisites for this course (if any)**: Principles of Ecology.**
5. Co-requisites for this course (if any)**:** **NA**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	30 hrs	80%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**	20	20%

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20 hrs
2	**Laboratory/Studio**	30 hrs
3	**Tutorial**	-
4	**Others** (specify) / 4 office hrs / week	30 hrs
	Total	**80 hrs**

B. Couíse Objectives and Leaíning Outcomes

1. Course Description

This course considers Animal ecology to study of animals and how they relate to their environment. It will study basic concepts of ecology including climate and environmental periodicity, terrestrial ecosystems, aquatic ecosystems, limiting factors and the ecological niche concept. Also, it will consider the transport and fate of pollutants, as well as their effects on animal in each environment.

The Lab section; will focus on the methods that used to study the animal ecology, measuring the population, measuring the biodiversity, the tools and equipment that used to measure the environment aspect, and the principle to measure the pollution in water and soil.

2. Course Main Objective

The course will help the student to be able to:

- Understand major concepts in the field of animal ecology.
- Know the basic facts of population, community and ecosystem level ecology.
- Use the rule and equations to calculate animal population and biodiversity
- Recognize the effect of environment pollution on the animal.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Identify main Terms of ecology: Ecology; community; environments, ecosystems, populations, etc…	K1 & K2
1.2	Recognize the relationships between individuals of same population	K1 & K2
1.3	Learn the different source of pollution	K2 & K3
2	**Skills :**	
2.1	Recognize the animal that found in each environment	S1
2.2	Calculate the animal population	S2
2.3	Study the effect of pollution on animal environment	S2 & S3
2.4	Define the energy flow in different ecosystems	S2 & S3
3	Values:	
3.1	Work independently to identify the different environmental pollutions	V2
3.2	Work with high level of integrity	V1
3.3	Develop the ability to using references	V3

C. Couíse Content

No	List of Topics	Contact Hours
1	General introduction about the animal ecology and its component (biotic – abiotic)	3
2	Ecosystem and Factors that affect the succession. Practical: Practical techniques to collect data from environment	3
3	Different type of ecosystem (aquatic- terrestrial) and animal that live in each of ecosystem Practical: Practical techniques to collect data from environment	3
4	The pollution in the ecosystem. Practical: ecological method to identify the pollution in water and soil	3
5	Animal community. The relationship between animal in the same community Practical: identify the relationship between animal in a community	3
6	Animal population. The density of organisms, factor that affect the animal density, and the ways of calculating density. Practical: Method to study animal population - calculation animal population	3
7	Food chain and food web	3
8	Diversity and Richness and environmental pyramids- type of ecological pyramids: Pyramid of numbers- Pyramid of biomass- Pyramid of energy/productivity	3
9	The effect of the pollution on the food chain- web and the	3
10	Biodiversity in the environment Practical: Calculating a Biodiversity Index	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**		
1.1	Identify main Terms of ecology: Ecology; community; environments, ecosystems, populations, etc…	Lectures Student research Discussion	Homework Mid-term and final Exam
1.2	Recognize the relationships between individuals of same population		
1.3	Learn the different source of pollution		
2.0	**Skills**		
2.1	Recognize the animal that found in each environment	Presentation Discussion Lab work	Mid-term and final Exam -quiz Presentation from the student about what they find Report from lab work
2.2	Calculate the animal population		
2.3	Study the effect of pollution on animal environment		
2.4	Define the energy flow in different ecosystems		
3.0	Values		
3.1	Work independently to identify the different environmental laws	Lab work	Report from lab work
3.2	Work with high level of integrity		
3.3	Develop the ability to using references		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Project, Problem Sets	-	10%
2	Midterm Exam (Lab)	6	10%
3	Exam Midterm (Lecture)	6	20%
4	Final Exam (Lab)	11	20 %
5	Final Exam (Lecture)	12	40%
6	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/week

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Integrative Animal Biology
Essential References Materials	https://www.journals.elsevier.com/saudi-journal-of-biological-sciences
Electronic Materials	https://besjournals.onlinelibrary.wiley.com/journal/13652656
Other Learning Materials	https://www.britannica.com/animal/animal/Ecology-and-habitats

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	The classrooms are suitable with the number of enrolled students, and air conditioned. Lecture room equipped with a board and Data show. Instructors use their own laptop.
Technology Resources (AV, data show, Smart Board, software, etc.)	Classrooms with data show.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Couíse Quality Evaluation

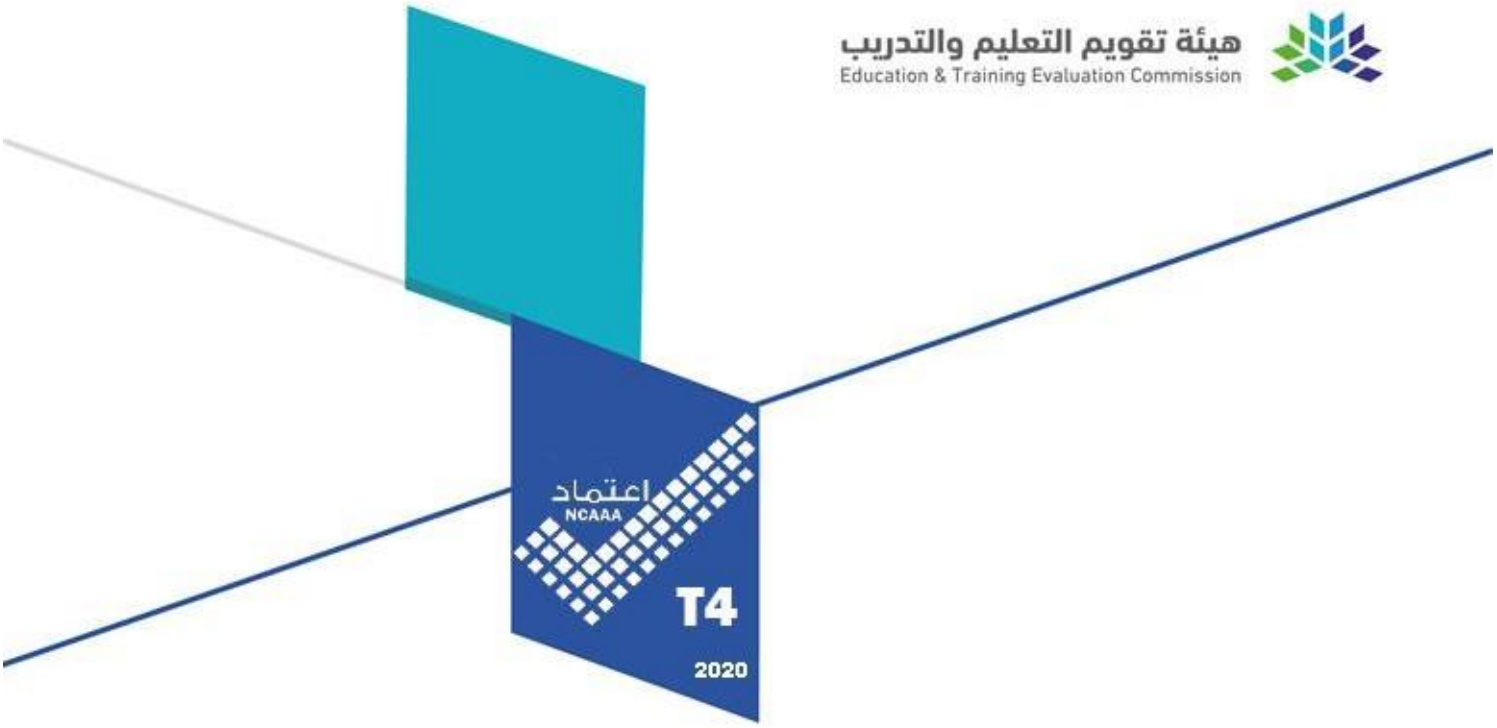
Evaluation Areas/Issues	Evaluators	Evaluation Methods
Student Feedback on Effectiveness of Teaching	Students.	Classroom discussions. Questionnaires.
Evaluation of Teaching	Instructor or by the Department	Analysis the grades of students.

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 Appíoval Data

Council / Committee	لجنة تحديث برنامج الأحياء – قسم الأحياء – كلية العلوم التطبيقية
Reference No.	
Date	02.04.2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	**Embryology**
Course Code:	
Program:	**Biology (Zoology)**
Department:	**Biology**
College:	**Faculty of Sciences**
Institution:	**Umm Al-Qura University**

Table of Contents

A. Course Identification

1. Credit hours: 3 Credits
2. Course type **a.** University ☐ College ☐ Department ■ Others ☐ **b.** Required ■ Elective ☐
3. Level/year at which this course is offered: 4th Year / 11th Level
4. Pre-requisites for this course (if any)**:** Vertebrates
5. Co-requisites for this course (if any)**:** **NA**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	30 hrs	100 %
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20 hrs
2	**Laboratory/Studio**	30 hrs
3	**Tutorial**	-
4	**Others** (specify) / 4 office hrs / week	30 hrs
	Total	**80 hrs**

B. Course Objectives and Learning Outcomes

1. Course Description

Embryology is designed for the students to understand gamete formation, fertilization and embryo development concepts in animals. Also, comparison of the events of cleavage, blastulation and gastrulation in selected chordate embryos must be covered. Understanding the formation of some selected organs created by ectoderm, endoderm and mesoderm in addition to extra-embryonic membranes and their role in the formation of placenta. Knowing the different stages of pregnancy in humans and the events that happen in each stage with clear idea about multiple births and formation of twins.

2. Course Main Objective

After completing this course, students should be able to:

1. Define the process of embryonic development in general.
2. Describe the major phenomenon of development, growth and differentiation.
3. Explain the process of fertilization.

4. Comparison the events of cleavage, blastulation and gastrulation in selected chordate embryos.
5. Understand the formation of some selected organs created by ectoderm, endoderm and mesoderm.
6. Study the extra-embryonic membranes and their role in the formation of placenta.
7. Know the multiple birth and formation of twins.
8.Gain the scientific terms of embryology which allow the students how to deal with internet, text books and references

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Define the process of embryonic development in general.	K1
1.2	Describe the major phenomenon of development, growth and differentiation.	K2
1.3	Explain the process of fertilization. Comparison the events of cleavage, blastulation and gastrulation in selected chordate embryos.	K3
1.4	Understand the formation of some selected organs created by ectoderm, endoderm and mesoderm.	K2
1.5	Study the extra-embryonic membranes and their role in the formation of placenta.	K3
1.6	Know the multiple birth and formation of twins	K1
1.7	Gain the scientific terms of embryology which allow the students how to deal with internet, text books and references.	K2
1.8	Observe the serial embryonic stages in some selected chordate	K3
2	**Skills :**	
2.1	The student is able to propose solutions to some problems.	S1
2.2	To use computer and internet.	S2
2.3	To describe the disorders, arise after any organ injury	S3
3	**Values:**	
3.1	Developing oral presentations.	V1
3.2	Communicating personal ideas and thoughts.	V2
3.3	Work independently and as part of a team to finish some assignments.	V3
3.4	Communicate results of work to others	V2

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to the basis of embryology. History of embryology.Definition of Growth and cell differentiation. Brief of main embryonic stages.	3
2	Reproduction, types of reproduction (asexual and sexual). Origin of sex cells and formation of gonads. Male reproductive system. Formation of mature spermatozoon. Spermatogenesis	3
3	Female reproductive system. Oogenesis. Yolk and its role in egg formation. Types of eggs according to the amount and distribution of yolk granules. Ovum membranes (primary and secondary). Formation of eggs in frog, birds and mammals.	3
4	Fertilization. Acrosomal reaction. Cleavage- blastula. Fate maps	3
5	Early embryonic development of amphioxus, frog, chick and mammals..	3
6	Comparison of blastula in amphioxus, frog, chick and mammals Gastrulation: formation of gastrula in amphioxus, frog, chick and mammals	3
7	Formation of some ectodermal organs: Nervous system (central and peripheral system and neural crest). Sense organs (optic, otic and olfactory organs). Formation of some mesodermal organs: Heart and urino-genital systems. Formation of some endodermal organs: Alimentary canal, liver and pancreas	3
8	Embryonic development of chick embryo: Chick embryo at 33-48 hrs. Cephalic flexion and embryonic torsion. Herat formation. Blood circulation. Brain formation	3
9	Extra-embryonic membranes in birds. Yolk sac. Amnion and chorion. Allantois.	3
10	Placenta:Definition, function, formation.Role of extra-embryonic membranes and endomertrium. Formation of chorio-vitelline and chorio-allantoic placenta. Types of placenta according to: Number of parries (epithelochorial, syndesmochorial, endotheliochorial and haemochorial placenta).Shape (diffuse, cotyledonary, zonary and discoidal).Fate of placents (non-deciduous and deciduous placednta).	3
Total		**30 hrs**

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**		
1.1	Define the process of embryonic development in general.	1. lectures 2. seminar presentation and web-interactions.	1. Homework and quizzes. 2. Midterm and final written exams (theoretical and practical).

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	Describe the major phenomenon of development, growth and differentiation. Explain the process of fertilization. Comparison the events of cleavage, blastulation and gastrulation in selected chordate embryos. Understand the formation of some selected organs created by ectoderm, endoderm and mesoderm. Study the extra-embryonic membranes and their role in the formation of placenta. Know the multiple birth and formation of twins. Gain the scientific terms of embryology which allow the students how to deal with internet, text books and references. Observe the serial embryonic stages in some selected chordate	3. images and movies.	3. Evaluation of reports. 4. Oral presentation. 5. Course work report
2.0	**Skills**		
2.1	Developing oral presentations	Application of essential scientific techniques through lectures, classes and essays. Small group discussion. Ask the students to make small search project during the semester. Making connections between different topics across the course.	Course work reports. Evaluation of the topics prepared by students according to the content, arrangement, and covering of the topic. Midterm and final exams. Checking the homework assignments
2.2	Communicating personal ideas and thoughts.		
2.3	Work independently and as part of a team to finish some assignments.		
3.0	**Values**		
3.1	Use information and communication technology	Oral presentations. Internet search assignments and essays. Incorporating the use and utilization of computer in the course requirements.	Evaluation of student essays and assignments. Evaluating the laboratory written reports. Marks given to for good reports and presentations Evaluating during the discussion in lecture and reports. Part of the grad is put
3.2	Use IT and communication technology in gathering and interpreting information and ideas		
3.3	Use the internet as a means of communication and a source of information.		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		Students will be asked for delivering a summary regarding certain topics related to the course.	for student's written participation

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Project, Problem Sets	-	10%
2	Midterm Exam (Lab)	6	10%
3	Exam Midterm (Lecture)	6	20%
4	Final Exam (Lab)	11	20 %
5	Final Exam (Lecture)	12	40%
6	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 :

Teaching staff are available 1 hour / day, (Sun-Thu from 12:00 to 1:00 p.m)

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	1. Inderbir Singh's HUMAN EMBRYOLOGY, 12 th ed., by V Subhadra Devi ,2020, edited by Jaypee Brothers Medical Publishers; JAYPEE BROTHERS , ISBN-10 : 9390281407 2. Embryology Workbook , by Preetie Sonje (Author), CBS Publishers & Distributors Pvt Ltd, India , ISBN-10 : 9390046009
Essential References Materials	1. Foundations of Neural Development, by S.Marc Breedlove, 2017 , Sinauer Associates Is an Imprint of Oxford Un, EAN/UPC 9781605355795 2. Human embryology and developmental biology. Carlson, Bruce M.; Kantaputra, Piranit N. (2014). Philadelphia, PA: Elsevier/Saunders. ISBN 978-1-4557-2794-0
Electronic Materials	https://embryology.med.unsw.edu.au/embryology/index.php/Animal_Development.
Other Learning Materials	Related videos and softwars

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Lecture room suitable for 35 students. Lecture room equipped with interactive board and Data show.

Item	Resources
Technology Resources (AV, data show, Smart Board, software, etc.)	Computers and internet connection. Active smart Board.Data show is required in every room.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Software and related videos

G. Course Quality Evaluation

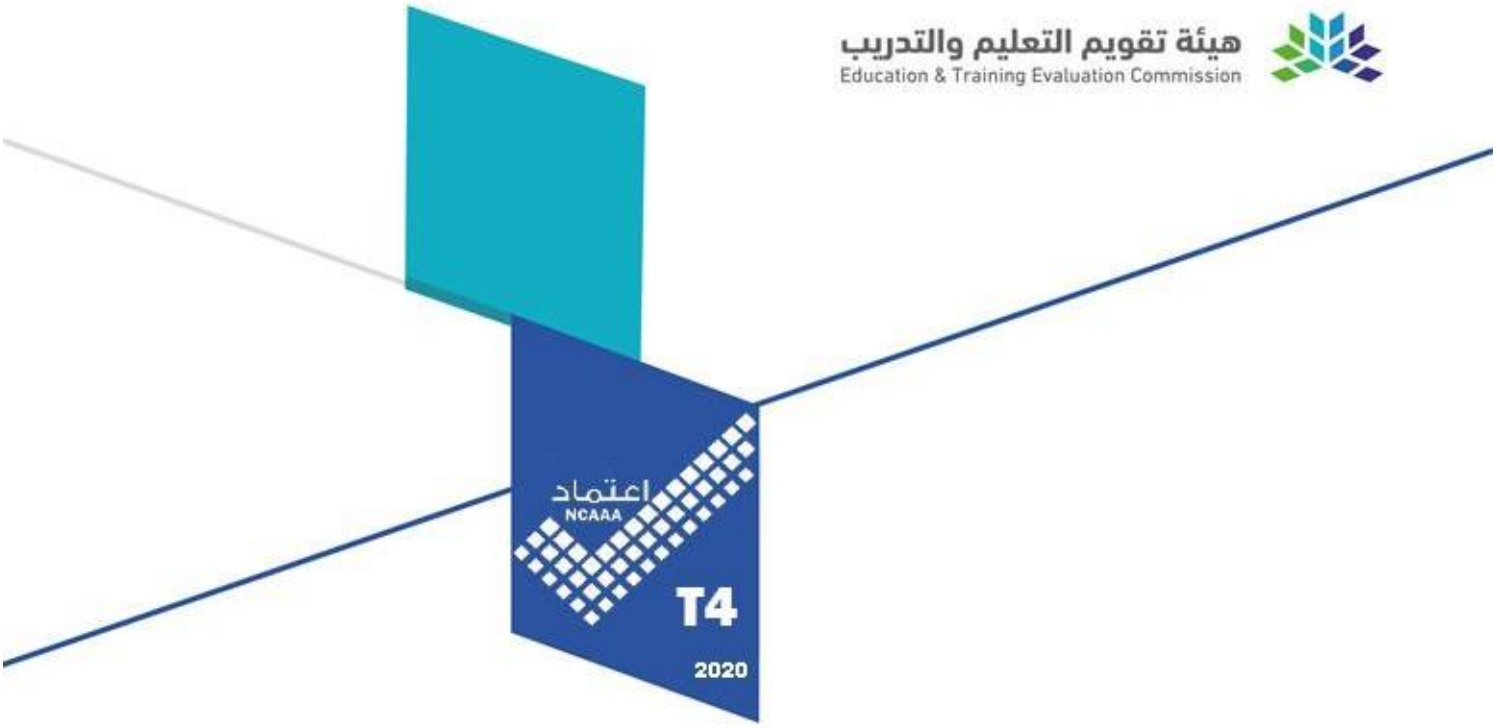
Evaluation Areas/Issues	Evaluators	Evaluation Methods
1.Strategies for Obtaining Student Feedback on Effectiveness of Teaching	Students	Questionnaires
2.Quality of learning resources	Staff and Students	Questionnaires

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	لجنة تحديث برنامج الأحياء – قسم الأحياء – كلية العلوم التطبيقية
Reference No.	
Date	02.04.2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	**Entomology**
Course Code:	
Program:	**BCs. Biology (Zoology)**
Department:	**Biology**
College:	**Faculty of Science**
Institution:	**Um Al-Qura University**

Table of Contents

A. Course Identification

1. Credit hours:	3 Credit
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	**3th Year / 8th Level**
4. Pre-requisites for this course (if any)**:**	**Invertebrates**
5. Co-requisites for this course (if any)**:**	**Non**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	30 hrs	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	2 hrs/week/10 weeks (20)
2	**Laboratory/Studio**	3 hrs/week/10 weeks (30)
3	**Tutorial**	
4	**Others** (specify)	3 hrs/week/10 weeks (30)
	Total	**80 hrs.**

B. Course Objectives and Learning Outcomes

1. Course Description

Entomology is the study of insects. Insects are involved with virtually every part of our lives; they are pests that eat our food, our houses, our animals, and are vectors that spread sickness and disease. But insects aren't all bad! Many insects are beneficial pollinators, decomposers of dead materials, and useful in the biocontrol of unwanted pests. Entomologists study insects to help us manage pests or learn how to better use them to our advantage. The course "general entomology" is designed for the students to understand insects and the human – insect relationship concepts. the basic morphological and anatomical characteristic of insects including the integument and its components, the different tagmata of insect body and their appendages, the internal anatomy, the history of insect taxonomy and the bases of modern taxonomy.

2. Course Main Objective

After completing this course, students should be able to:

- Understand the principles of the human – insect relationship.
- Demonstrate the link the basic morphological characteristic of insects including the integument and its components, the different tagmata of insect body and their appendages.
- Describe the structure and function of various organs.
- Demonstrate the internal anatomy of insects.
- Understanding the history of insect taxonomy and the bases of modern taxonomy.
- List all the insects' orders.
- Recognize some important insect-related diseases.
- Recognize and design models of insect life cycle.
- Compare and assess the concepts and principles behind scientific theories regarding the significance of the specific structure in the insect body.
- Apply field and practical applications.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Identify the terminology and nomenclature of insect, morphology and their body plan.	K1
1.2	Know the insect - human relationships.	K1
1.3	Learn basis of insect taxonomy, anatomy, biology, reproduction and their economic importance.	K1
1.4	Understand the insect morphology, body tagmata; the antennae, thoracic and abdominal appendages.	K1 & k2
1.5	Assimilate and Recognize the internal anatomy of insects: integument and hypodermis; digestive; circulatory; respiratory; excretory; nervous and reproductive systems	K1 & k2
1.6	Realize and draw the life cycle representative species for different orders and families.	K2 & k3
1.7	Acquire and list of insects with beneficial, vectors, pests or biological control species.	K1
1.8	Apply the microscopic examination to selected microscopic species and their mouth parts, wings and appendages.	K2 & K3
2	**Skills :**	
2.1	Summarize the morphological, anatomical and biological characteristics of representative species.	S1
2.2	Categorize the life cycles of beneficial, parasitic, pest species.	S1 & S2
2.3	Relate and realize the human- insect relationships.	S2
2.4	Submit individual or team reports	S3
2.5	Summarize the specific histological structure of body organs.	S2
2.6	Differentiate between insect stages.	S3
2.7	Dealing with and apply practical and microscopic applications.	S2 , S3
2.8	Field activities, sample collection, sorting, classify and photograph them, then prepare student teams presentation	S3
3	**Values:**	

CLOs		Aligned PLOs
3.1	Developing oral presentations and leadership activity	V2
3.2	Communicating personal ideas and thoughts	V1
3.3	Work independently, Self-learning and as part of a team,	V3
3.4	To examine, describe, draw, dissect or contribute reports.	V1

C. Course Content

No	List of Topics	Contact Hours
1	The insect - human relationship: beneficial; neutral and harmful relationship. The integument and its components: cuticle; cuticular appendages and process; Tanning or sclerotization; hypodermis; tentorium and pore canals.	3
2	The different tagmata of insect body: head; mouthparts; antenna and tentorium. The mouth–parts structure (Labrum – mandibles – maxillae – labium – hypopharynx – the preoral cavity). Types and modifications of mouth-parts.	3
3	The insect thorax: segments (prothorax – mesothorax – metathorax); thoracic sclerites and endoskeleton. The thoracic appendages: structure of leg (Coxa – trochanter – femur – tibia – tarsus – pretarsus); modifications. Wings: structures, venation, regions, basal articulation of wings and the wing as coupling apparatus	3
4	The abdomen and its appendages: structure; segments; endoskeleton; abdominal appendages; reproductive and nonreproductive appendages; structure of ovipositor; sting apparatus and male genitalia.	3
5	The internal anatomy: 1- The digestive system: structure; histology; and functions of salivary glands, foregut (the preoral cavity –pharynx – esophagus- proventriculus and the cardiac valves), midgut (peritrophic membrane, gastric caeca) and hind gut (pyloric valves – intestine – rectum and rectal glands- anal glands); in addition, nutrition and digestion.	3
6	2- The circulatory system "open type": dorsal vessels; diaphragm; sinuses; pulsatory organ; hemolymph; circulation and types of hemocytes.	3
7	3- The excretory system: Malpighian tubules numbers and structure; attachment types of Malpighian tubules with hind gut; pericardial cells and nephrocytes and fat bodies.	3
8	4- The respiratory system: trachea and tracheoles; spiracles; types of respiratory systems (the holopneustic, the hemipneustic, and the apneustic); air sacs; the respiratory gills (tracheal gill – spiracular gill – blood gill) and the integument as respiratory organ; respiration of endoparasitic insects.	3
9	5- The nervous system "NS": the central NS (brain, suboesophageal ganglion and ventral nerve cord); the visceral NS (stomatogastric sympathetic NS, ventral and caudal sympathetic); and the peripheral nervous system.	3

10	6- The reproductive system: Types of reproduction; male reproductive system (testes, vas deferens, ejaculatory ducts, and male accessory glands). The reproductive system: The female reproductive system. The ecdysis and metamorphosis	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**		
1.1	Identify the terminology and nomenclature of insect, morphology and their body plan.	Study the structure and function of the thalamus, pituitary, thyroid parathyroid, adrenal gonads and pancreatic Islets. Lectures and student research papers; visual display "PowerPoint"; Homework assignments; Discussions; Handout of lecture notes	Homework; Quizzes; oral, presentation evaluation, sheet, discussion, midterm and final exams.
1.2	Know the insect - human relation-ships.		
1.3	Learn basis of insect taxonomy, anatomy, biology, reproduction and their economic importance.		
1.4	Understand the insect morphology, body tagmata; the antennae, thoracic and abdominal appendages.		
1.5	Assimilate and Recognize the internal anatomy of insects: integument and hypodermis; digestive; circulatory; respiratory; excretory; nervous and reproductive systems		
1.6	Realize and draw the life cycle representative species for different orders and families.		
1.7	Acquire and list of insects with beneficial, vectors, pests or biological control species.		
1.8	Apply the microscopic examination to selected microscopic species and their mouth parts, wings and appendages.		
2.0	**Skills**		
2.1	Summarize the relationships between insects and human health and economic importance.	1. Interactive lectures. 2. Seminars. 3. Participation of students in discussions during the lecture. 4. Trying to explain the issues in regular	- Exam must contain questions that can measure these skills. - Quiz and exams. - Discussions after the lecture. Practical exam.
2.2	Categorize and tabulate the morphological and anatomical characterization to design simple key for modern insect classification.		
2.3	Apply lab applications. Submit individual or team reports		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.4	Develop skills for identification, drawing and summarize general characters of orders and families.	and motivated manner. Follow up the students in lab and during carryout all analytical techniques.	
2.5	Dealing with insect collection, sorting and report them as presentation.		
2.6	Differentiate between adult and larval stages.		
2.7	Summarize the anatomical and histological structure of body organs		
3.0	**Values**		
3.1	Personal leadership activity	Follow up, correction, reorientation of their work. Discussion	Evaluation, oral exam, written exam
3.2	Self-learning in teamwork.		
…	Reports and presentations		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizes presentations, and report,	weekly	10 %
2	Mid Term Exam (Theoretic)	5	20 %
3	Mid Term Exam (practical)	6	10 %
4	Final Practical Exam	12	20 %
5	Final Exam	13	40 %
	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/week

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Chapman, R. F. (2013). The insect structure and function, Edition 5th. ELBS publisher. Clements. AN Physiology of Mosquitoes, 19(63), 220-232.
Essential References Materials	Comstock & Joun henry. Insect life Carpenter. The biology of insect D.B. Tembhare, 1997. Modern entomology. (Himalaya Publ. House). 623 pages. P.J. Gullan & P.S. Cranston, 2000. The insects: An outline of Entomology. (Blackwell Science, USA).
Electronic Materials	Scientific search engines on the internet.
Other Learning Materials	CD prepared by the staff members containing U-tube videos. Multi- media associated with the text book and the relevant websites. Biological charts.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	The areas of classrooms are suitable, concerning the number of enrolled students, and air conditioned. Lecture room equipped with a black board and Data show. Instructors use their own laptop. Ecology lab well equipped.
Technology Resources (AV, data show, Smart Board, software, etc.)	Classrooms are already provided with data show, audio-visual equipment.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Laboratory instruments for measuring some ecological parameters.

G. Course Quality Evaluation

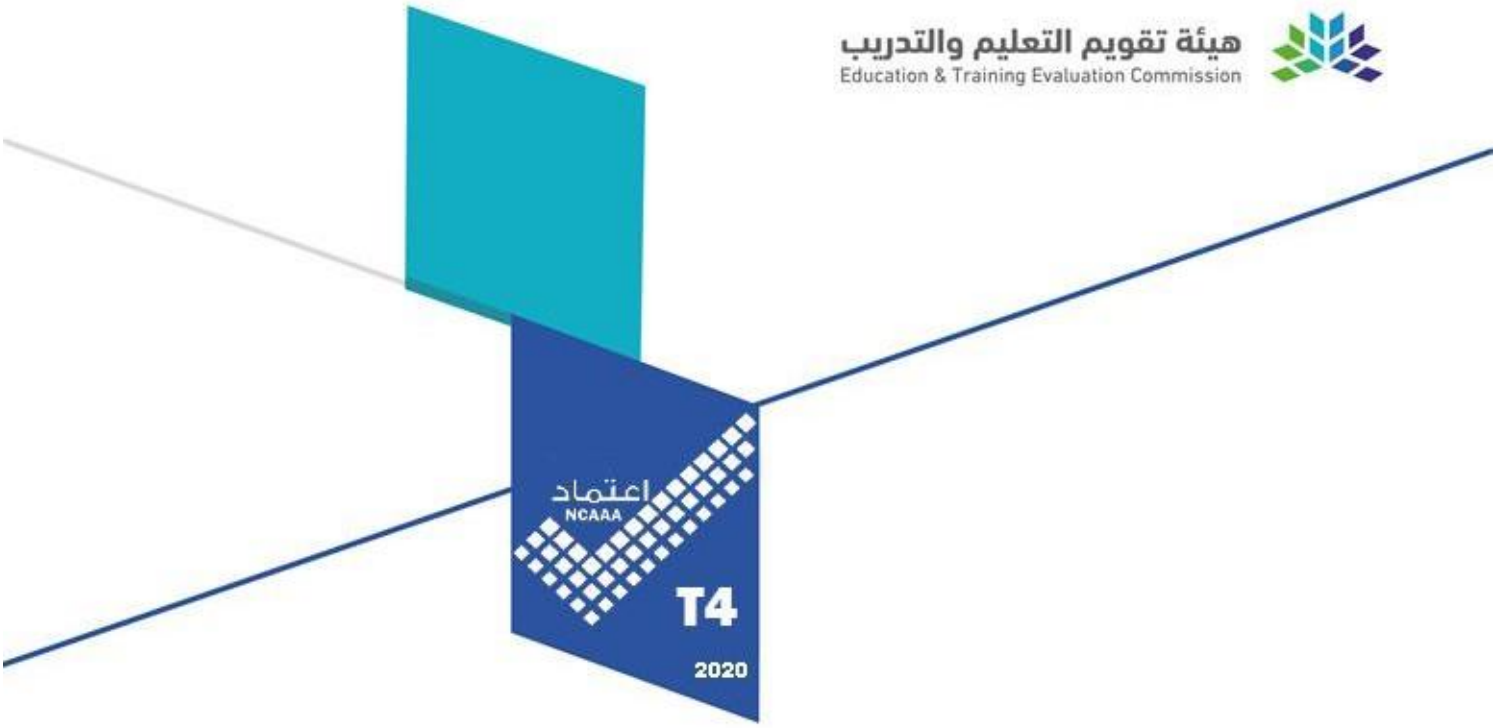
Evaluation Areas/Issues	Evaluators	Evaluation Methods
Student Feedback on Effectiveness of Teaching	Students.	Classroom discussions. Questionnaires.
Evaluation of Teaching	Instructor or by the Department	Revision of student answer paper by another staff member. Analysis the grades of students.

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	لجنة تحديث برنامج الأحياء – قسم الأحياء – كلية العلوم التطبيقية
Reference No.	
Date	02.04.2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	Graduation Project
Course Code:	
Program:	BSc Biology (Zoology Track)
Department:	Biology Department
College:	Science
Institution:	Umm Al-Qura University

Table of Contents

A. Course Identification

1. Credit hours: **4 Credits**
2. Course type **a.** University ☐ College ☐ Department ■ Others ☐ **b.** Required ■ Elective ☐
3. Level/year at which this course is offered: 4th Year /12th Level
4. Pre-requisites for this course (if any): (108 credit hrs) & Research skills in animal biology (4th Year /11th Level)
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**	40hrs	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	40hrs
2	**Laboratory/Studio**	
3	**Tutorial**	-
4	**Others** (specify) – Office hours	40hrs
	Total	80 hrs

B. Course Objectives and Learning Outcomes

1. Course Description

Students are supposed to conduct an original piece of work, in which they include the knowledge and skills they have acquired during the degree course. Each student or group of students (maximum 4) is/are assigned a supervisor who is a faculty member who coordinates the Graduation Project (GP), advises the student(s) in the project team and is responsible for reporting the assessment data. A graduation project committee must be assigned at the beginning of the semester, including the Chairman of the department who is assigned as the course coordinator. The committee members are the GP supervisors and other faculty members.

2. Course Main Objective

The Graduation Project (GP) is an obligatory subject with four credit hours. Students must do an original piece of work, in which they apply the knowledge and competencies they have acquired during the program.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Students will Learn how to identify and solve problems in animal biology.	K1
1.2	Students will learn to formulate the problem in the form of "An Essential Question".	K1,K2
1.3	Students will learn how to to collect scientific data on a particular problem related to animal biology.	K2,K3
1.4	Students will know how to write technical reports and conduct presentation about problems in animal biology in accordance with standard scientific guidelines.	K1,K2,K3
2	**Skills :**	
2.1	Student will apply the basic knowledge in animal biology and skills earned throughout the program.	S1
2.2	Students will conduct enough literature review in the project domain.	S2,S3
2.3	Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.	S2,S3
2.4	Skills of a high order in interpersonal understanding, teamwork and communication.	S1,S2,S3
3	**Values:**	
3.1	A commitment to the highest standards of professional effort and the ability to take a leadership role in the filed related to animal biology.	V2,V3
3.2	Develop the curiosity and desire to incorporate their knowledge of bioinformatics into their professional development plan.	V3
3.3	Demonstrate the ability to work independently and as part of a team with colleagues and advisors	V2

C. Course Content

No	List of Topics	Contact Hours
1		**4**
2		**4**
3		**4**
4		**4**
5		**4**
6		**4**
7		**4**
8		**4**
9		**4**
10		**4**
Total		**40**

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	Students will Learn how to identify and solve problems in animal biology.	Group discussion Laboratory practice (conducting experiments and or analyses and writing reports). Self-study and learning by reading literature Field practice	Final presentation Oral examination Assignments Reports Final thesis .
K2	Students will learn to formulate the problem in the form of "An Essential Question".	Group discussion Laboratory practice (conducting experiments and or analyses and writing reports). Self-study and learning by reading literature Field practice	Final presentation Oral examination Assignments Reports Final thesis .
K3	Students will learn how to to collect scientific data on a particular problem related to animal biology.	Group discussion Laboratory practice (conducting experiments and or analyses and writing reports). Self-study and learning by reading literature Field practice	Final presentation Oral examination Assignments Reports Final thesis
K4	Students will know how to write technical reports and conduct presentation about problems in animal biologyin accordance with standard scientific guidelines.	Group discussion Laboratory practice (conducting experiments and or analyses and writing reports). Self-study and learning by reading literature Field practice	Final presentation Oral examination Assignments Reports Final thesis
2.0	**Skills**		
S1	Student will apply the basic knowledge in animal biology and skills earned throughout the program.	Group discussion Laboratory practice (conducting	Final presentation Oral examination Assignments

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		experiments and or analyses and writing reports). Self-study and learning by reading literature Field practice	Reports Final thesis Final presentation Oral examination Assignments Reports Final thesis
S2	Students will conduct enough literature review in the project domain.	Group discussion Laboratory practice (conducting experiments and or analyses and writing reports). Self-study and learning by reading literature Field practice	Final presentation Oral examination Assignments Reports Final thesis
S3	Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.	Group discussion Laboratory practice (conducting experiments and or analyses and writing reports). Self-study and learning by reading literature Field practice	Final presentation Oral examination Assignments Reports Final thesis
S4	Skills of a high order in interpersonal understanding, teamwork and communication.	Group discussion Laboratory practice (conducting experiments and or analyses and writing reports). Self-study and learning by reading literature Field practice	Final presentation Oral examination Assignments Reports Final thesis
3.0	**Values**		
V1	A commitment to the highest standards of professional effort and the ability to take a leadership role in the filed related to animal biology.	Group discussion Laboratory practice (conducting experiments and or analyses and writing reports). Self-study and learning by reading literature Field practice	Final presentation Oral examination Assignments Reports Final thesis

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
V2	Develop the curiosity and desire to incorporate their knowledge of bioinformatics into their professional development plan.	Group discussion Laboratory practice (conducting experiments and or analyses and writing reports). Self-study and learning by reading literature Field practice	Final presentation Oral examination Assignments Reports Final thesis
	Demonstrate the ability to work independently and as part of a team with colleagues and advisors	Group discussion Laboratory practice (conducting experiments and or analyses and writing reports). Self-study and learning by reading literature Field practice	Final presentation Oral examination Assignments Reports Final thesis

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Poster	-	10%
2	Experiments	6	20%
3	Writing Thesis included abstract, introduction, materials and methods, results, discussion, conclusion, references. Thesis pages range from 20 to 40 pages.	11	40%
4	Oral Examination	11	10%
5	Final Presentation	11	20%
6	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:

Four office hours per week

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	- Handout
Essential References Materials	
Electronic Materials	
Other Learning Materials	Handouts and Lecture notes

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	1. Classrooms, 2. laboratories 3. Computer lab
Technology Resources (AV, data show, Smart Board, software, etc.)	1. Computers 2. Smart Board. 3. Data show
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

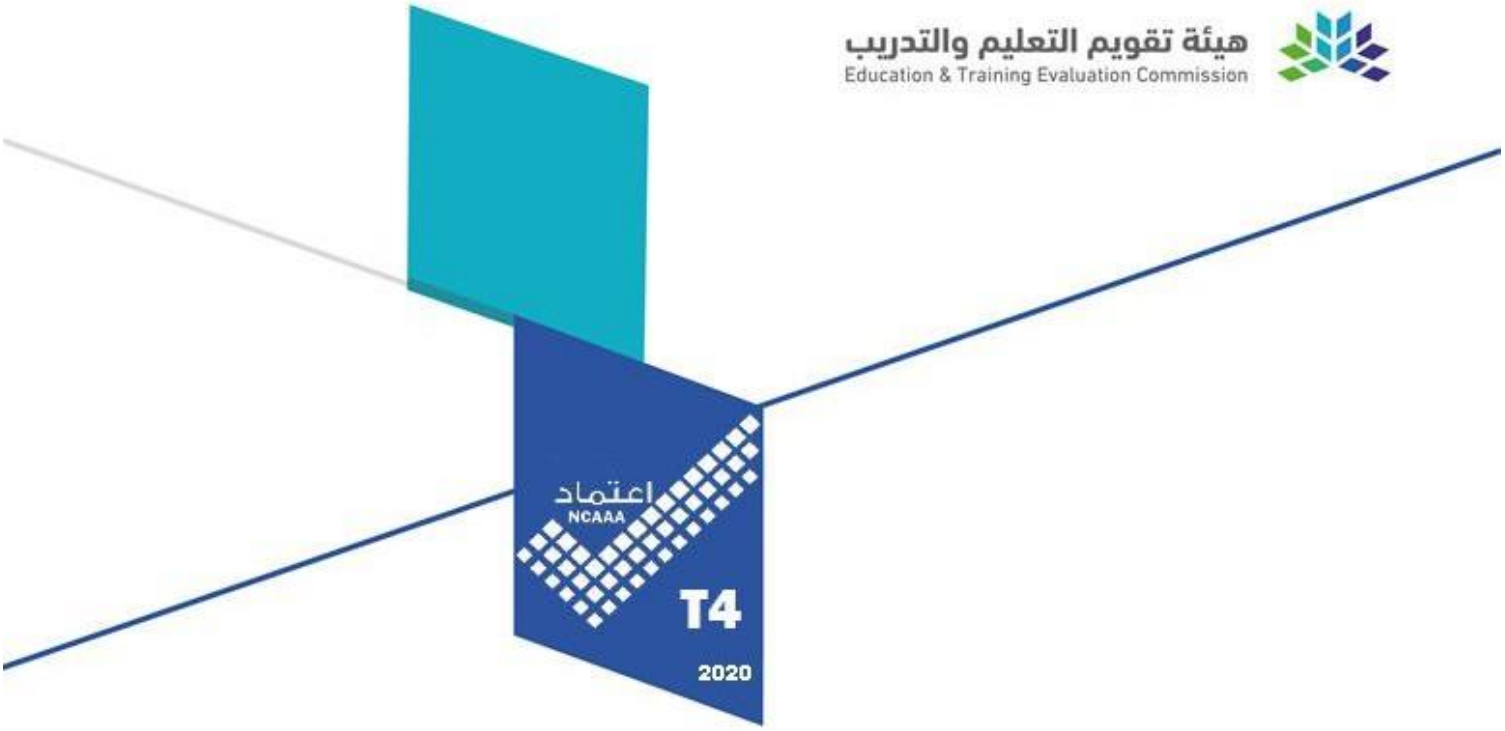
Evaluation Areas/Issues	Evaluators	Evaluation Methods
1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching	Students	Direct
2. Quality of learning resources	Staff and Students	Direct

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	لجنة تحديث برنامج الأحياء – قسم الأحياء – كلية العلوم التطبيقية
Reference No.	
Date	02.04.2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	**Invertebrates**
Course Code:	
Program:	**BCs. Biology (Zoology)**
Department:	**Biology**
College:	**Sciences**
Institution:	**Umm Al-Qura University**

Table of Contents

A. Course Identification

1. Credit hours: 3 Credit
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: 3th Year / 7th Level
4. Pre-requisites for this course (if any)**:** Animal biology
5. Co-requisites for this course (if any)**: Non**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	30hrs	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	20 hrs
2	**Laboratory/Studio**	30 hrs
3	**Tutorial**	-
4	**Others** (specify) / 4 office hrs / week	30 hrs
	Total	**70 hrs**

B. Course Objectives and Learning Outcomes

1. Course Description

This course will focusing on fundamental principles of Invertebrates structure. These principles will be illustrated by selected examples from invertebrates (morphology- structure – taxonomy and ecological ecosystems).

It includes general anatomical directions and nomenclature , anatomy of the Integumentary system.

The laboratory portion of the course will be more “hands-on”. This will involve some inspection/dissection of specimens, based on anatomicaly-based “wet” and computer labs demonstrating Invertebrates structure.

2. Course Main Objective

Identifying and knowing various invertebrate compared to other organisms.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Identify the Invertebrates	K3
1.2	Morphology and structure	K2
1.3	Ecology of invertebrates	K3
1.4	Role of their lives	K3
2	**Skills :**	
2.1	How to recognize and study and invertebrates	S1
2.2	dissecting Invertebrates	S2
2.3	Study its role in the ecology	S3
3	**Values:**	
3.1	Developing oral presentations.	V1
3.2	Communicating personal ideas and thoughts.	V2
3.3	Work independently and as part of a team to finish some assignments.	V3
3.4	Communicate results of work to others	V3

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to invertebrates, basic terminology and course requirement	3
2	Protozoan organisms (amoeba species)	3
3	Flagellates (parasitic and free living)	3
4	Sporozoae and ciliates	3
5	Metazoan (sponges)	3
6	Coelenterates	3
7	Worms (Parasitic)	3
8	Worms (non parasitic)	3
9	Arthropods	3
10	Acanthocephali	3
Total		**30 hrs**

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**		
1.1	General information about Invertebrates	1. In-class lecturing where the previous knowledge is linked to the current and future topics. 2. Homework assignments. 3. Discussions (connecting what they learn in the class	1- homework and quizzes. 2- Midterm and final written exams (theoretical and practical).
1.2	know the anatomical direction and terms.		
1.3	Anatomy of the different body systems in animals and human .		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.4	Develop the anatomical drawing of body systems .	and applying this information in laboratory). 4. Handout of lecture notes for each topic.	3-Evaluation of reports. 4-Oral presentation. 5- Course work reports.
1.5	know the characters and types of meristematic and permanent tisuues.		
2.0	**Skills**		
2.1	To know anatomical characteristics of Invertebrates organisms.	1- Application of essential scientific techniques through lectures, classes and essays. 2- Small group discussion. 3- Ask the students to make small search project during the semester. 4- Making connections between different topics across the course. 5- Class discussions (Engage students in interaction with questions and answers). 6- Homework assignments. 7- Use of microscopic illustrations. 8- Laboratory training. 9- Activities and homework 10- .	1- Evaluation of the topics prepared by students according to the content, arrangement, and covering of the topic. 2- Midterm and final exams. 3- Checking the homework assignments. 4- Course work reports.
2.2	To recognize an overview of the tissues anatomy.		
2.3	To refer different organs of different systems.		
2.4	To dissect experimental animals, and identify various systems.		
2.5	To know anatomical nomenclature and terms.		
2.6	To describe the disorders arise after any organ injury.		
2.7	To use computer and internet.		
3.0	**Values**		
3.1	Developing oral presentations.	1- Engage student in carrying out internet search. 2- The ability to debate the scientific basis of physiological mechanisms of body systems. 3- Writing group reports. 4- Solving problems in groups during tutorial. 5- Checking the homework assignments in groups during discussion. 6- Cooperative learning and application of scientific method in thinking the scientific problem solving.	1- Oral exams. 2- Evaluation of student essays assignments and search work. 3- Observation of student ethical and moral behavior. 4- Students' attendance is recorded during lectures. 5- Assessment of the student reports. 6- Grading homework assignments.
3.2	Communicating personal ideas and thoughts.		
3.3	Work independently and as part of a team to finish some assignments.		
3.4	Communicate results of work to others		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		7- Work as part of a team. 8- Conducting group experiments and writing group reports. Dividing students into groups to cooperate with each other during the experiments.	

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes, Project, Problem Sets	-	10%
2	Midterm Exam (Lab)	6	10%
3	Exam Midterm (Lecture)	6	20%
4	Final Exam (Lab)	11	20 %
5	Final Exam (Lecture)	12	40%
	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 :

- Four office hours per week

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	General animal (Arabic) – Invertebrates by Dr. N.Z.Zahid
Essential References Materials	Samples in lab
Electronic Materials	Google + Wikipedia
Other Learning Materials	YouTube

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	1. Lecture room suitable for 35 students equipped with a black board and Data show. 2. Dissecting tables and dissecting instruments 3. Instructors use their own laptop.
Technology Resources (AV, data show, Smart Board, software, etc.)	1. Data show 2. Speakers 3. Microscopes
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	1. Anatomical Laboratory instruments & equipment 2. Related videos films

G. Course Quality Evaluation

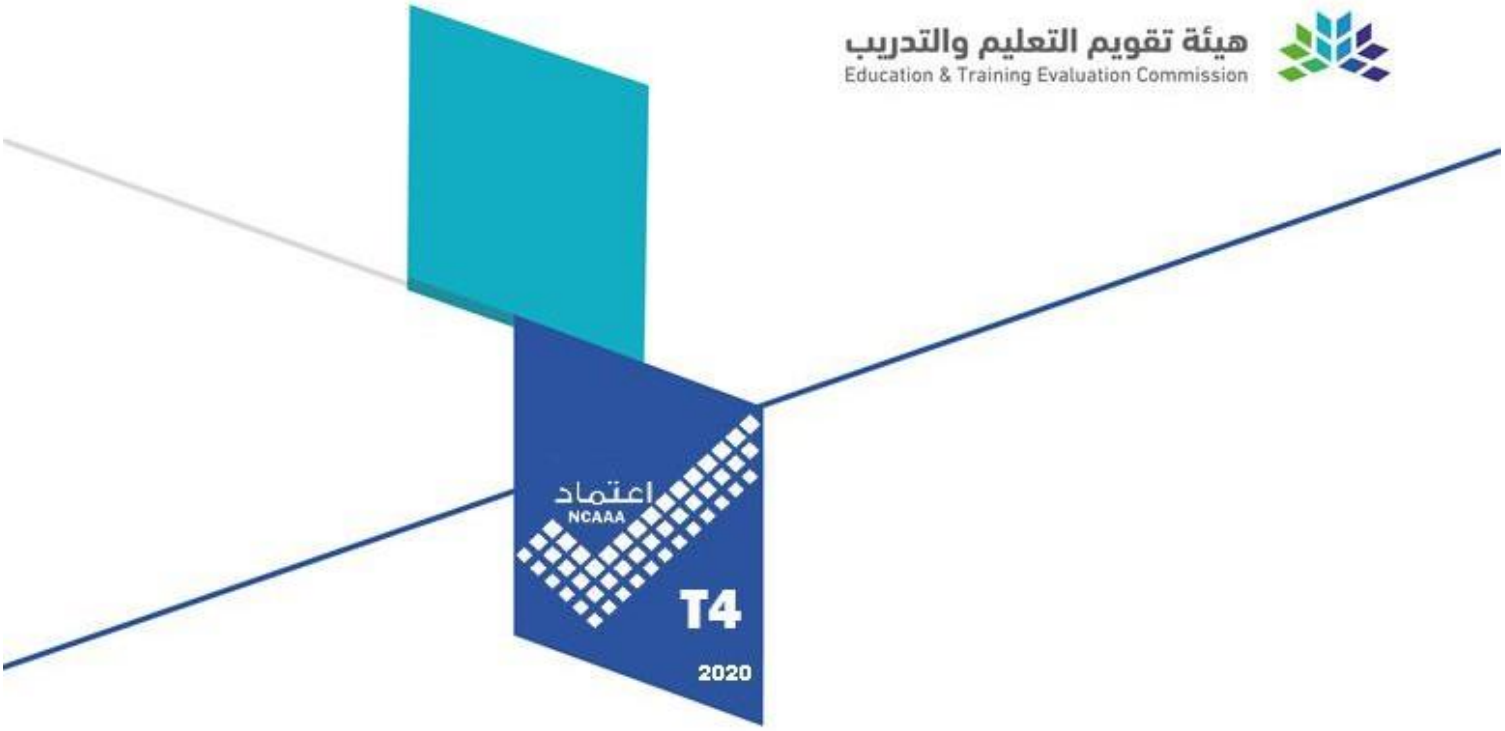
Evaluation Areas/Issues	Evaluators	Evaluation Methods
1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching	Students	Questionnaires
2. Quality of learning resources	Staff and Students	Questionnaires

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	لجنة تحديث برنامج ألحياء – قسم ألحياء – كلية العلوم التطبيقية
Reference No.	
Date	02.04.2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	**Protection of Wildlife**
Course Code:	
Program:	**BCs. Biology (Zoology)**
Department:	**Biology**
College:	**Faculty of Sciences**
Institution:	**Umm Al-Qura University**

Table of Contents

A. Course Identification

1. Credit hours: **2 Credits**
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: **4th Year / 12th Level**
4. Pre-requisites for this course (if any)**:** Animal Taxonomy and Fauna
5. Co-requisites for this course (if any)**:** **NA**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	20 hrs	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other** / Case study (Two)		-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	2h / weekly
2	**Laboratory/Studio**	
3	**Tutorial**	
4	**Others** (specify)	
	Total	

B. Course Objectives and Learning Outcomes

1. Course Description

This course is one of the basic courses in wildlife ecology and protection that provides students with the required knowledge on the scope and meaning of wildlife generally. Principles of wildlife ecology as applied to the protection of wildlife species and habitats. Special emphasis on the growth and regulation of populations, spatial patterns of population distribution, interactions among species and their environments, and the human dimensions of wildlife protection.

2. Course Main Objective

This course is intended to:

- Introduce students to the fundamentals of wild animal ecology as the underlying fact in wildlife protection.
- Provides students with the essential conservation science education to study, conserve and protect wildlife populations, and the land and water environments on which they and we depend.
- Understand the biology and ecology of wildlife; how to manage, conserve and restore wildlife populations and their habitats; how to resolve human-wildlife conflict and wildlife disease problems; and how to conserve and enhance biological diversity.
- Encourage students to participate in continuing and emerging environmental biotechnological matters.
- Integrate the theoretical knowledge with the practical skills applied in the laboratory.
- Enhance the skills of self-directed learning and investigation of scholarly articles.
- Motivate students to participate in research activities and projects.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Understand the guiding principles and practices underlying wildlife management, including historical and contemporary developments.	K1
1.2	Describe the basic principles used in the field of wildlife ecology and protection.	K1
1.3	Define the important wildlife ecology and protection techniques and related processes.	K1 & K2
1.4	Describe the ecology of some wild animals with respect to their habitats and feeding habits.	K3
2	**Skills :**	
2.1	Key techniques used by wildlife biologist to gain scientific data used to inform wildlife management.	S3
2.2	The management of select wildlife populations through relevant case studies.	S2
2.3	Apply the knowledge gained to the management of any wildlife species.	S1 & S2
2.4	Describe suitable methods for characterizing the activity, function, diversity, and composition of microbial communities.	S3, S4
2.5	Communicate effectively both orally and in writing for data analysis and consultation.	S5 & S6
2.6	Perform accurate procedures used in the operation of related apparatuses.	S3 & S4
3	**Values:**	
3.1	Appraise the value of critical judgment through constructive criticism among colleagues.	V1 & V3
3.2	Demonstrate personal integrity, reliability, honesty, trustworthiness, teamwork, and ethical behavior toward others in the community.	V2 & V4

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to Wildlife Ecology & wild animals	2
2	Life on Earth	2
3	Wildlife and Society	2
4	Population, territorial defense, home range of the individual species populations.	2
5	Environmental and Field Techniques	2
6	Food & feeding habits of wildlife species	2
7	Field Skills (includes residential field trip, where possible)	2
8	Identification and classification of important wildlife species	2
9	Ecology and Ecosystem Protection	2
10	Plant Growth and Survival	2
Total		20 hrs

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**		
1.1	Understand the guiding principles and practices underlying wildlife management, including historical and contemporary developments.	- Interactive lectures - Group discussions - Tutorials	▪ Written exams including: - Short answers - MCQs - EMQs - SAQs - LAQs ▪ Assignment ▪ Open-book exam ▪ Quizzes
1.2	Describe the basic principles used in the field of wildlife ecology and protection.		
1.3	Define the important wildlife ecology and protection techniques and related processes.		
1.4	Describe the ecology of some wild animals with respect to their habitats and feeding habits.		
2.0	**Skills**		
2.1	Key techniques used by wildlife biologist to gain scientific data used to inform wildlife management.		▪ Written exams including: - Short answers - MCQs - EMQs - SAQs
2.2	The management of select wildlife populations through relevant case studies.		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.3	Apply the knowledge gained to the management of any wildlife species.	- Interactive lectures - Tutorials - Practical work	- LAQs ▪ Assignment ▪ Open-book exam ▪ Quizzes ▪ OSPE
2.4	Describe suitable methods for characterizing the activity, function, diversity, and composition of microbial communities.		
2.5	Communicate effectively both orally and in writing for data analysis and consultation.		
2.6	Perform accurate procedures used in the operation of related apparatuses.		
3.0	**Values**		
3.1	Appraise the value of critical judgment through constructive criticism among colleagues.	- Tutorials - Practical work - Small group - Discussion	- Lab demonstration - Assignments - OSPE
3.2	Demonstrate personal integrity, reliability, honesty, trustworthiness, teamwork, and ethical behavior toward others in the community.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Periodical Exam(s)	3-7	15 %
2	Mid Term Exam (Theoretic)	6	20 %
3	Reports and essay	9	15 %
4	Oral presentation	10	10 %
5	Final Examination	13	40 %
	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:

Teaching staff are available 1 hour / day, (Sun-Thu from 12:00 to 1:00 p.m)

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Sinclair, A. R. E., Fryxell, J. M., & Caughley, G. (2006). Wildlife ecology, conservation, and management. 2nd ed. Malden, MA ; Oxford: Blackwell Pub.
Essential References Materials	The Journal of Wildlife Management Wildlife Protection and Habitat Management: Practice and Perspectives Journal of Wildlife and Biodiversity

Electronic Materials	Introduction to Wildlife Conservation. ALISON – online learning website. https://alison.com/course/introduction-to-wildlife-conservation
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	➢ Lecture room = 30 students ➢ Laboratory for practical = 15 students
Technology Resources (AV, data show, Smart Board, software, etc.)	➢ Computers ➢ Internet access ➢ Smart Board (preferred) ➢ Projector
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	➢ Display screen ➢ White board ➢ SDS electrophoresis tanks and its contents ➢ DNA electrophoresis tanks and its contents ➢ PCR Thermocycler ➢ UV rays for DNA visualization

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students	➢ Class discussion. ➢ Written feedback by individuals. ➢ Satisfaction survey at the end of each semester.
Extent of achievement of course learning outcomes	Course instructor Peer reviewer Program director	➢ Course development according to the analysis of student feedback. ➢ Monitoring students' performance throughout the semester using formative assessment. ➢ Analyzing students' progress. ➢ Using statistics to analyze students' achievement at the end of each semester and implement data comparison. ➢ Department council discussion. ➢ Peer evaluation of the instructor.
Quality of learning resources	Course instructor	➢ Attending staff development workshops and programs. ➢ Continuous education. ➢ Implementing student feedback.

Evaluation Areas/Issues	Evaluators	Evaluation Methods
		➢ Variations of teaching strategies including tutorials, PBL and more emphasizing on the practical sessions

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	لجنة تحديث برنامج ألحياء – قسم ألحياء – كلية العلوم التطبيقية
Reference No.	
Date	02.04.2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	**Toxicology**
Course Code:	
Program:	**Biology (Zoology)**
Department:	**Biology**
College:	**Faculty of Sciences**
Institution:	**Umm Al-Qura University**

Table of Contents

A. Course Identification

1. Credit hours: 2 Credits
2. Course type **a.** University ☐ College ☐ Department ■ Others ☐ **b.** Required ■ Elective ☐
3. Level/year at which this course is offered: 4th Year / 10th Level
4. Pre-requisites for this course (if any)**:** Animal ecology and pollution
5. Co-requisites for this course (if any)**:** **NA**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	20 hrs	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other /** Case study (Two)		-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	2h / weekly
2	**Laboratory/Studio**	
3	**Tutorial**	
4	**Others** (specify)	
	Total	

B. Course Objectives and Learning Outcomes

1. Course Description

Toxicology studies the body's response to drugs, foods, and toxic substances. Fundamentals of pharmacology and mechanisms of action are examined for acute and chronic exposure derived from environmental, dietary, occupational and pharmaceutical sources. Emphasis is placed on information literacy to support problem-based and evidence-based learning.

2. Course Main Objective

1. Developing an understanding of how the body's biochemical and physiological mechanisms operate to manage the exposure to toxins, poisons and drugs.
2. Developing an appreciation of how exposure to toxins and the processing of metabolites can limit the patient response to chiropractic care.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Upon the successful conclusion of this course, the student should be able to understand and apply pharmacokinetic and pharmacodynamic principles that impact administration, absorption, distribution, metabolism, elimination, efficacy, potency, effectiveness and biological activity of drugs and toxins.	K1
1.2	Understand and describe how the liver's cytochrome P450 system works, including Biotransformation Phases I and II, and how drug-drug and drug-herb interactions affect this detoxification system.	K3
1.3	Understand the therapeutic and adverse effects of selected drugs, supplements, and environmental toxins.	K1
1.4	Understand and identify health conditions linked to selected toxic exposures from food, lifestyle, environment, workplace and home.	K1
2	**Skills :**	
2.1	Evaluate the risk that exposure to chemicals in the environment will cause toxicity and disease in humans.	S1
2.2	Retrieve toxicology information from public health effects databases, interpret the information, and use scientific evidence to explain the roles of environmental toxicants in human disease.	S2
2.3	Explain how personal characteristics, such as diet and genetics, affect how individuals respond to environmental toxicants.	S3
3	**Values:**	
3.1	Solve problems, such as interpreting data to determine the dose of a chemical that is likely to be toxic to humans versus a dose that is not likely to be toxic to humans, and determining why a chemical is nontoxic to one species, such as mice, but is toxic to a different species, such as humans.	V1 , V2
3.2	Collaborate with students who have varied perspectives and areas of expertise in order to solve problems,	V3

C. Course Content

No	List of Topics	Contact Hours
1	History of Toxicology. Classification and properties of toxic substances.	2 hrs
2	Dose Response ,Toxic Effects and Interactions	2 hrs
3	Toxicity Testing and Risk Assessment	2 hrs
4	Absorption and Distribution	2 hrs
5	Biotransformation and Excretion	2 hrs
6	Toxic Effects on the Nervous System	2 hrs
7	Cellular Adaptive Responses	2 hrs
8	Carcinogens	2 hrs
9	Club Drugs and hepatotoxicity	2 hrs
10	Nephrotoxicity	2 hrs
Total		20 hrs

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**		
1.1	understand and apply pharmacokinetic and pharmacodynamic principles that impact administration, absorption, distribution, metabolism, elimination, efficacy, potency, effectiveness and biological activity of drugs and toxins.	1. In-class lecturing where the previous knowledge is linked to the current and future topics. 2. Homework assignments. 3. Discussions (connecting what they learn in the class and applying this information in laboratory). 4. Handout of lecture notes for each topic.	1-homework and quizzes. 2-Midterm and final written exams (theoretical and practical). 3-Evaluation of reports. 4-Oral presentation. 5-Course work reports.
1.2	Understand and describe how the liver's cytochrome P450 system works, including Biotransformation Phases I and II, and how drug-drug and drug-herb interactions affect this detoxification system.		
1.3	Understand the therapeutic and adverse effects of selected drugs, supplements, and environmental toxins.		
2.0	**Skills**		
2.1	Evaluate the risk that exposure to chemicals in the environment will cause toxicity and disease in humans.	1- Application of essential scientific techniques through lectures, classes and essays. 2- Small group discussion. 3- Ask the students to make small search project during the semester. 4- Making connections between different topics across the course. 5- Class discussions (Engage students in interaction with questions and answers). 6- Homework assignments. 7- Use of microscopic illustrations. 8- Laboratory training. 9- Activities and homework.	1- Evaluation of the topics prepared by students according to the content, arrangement, and covering of the topic. 2- Midterm and final exams. 3- Checking the homework assignments. 4- Course work reports.
2.2	Retrieve toxicology information from public health effects databases, interpret the information, and use scientific evidence to explain the roles of environmental toxicants in human disease.		
2.3	Explain how personal characteristics, such as diet and genetics, affect how individuals respond to environmental toxicants.		
3.0	**Values**		
3.1	Solve problems, such as interpreting data to determine the dose of a chemical that is likely to be toxic to humans versus a dose that is not likely to be toxic to humans, and determining why a chemical is nontoxic to one species, such as mice, but is toxic to a different species, such as humans.	1- Engage student in carrying out internet search. 2- The ability to debate the scientific basis of physiological mechanisms of body systems. 3- Writing group reports. 4- Solving problems in groups during tutorial. 5- Checking the homework assignments in groups during discussion.	1- Oral exams. 2- Evaluation of student essays assignments and search work. 3- Observation of student ethical and moral behavior. 4- Students' attendance is recorded during lectures. 5- Assessment of the student reports. 6- Grading homework assignments.
3.2	Collaborate with students who have varied perspectives and areas of expertise in order to solve problems,		
3.3	Solve problems, such as interpreting data to determine the dose of a chemical that is likely to be toxic to humans		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	versus a dose that is not likely to be toxic to humans, and determining why a chemical is nontoxic to one species, such as mice, but is toxic to a different species, such as humans.	6- Cooperative learning and application of scientific method in thinking the scientific problem solving. 7- Work as part of a team. 8- Conducting group experiments and writing group reports. Dividing students into groups to cooperate with each other during the experiments.	

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Periodical Exam(s)	3-7	15 %
2	Mid Term Exam (Theoretic)	6	20 %
3	Reports and essay	9	15 %
4	Oral presentation	10	10 %
5	Final Examination	13	40 %
	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 :

Teaching staff are available 1 hour / day, (Sun-Thu from 12:00 to 1:00 p.m)

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	1. Green Toxicology: Making Chemicals Benign by Design (Issn) 1st Edition by Alexandra Maertens, Royal Society of Chemistry, 2022. ISBN-13: 978-1839162282 2. An Introduction to Toxicology by Philip C. Burcham, 2016, Springer , ISBN-13: 978-1447155522 3. Principles and Methods of Toxicology ,5th Edition,by A. Wallace Hayes, 2008, Informa Healthcare; ISBN-13: 978-0849337789
Essential References Materials	1. A Textbook of Modern Toxicology, 5th Edition, Ed. Ernest Hodgson, 2018. 2. Casarett & Doull's Toxicology, The Basic Science of Poisons, 8th Ed.,Edited by Curtis D. Klaasen, McGraw-Hill Publishing, 2013.
Electronic Materials	1. Toxicology Tutor I, National Library of Medicine http://sis.nlm.nih.gov/enviro/toxtutor/Tox1/amenu.htm 2. Toxicology Tutor II, National Library of Medicine http://sis.nlm.nih.gov/enviro/toxtutor/Tox2/amenu.htm
Other Learning Materials	1. Handouts and Lecture notes 2. Microsoft office package. 3. Multi- media associated with the text book and the relevant websites.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	1. Lecture room suitable for 35 students. 2. Lecture room equipped with interactive board and Data show.
Technology Resources (AV, data show, Smart Board, software, etc.)	1. Computers and internet connection. 2. Active smart Board.Data show is required in every room.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	1. Software and related videos

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching	Students	Questionnaires
2. Quality of learning resources	Staff and Students	Questionnaires

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	لجنة تحديث برنامج الأحياء – قسم الأحياء – كلية العلوم التطبيقية
Reference No.	
Date	02.04.2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Field Experience Specifications

Course Title:	Internship
Course Code:	
Program:	BSc Biology (Zoology Track)
Department:	Biology Department
College:	Science
Institution:	Umm Al-Qura University

Table of Contents

A. Field Experience Identification

1. Credit hours: 15hrs
2. Level/year at which this course is offered: 3rd Year/ 9th Level + Following Summer
3. Dates and time allocation of field experience activities. • Number of weeks: (15) week • Number of days: (75) day • Number of hours: (450) hour
4. Pre-requisites to join field experience (if any)**:** Students must earn a minimum of 80 % credits of the biology program (Zoology Track) to register the course

B. Learning Outcomes, and Training and Assessment Methods

1. Field Experience Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Know how to apply knowledge gained in the animal biology to real-world challenges in an internship environment.	K, K2, K3
1.2	Know how to develop and enact a compelling professional vision that values diversity and inclusion in the workplace related to animal biology.	K, K2, K3
1.3	Describe the nature and function of the organization in which the internship experience takes place.	K, K2, K3
2	**Skills:**	
2.1	Apply knowledge gained in the animal biology to real-world challenges in an internship environment.	S1, S2, S3
2.2	Develop and enact a compelling professional vision that values diversity and inclusion in the workplace related to animal biology.	S1, S2, S3
2.3	Engage in responsible conduct while working as an intern and allow decisions to be informed by a value-centered life.	S1, S2, S3
3	**Values:**	
3.1	Exhibit evidence of increased content knowledge of animal biology gained through practical experience.	V1, V2, V3
3.2	Apply appropriate workplace behaviors in a professional setting.	V1, V2, V3
3.3	Evaluate the internship experience in terms of personal, educational and career needs.	V1, V2, V3

2.Alignment of Learning Outcomes with Training Activities and Assessment Methods

Code	Learning Outcomes	Training Methods/Activities	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	Know how to apply knowledge gained in the animal biology to real-world challenges in an internship environment.	Organization Analysis Diversity and Inclusion Analysis Networking Project: Problem Analysis:	Work Place Competencies Workbook Log Demonstrate Learning Outcomes Student Evaluation
	Know how to develop and enact a compelling professional vision		

Code	Learning Outcomes	Training Methods/Activities	Assessment Methods
	that values diversity and inclusion in the workplace related to animal biology.	Final Reflection Paper	Progress Reports Attendance Final report Final Presentation
1.2	Describe the nature and function of the organization in which the internship experience takes place.		
2.0	**Skills**		
2.1	Apply knowledge gained in the animal biology to real-world challenges in an internship environment.	Organization Analysis Diversity and Inclusion Analysis Networking Project: Problem Analysis: Final Reflection Paper	Work Place Competencies Workbook Log Demonstrate Learning Outcomes Student Evaluation Progress Reports Attendance Final report Final Presentation
2.2	Develop and enact a compelling professional vision that values diversity and inclusion in the workplace related to animal biology.		
2.3	Engage in responsible conduct while working as an intern and allow decisions to be informed by a value-centered life.		
3.0	**Values**		
3.1	Apply knowledge gained in the animal biology to real-world challenges in an internship environment.	Organization Analysis Diversity and Inclusion Analysis Networking Project: Problem Analysis: Final Reflection Paper	Work Place Competencies Workbook Log Demonstrate Learning Outcomes Student Evaluation Progress Reports Attendance Final report Final Presentation
3.2	Develop and enact a compelling professional vision that values diversity and inclusion in the workplace related to animal biology.		
3.3	Engage in responsible conduct while working as an intern and allow decisions to be informed by a value-centered life.		

3. Field Experience Learning Outcomes Assessment

a. Students Assessment Timetable

#	Assessment task*	Assessment timing (Week)	Percentage of Total Assessment Score
1	Work Place Competencies	Weekly	10%
2	Workbook Log	Week	10%
3	Demonstrate Learning Outcomes	Weekly	10%
4	Student Evaluation	Weekly	10%
5	Progress Reports	Weekly	10%
6	Attendance	Weekly	10%
7	Final report	Final week	20%
8	Final Presentation	Final week	20%
	Total		100%

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

b. Assessment Responsibilities

م	Category	Assessment Responsibility

1	**Teaching Staff**	Work Place Competencies Workbook Log Demonstrate Learning Outcomes Student Evaluation Progress Reports Attendance Final report Final Presentation
2	**Field Supervisor**	Work Place Competencies Workbook Log Demonstrate Learning Outcomes Student Evaluation Progress Reports Attendance
3	**Others** (Field Experience committee)	

C. Field Experience Administration

1. Field Experience Locations

a. Field Experience Locations Requirements

Suggested Field Experience Locations	General Requirements*	Special Requirements**
Research area	Approval by Biology Department	Approval by Biology Department
Healthcare Sector		
The field of environmental conservation		
Education Field		
Field of biotechnology		
Field of forensic science		
Business, industry and economics		
The field of scientific publishing and communication		
The field of wildlife		
Natural Reserves		

*Ex: provides information technology ,equipment ,laboratories ,halls ,housing ,learning sources ,clinics etc.

**Ex: Criteria of the training institution or related to the specialization, such as: safety standards, dealing with patients in medical specialties, etc.

b. Decision-making procedures for identifying appropriate locations for field experience

After preparing an integrated animal for the field experience by the Field Experience Committee, the head of the department displays the topics of field experience and its location for students to choose what suits them best.
Then the students apply to choose one of the displayed field experiences.
Finally, the supervisor provides the student with guidelines about what kinds of tasks the student is supposed to practice at the field location.

2. Supervisory Staff

a. Selection of Supervisory Staff

Selection Items	Field Supervisor	Teaching Staff

Qualifications	PhD in animal Biology	Faculty staff members
Selection Criteria		

b. Qualification and Training of Supervisory Staff

(Including the procedures and activities used to qualify and train the supervisory staff on supervising operations, implementing training activities, the follow-up and evaluation of students, etc.)

3. Responsibilities

a. Field Experience Flowchart for Responsibility

including units, departments, and committees responsible for field experience, as evidenced by the relations between them.

- Internship Committee prepares an integrated animal on field experience based on questionnaires for faculty, students, and other institutions, and submits it to the department head.
- The head of the department displays the topics of field experience and its Institute for students to choose what suits them best.
- The students apply to choose one of the displayed field experiences.
- The supervisor (a faculty staff member) should provide the student with guidelines about what kinds of tasks the student is supposed to practice at the field location.
- The Field Placement Agreements serve as a contract between the University and training organization. These agreements are negotiated annually and must be approved by the Dean of the Applied Science and each organization Superintendent.
- The field supervisor, is responsible for guiding and assigning tasks to the student as well as reporting the student's progress to the supervisor.
- Finally, the student should give a final report and a presentation about his progress in front of the Internship Committee

b. Distribution of Responsibilities for Field Experience Activities

Activity	Department or College	Teaching Staff	Student	Training Organization	Field Supervisor
Selection of a field experience site	✓		✓	✓	
Selection of supervisory staff	✓		✓		
Provision of the required equipment	✓			✓	
Provision of learning resources	✓			✓	
Ensuring the safety of the site	✓	✓	✓	✓	✓
Commuting to and from the field experience site			✓		
Provision of support and guidance		✓			✓

Activity	Department or College	Teaching Staff	Student	Training Organization	Field Supervisor
Implementation of training activities (duties, reports, projects, ...)			✓		
Follow up on student training activities		✓			✓
Adjusting attendance and leave		✓			✓
Assessment of learning outcomes	✓	✓	✓	✓	✓
Evaluating the quality of field experience	✓	✓	✓	✓	✓
Others (specify)					

4. Field Experience Implementation

a. Supervision and Follow-up Mechanism

1. The student fills the form of the field experience to choose the suited field.
2. The site visit should be done by the faculty advisor to collect students' feedback regularly, if they are trained outside the campus.
3. Students should prepare Data logbook for daily records.
4. Students are expected to give a short report every week to the supervisor.
5. Students are expected to evaluate their field training efficiency, supervisor's performance, and all their feedback related to field-work training for improvement purposes to detect the strength and weak points during the training (using a suitable questionnaire)
6. Quality Assurance Committee analyses all questionnaires results and files a full detailed report and provide the department council with the suggested modification.
7. Proper actions based on the suggested modifications and recommendations will be taken by the department management and faculty deanship to improve the performance and overcome the challenges facing the field training course practice.

b. Student Support and Guidance Activities

1. All fields of training should be displayed to the students, to choose the suitable field training.
2. Supervising faculty remains in constant touch with students and his field supervisor.
3. The results and recommendations from the supervisors in the training field about the evaluation of the students (their work technically and their exams and reports and presentations) are submitted to the department and then students take corrective measures in presentation and writing skills.
4. Students report back to the faculty supervisor for any problem arises during the training.
5. Students submit a progress report every week to the academic supervisor by email.

5. Safety and Risk Management

Potential Risks	Safety Actions	Risk Management Procedures
The expulsion of trainee without compelling reasons	Sign Memorandum of Understanding (MoU) with the Field experience institute for	Select Field experience institute with an agreement in advance.

	providing training to the students.	
Injury to the trainee during Field training	Insure for any physical injury suffered by the trainee during the training period.	Select Field experience institute with an agreement in advance.
Claim for financial reimbursements from the college against any expenditure for the completion of training program.	Contract an agreement with the Field experience institute.	Select Field experience institute with an agreement in advance.

G. Training Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Training of trainee.	Student Faculty supervisor Field supervisor Field experience committee	Questionnaire. Reports.
Faculty supervision	Student Faculty supervisor Field supervisor Field experience committee	Questionnaire. Reports.
Field supervision	Student Faculty supervisor Field supervisor Field experience committee	Questionnaire. Reports.

Evaluation areas (e.g., Effectiveness of Training and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Supervisory Staff, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

E. Specification Approval Data

Council / Committee	
Reference No.	
Date	