هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

توصيف المقرر الدراسي

Course Title:	General Biology
Course Code:	BIO 1101
Program:	Bachelor of Science in Biology.
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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A. Course Identification

1. Credit hours:	5 (4 Lectures + 2 Lab + 0 Tutorials).
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	Level 1 / First Year
4. Pre-requisites for this course (if any)**:**	None.
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	48
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	72
Other Learning Hours*		
1	**Study**	4-6
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	4-6

* 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 has titles which will introduce the basic concepts for all courses of biology in all educational levels. So, this course involves a tour in the cell, macromolecules, homeostasis, plant backgrounds, principles of genetics and biodiversity.

2. Course Main Objective

- To introduce students into the long-term key concepts in biology which represents general source for their continuing and completing education.
- To acquire the basic and fundamental knowledge of biological terms.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	List basic concepts and principles of general biology.	1.1
1.2	Tell an understanding and appreciation of the vast diversity of living things, their special adaptations to their environment, and their evolutionary and ecological relationships.	1.1-1.2
2	**Skills:**	
2.1	Summarize ideas as well as facts by requiring students to read material on ethical probes that have no easy answers.	2.1
2.2	Prepare and rate hypotheses based on discovery-based activities by the mean of laboratories that emphasize observation and hands-on.	2.1-2.2
2.3	Analyze the results obtained from examination and investigations.	2.1-2.2
3	**Values:**	
3.1	Show ability to communicate effectively with class mates and teaching staff.	3.1-3.2
3.2	Use laboratory instruments and computers.	3.3
3.3	Analyze biological experiments and use various slides during laboratory classes.	3.2-3.3

C. Course Content

No	List of Topics	Contact Hours
1	A tour in the cell	4
2	Cell membrane structure and function	4
3	Macromolecules: structure and function	
4	Introduction to Genetics	4
5	The cell cycles. Mitosis, Meiosis.	
6	Introduction to Animals and Plants Physiology.	4
7	Hemostasis and hormonal regulation	4
8	Cellular energy (Photosynthesis and Cellular respiration).	5
9	Animal tissues.	5
10	Plant structure, growth and development. Plant tissues. Plant diversity	5
11	Biodiversity: Bacteria and Archeae, Protista and fungi Introduction to animal diversity: Invertebrates, vertebrates	5
Total		48

Topics to be covered (Laboratories)

Lab No.	Topics	Number of Weeks	Contact hours
Lab 01	Safety and Laboratory, Introduction to Measurement.	1	2
Lab 02	Structure and types of Microscopes.	1	2
Lab 03	Molecular Models, Structure of Animals and Plants Cells.	1	2
Lab 04	Animal and plant Tissue Slides.	1	2
Lab 05	Kingdom Fungi Slides, Kingdom Protista Slides, Kingdom Monera.	1	2
Lab 06	Cell Cycle and Mitosis& Meiosis.	1	2
Lab 07	Bacteria and Viruses.	1	2
Lab 08	DNA, Human Organs.	1	2
Lab 09	Osmosis and Diffusion.	1	2
Lab 10	Genetics I: Meiosis & Mendelian Genetics.	1	3
Lab 11	Genetics II: Human Genetics.	1	3
		11	24

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	List basic concepts and principles of general biology.	Three hours weekly contain lectures.	Students will be evaluated on their ability to present complete solutions to problems.
1.2	Tell an understanding and appreciation of the vast diversity of living things, their special adaptations to their environment, and their evolutionary and ecological relationships.	Two hours weekly of Laboratory devoted to experiments. Self-Study including work on work sheets.	Performance must include class examinations and homework assignments
2.0	**Skills**		
2.1	Summarize ideas as well as facts by requiring students to read material on ethical probes that have no easy answers.	Self-study is an important method for students' learning.	Questions in Lectures.
2.2	Prepare and rate hypotheses based on discovery-based activities by the mean of laboratories that emphasize observation and hands-on.	Introduce some concepts by examples from real-life Problems (i.e. laboratory).	Participation through class work and Homework.

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.3	Analyze the results obtained from examination and investigations.	Motivate students to work cooperatively with their class mates to develop individual skills.	Short Quizzes and Exams.
3.0	**Values**		
3.1	Show ability to communicate effectively with class mates and teaching staff.	Encourage the students to solve the exercises and problems on white board.	Laboratory reports writing.
3.2	Use laboratory instruments and computers.	• Presentations. • Virtual labs.	Laboratory performance and reports.
3.3	Analyze biological experiments and use various slides during laboratory classes.	Use microscope and laboratory instruments.	Laboratory performance and reports.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around 7th -8th week	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15 %
6	Final Exam.	Around 13th week	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:
Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Campbell, A.,Reece, J.B –Pearson Biology 10th ed. (2013); international edition. ISBN-13: 978-0321775658 James W. Perry Laboratory Manual for General Biology 5th Edition, ISBN-13: 978-0534380250 (2006).
Essential References Materials	• Sadava et al. 2008. Life, the Science of Biology, 8th Edition. Freeman & Co. • Barnhart, M.C. and T.M. Tamme: Laboratory Manual for General Biology • Saudi Biological Sciences journal. Publications and magazine of biological and life sciences
Electronic Materials	https://www.dscc.edu
Other Learning Materials	None

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	The computers are equipped with different software's. and connected to data show.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different organisms, light microscopes, centrifuges, incubators, ovens and other glassware's.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد NCAAA T4 2020

Course Specifications

Course Title:	**General Chemistry**
Course Code:	**CHM 1101**
Program:	**Bachelor of Science in Biology**
Department:	**Biology**
College:	**Science**
Institution:	**Imam Mohammad Ibn Saud Islamic University**

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A. Course Identification **3**

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B. Course Objectives and Learning Outcomes **3**

1. Course Description ..... **Error! Bookmark not defined.**

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F. Learning Resources and Facilities **7**

1.Learning Resources 7

2. Facilities Required 7

G. Course Quality Evaluation **7**

H. Specification Approval Data **8**

B. Course Identification

1. Credit hours: 5(4 Lectures, 2 Lab, 0 Tutorial)
2. Course type **a.** University ☐ College ☐ Department ✓ Others ☐ **b.** Required ✓ Elective ☐
3. Level/year at which this course is offered: Level 1/Year 1
4. Pre-requisites for this course (if any)**: None**
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**	**72**	**100%**
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	**48**
2	**Laboratory/Studio**	**24**
3	**Tutorial**	**0**
4	**Others** (specify)	**0**
	Total	**72**

C. Course Objectives and Learning Outcomes

1. Course Description:

This introductory and general chemistry course covers fundamental observations, laws, and theories of chemistry at the basic level. Topics include atoms/molecules, stoichiometry, acids/bases, solutions, equilibrium, gases, solids, liquids, thermodynamics, the periodic table, and chemical bonding. The chemistry lab is taken in parallel with the course and covers the following basic experiments: density, mass-mass relationship, limiting reactant, acid-base titrations, solubility product, reactions in aqueous solution, Calorimetry and redox reactions.

2. Course Main Objective: ***This course is entended:***

- Recognize atoms, molecules and ions, atomic theory, structure of the atom, isotopes, chemical formulas, naming compounds, stoichiometry, Avogadro's number, mass spectrometer, empirical formulas, chemical equations, limiting reagents and changes taking place.
- Describe chemical reactions in aqueous solutions and their general proprieties.
- Recall types of chemical reactions (precipitation, acid-base, oxidation-reduction).
- Solve ideal gas equation, stoichiometric data, partial pressures and the kinetic molecular theory of gases,
- Identify quantum theory, electronic structure, Bohr's theory, dual nature of electron, quantum mechanics, and electron configuration, periodic classification periodic variation in physical properties, ionization energy, and electron affinity.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	To recognize the atomic theory and structure of the atom.	K1, K2
1.2	To describe different phenomena related to chemical reactions and its stoichiometry.	K1
1.3	To memorize gases laws and their physical properties.	K1, K2
1.4	To define the principles of safety, list of emergency responses and outline the routes of exposures to hazards, the minimization, and controlling and laboratory management.	K2
2	**Skills :**	
2.1	To differentiate between protons, neutrons and electrons.	S1
2.2	To write correct chemical equations and balance it.	S1
2.3	To interpret the ideal gas laws and illustrate chemical calculations.	S1,S3
2.4	To demonstrate ability to do oral communication and technical writing skills through writing and oral presentation of mini reports, operate electronic mail and Network in communicating with others.	S1, S2, S3
3	**Values:**	
3.1	To appraise coordination in teamwork and raise Knowledge during various evaluations, initiatives, and Lab-reports to uphold scientific integrity.	V1;V2
3.2	To provide students with practical field experience, and help them to adapt to the work environment culture as well as link theoretical study with practical reality.	V3

D. Course Content

No	List of Topics	Contact Hours
	Topics to be covered (Lectures and Tutorial)	
1	**The Study of Change:** Science for the twenty-first century, the study of chemistry, the scientific method and hypothesis, a law and theory, matter and substance, mixture, physical means, elements and compounds, classification of matter, The three state of matter, Types of changes, Physical and chemical properties of matter, Extensive and Intensive properties, Measurement, handling numbers, Accuracy and precision	**6**
2	**Atoms, Molecules and Ions:** The atomic theory, Dalton's atomic theory, Cathode ray tube, Millikan's experiment, Types of radioactivity, Thomson's model, Rutherford's experiment, The structure of the atom, Atomic number, Masse number, Isotopes, The periodic table, Molecules and ions, Formulas and models, Chemical formulas, molecular formula, empirical formula, Formula of Ionic compounds, Chemical nomenclature, Naming compounds, Organic chemistry.	**6**
3	**Masse Relationships in chemical reactions (Stoichiometry):** The mole, Avogadro's number, Molar mass, Molecular mass, Formula mass, the mass spectrometer, Percent composition and empirical formula, Experimental determination of empirical formulas, Chemical reaction, Chemical equations, Balancing chemical equations, Amounts of reaction and reactants and products, Reaction Yield, Limiting reagents.	**10**
4	**Reaction in aqueous solutions:** General proprieties of aqueous solutions, Solution, solute, solvent, An electrolyte and nonelectrolyte, Precipitation reactions, Solubility, Properties of acids, Properties of bases, Arrhenius acid and base, Brønsted acid and base, Neutralization reaction. Oxidation-	**7**

	reduction reactions, Oxidation number, Types of oxidation-reduction reactions, Solution Stoichiometry, Concentration, dilution, indicators, Equivalence point, Gravimetric analysis, Acid base titrations, Redox titrations.	
5	**Gases:** Physical characteristics of gases, Units of pressure, Boyle's law, Charles' & Gay-Lussac's Law, Avogadro's law, and The gas laws. The ideal gas equation, Gas stoichiometry, Dalton's law of partial pressures, The kinetic molecular theory of gases, Molecular Speed Distribution, Gas diffusion, Gas effusion, Deviations from ideal behavior.	**8**
6	**Quantum Theory and the Electronic Structure of Atoms:** Properties of waves, Line emission spectrum, Bohr's model of the atom, The dual nature of the electron, Schrodinger Wave Equation, Quantum numbers, Atomic Orbitals, Aufbau principle, Hund's rule, Electron Configuration.	**7**
7	**The Periodic Table:** Development of the periodic table, ground state electron configurations of the elements, classification of the elements, electron configurations of cations and anions, isoelectronic, effective nuclear charge, atomic radii, ionization energy, electron affinity, diagonal relationships on the periodic table, properties of oxides across a period.	**4**
Total		**48**
Topics to be covered (Laboratories)		
1	Density of liquids & Density of regular and irregular solids	**2**
2	Stoichiometry: Mass-mass relationship	**2**
3	The chemical composition by mass percentage	**2**
4	Preparation of primary standard and dilution rule & titration	**3**
5	Determination of the empirical formula	**3**
6	Strong acid-strong base titration	**2**
7	Vinegar Analysis, Mass %	**2**
8	Reactions in Aqueous Solutions & Precipitation reaction & Limiting reactant	**2**
9	Redox titration of Fe2+	**2**
10	Determination of the specific heat of metal	**2**
11	Revision	**2**
Total		**24**

E. 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 recognize the atomic theory and structure of the atom.	Lecturing	Short quizzes
1.2	To describe different phenomena related to chemical reactions and its stoichiometry.	Solving problems, Homework and assignment	Homework and assignment marks and written exams
1.3	To recall gases laws and their physical properties.	Discussions, Laboratory classes	Quizzes and MCQs, laboratory report
2.0	**Skills**		
2.1	To distinguish between protons, neutrons and electrons.	Lecturing and oral discussion	Short quizzes and Multiples Choice Questions

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.2	To demonstrate the ability to write correct chemical equations and balance it.	Lectures supported by laboratory experiments	Homework assignment, Examination and laboratory sheet
2.3	To interpret the ideal gas laws and illustrate chemical calculations.	Lecturing and oral discussion supported by laboratory experiments	Examination and laboratory report
2.4	To demonstrate ability to do oral communication and technical writing skills through writing and oral presentation of mini reports, operate electronic mail and Network in communicating with others.	• Oral participation • Group discussions and lab experiment and reports • Encourage students to use electronic mail to submit homework and assignments.	• Oral tests and lab performance, reports and sheets Marks • Assignments and homework marks
3.0	**Values**		
3.1	To appraise coordination in teamwork and raise Knowledge during various evaluations, initiatives, and Lab-reports to uphold scientific integrity.	• Group discussion, assignments and homework • Lab-reports • Virtual labs and demonstrations	• Oral tests, lab performance, Lab-reports and sheets Marks • Assignments and homework marks

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	**Quizzes, Attendance, Participation, Homework**	**All the semester**	**10 %**
2	**Laboratory**	**All the semester**	**30 %**
3	**Midterm Exam 1**	**Around 5th week**	**10 %**
4	**Midterm Exam 2**	**Around 8th week**	**10%**
5	**Final Exam**	**Around 13thweek**	**40 %**
6	**Total**		**100%**

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

F. Student Academic Counseling and Support

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

- **There are two office hours per week reserved by each staff member, planned on his timetable, to help the students to solve their problems.**
- **Each department has an academic advisor who will act as a mentor, providing academic and career advice and general counselling.**

G. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	• ***Chemistry***, Raymond CHANG, Mc Graw Hill, 10thEducation, 2010, ISBN 9780073511092.
Essential References Materials	• ***Chemistry,*** Steven S. Zumdahl and Susan A. Zumdahl, Houghton Mifflin, 7thEdition, 2006, ISBN: 061852844X • ***Laboratory Manual for Principles of General Chemistry***, J. A. Beran,, 7th Edition, John Wiley & Sons Inc., 2004.
Electronic Materials	• **Blackboard** • **http://highered.mcgrawhill.com/classware/ala.do?isbn=0073048518&alaid=ala_1136810&protected=true&showSelfStudyTree=true** • **http://www.chem1.com/acad/webtext/virtualtextbook.html** • **http://www.shodor.org/UNChem/index.html**
Other Learning Materials	**Internal server: www. Elesevier.com**

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	**Each of the class room should be equipped with a whiteboard and a projector, with a maximum of 20 students.**
Technology Resources (AV, data show, Smart Board, software, etc.)	**The rooms are equipped with data show, Smart Board, WI-FI access.**
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	**None**

H. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	Students	**Direct:** Questionnaire.
	Course Responsible	**Direct:** Course e-Portfolio. **Indirect:** Second examiner checklist-Course report.
	Peer Reviewer	**Direct:** Questionnaire. **Indirect:** External assessor report.
Effectiveness of assessment	Program Leaders	**Direct:** Course e-Portfolio. **Indirect:** Course report.
Extent of achievement of course learning outcomes	Course Responsible	**Direct:** Exams - Course e-Portfolio. **Indirect:** Second examiner checklist-Course report.
	Program Leaders	**Indirect:** Exams.
Quality of learning resources	Students	**Indirect:** Second examiner checklist-Course report.
	Faculty (Academic Advisory)	**Direct:** course Entrance/Exit. **Indirect:** Observations - Accreditation review.

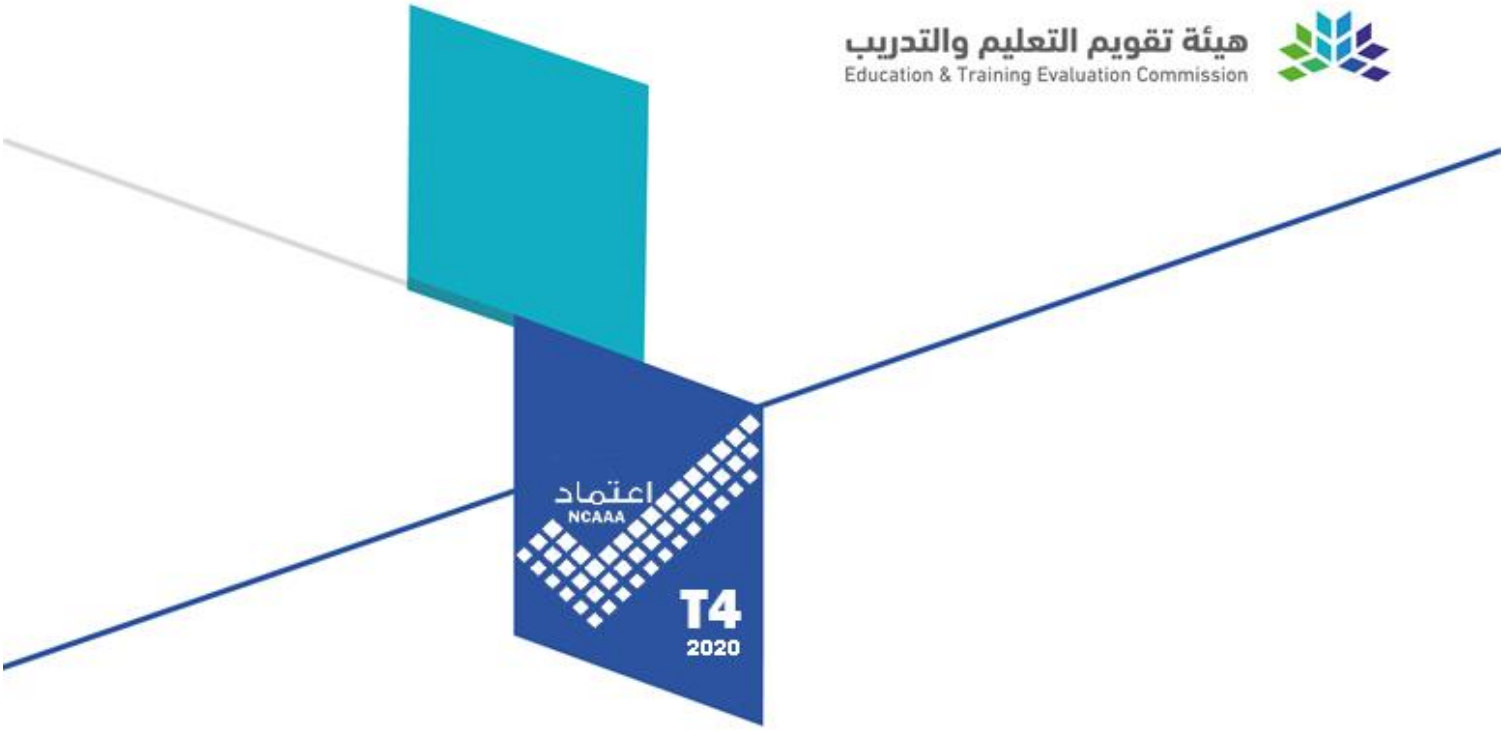
Evaluation Areas/Issues	Evaluators	Evaluation Methods
	Program Leaders	**Direct:** Course e-Portfolio. **Indirect:** Course evaluation survey- Observations- Syllabus review- Accreditation review.
Lab Performance	Students	**Direct:** Lab reports, Final Lab exam, Course e-Portfolio.
	Course Responsible	

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)

I. Specification Approval Data

Council / Committee	**Council of Chemistry Department**
Reference No.	**21**
Date	**29/7/1443**

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



توصيف المقرر الدراسي

Course Title:	Taxonomy of Botany
Course Code:	BIO 1121
Program:	Bachelor of Science in Biology.
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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A. Course Identification **3**

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2. Assessment Tasks for Students 7

E. Student Academic Counseling and Support **7**

F. Learning Resources and Facilities **7**

1.Learning Resources 7

2. Facilities Required 8

G. Course Quality Evaluation **8**

H. Specification Approval Data **9**

A. Course Identification

1. Credit hours:	5 (4 Lectures + 2 Lab + 0 Tutorials).
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	Level 2 / First Year
4. Pre-requisites for this course (if any)**:**	BIO 1101
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	48
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	72
Other Learning Hours*		
1	**Study**	4-6 hours
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	4-6 hours

* 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 has titles which will introduce the basic species concepts. So, this course involves classification philosophies in wild and cultivated plants, how are plants named, study of apparent taxonomic units: total vegetative and total floral, characteristics of common plant families, monocot families and eudicots families.

2. Course Main Objective

By the successful completion of the course the student will be able:

- To Recognize, and explain to others how you do it, 50 plant families.
- To Use technical identification keys, both dichotomous and multi-access, to identify plant taxa.

- To Explain some of the processes leading to plant diversification
- To Explain the basic principles guiding plant classification and nomenclature

- To demonstrate an introductory level consideration of biological taxonomic systems.
- To compare and contrast vegetative and reproductive anatomy, including leaves, stems roots, flowers, and fruits.
- To compare and contrast the mechanism of each wind, water and insect's pollination.
- To recognize some of the common and unusual families of flowering plants found locally.

To collect, identify and prepare herbarium mounts of plants and use a research herbarium.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	Recognize introduction addresses in taxonomy, its importance, its applications, the basic rules of classification.	1.1
1.2	List scientific and taxonomic keys naming, recent trends in the science of taxonomy	1.1-1.2
2	**Skills:**	
2.1	Explain and identify the relationship between cause and consequence in the different mechanisms of taxonomy.	2.1
2.2	Analyze data and information and view discussion of sound scientific debate.	2.1-2.2
2.3	Predict incidental problems which they face and provide appropriate solutions.	2.1-2.2
3	**Values:**	
3.1	Appraise collaborative work skill.	3.1
3.2	Illustrate linking between science and technology with society.	3.1-3.3
3.3	Demonstrate the operation and use of computers and means of modern technology.	3.3

C. Course Content

No	List of Topics	Contact Hours
1	(What is a plant? What is systematics and why study it?) Definition of taxonomy and identification of scientific importance and practical use. (Taxonomy and systematic) Wild and Cultivated plants.	3
2	Species concepts in wild plants: A. Morphological species concepts. B. Interbreeding species concepts. C. Ecological species concepts. D. Cladistic species concepts. Nominolistic species concepts.	3
3	Classification philosophies in wild and cultivated plants. Brief history of nomenclature and codes. The study of Keys of scientific and taxonomic and nomenclature directions in modern taxonomy.	3
4	Nomenclature (How are plants named?) Fundamental differences in the classification and nomenclature of	3

	cultivated and wild plants: A. Ambiguity of the term variety B. Culton versus taxon C. Open versus closed classifications	
5	A Comparison of the ICBN and ICNCP A. Nomenclatural types and standards. B. Denomination classes and the reuse of epithets. C. Botanical hybrid (species) names. D. The species category in cultivated plant taxonomy (cultonomy). E. The (notho-) genus category in cultivated plant taxonomy (cultonomy). F. Ties between the ICBN and ICNCP. Nomenclature through changes and use of the ICNCP references.	4
6	Vegetative terminology (How do taxonomists describe the features of roots, leaves and stems?) Study apparent taxonomic units, namely: Total Vegetative, total floral: inflorescences, fruits, seeds.	4
7	Dichotomous & polyclave keys (How are plants identified?) The herbarium (What is a herbarium and why is it important?) Flowers (How do taxonomists describe the features of flowers?)	4
8	Floral modifications & inflorescences (How do taxonomists describe various modifications from the 'basic' floral pattern and the features of inflorescences?	4
9	Fruits & seeds (How do we describe the features of fruits and seeds?).	3
10	Embryology & palynology (How do taxonomists describe the basic features of angiosperm embryology and pollen?).	4
11	Systematics & Diversity (What are the characteristics of common plant families? How are flowering plants classified?) Overview of Flowering Plant Classification; Ancestral Families (Nymphaeaceae, Amborellaceae). Magnoliids (Magnoliaceae)&Ceratophyllales (Ceratophyllaceae). Monocot Families: "Liliaceae," Orchidaceae.	6
12	Basal Eudicots (Ranunculaceae, Papaveraceae incl. Fumariodeae, Berberidaceae) Core Eudicots (Rosids) - Fabaceae (incl. 3 subfamilies), Rosaceae, Euphorbiaceae, Onagraceae.	4
13	Core Eudicots (Rosids): Malvaceae, Brassicaceae, Salicaceae; Asterids - Asteraceae. Core Eudicots (Asterids): Ericaceae, Primulaceae, Caprifoliaceae Core Eudicots (Asterids) : Boraginaceae, Hydrophyllaceae, Lamiaceae, Scrophulariaceae (sl) ; Verbenaceae Core Eudicots (Asterids) : Solanaceae, Apocynaceae (Asclepiadaceae), Apiaceae, Rubiaceae, Convolvulaceae Core Eudicots (Caryophyllids) : Amaranthaceae, Caryophyllaceae, Polygonaceae, Cactaceae, Nyctaginaceae	4
14	• Traditional Classification; Linnaeus. • Evolutionary Classification. Revision.	4
Total		48

Topics to be covered (Laboratories)

No.	Topics	Contact hours
1	Introduction, field safety; lab safety; plant collection information.	2
2	Field Trip - Common deciduous trees & shrubs of campus; Post Lab Exercises.	2
3	Field Trip - Woodland herbaceous plants.	2
4	Field Trip - Plants of the prairie.	3
5	Field Trip - Common plants of wet areas	3
6	Field Trip - Common Weeds.	2
7	Plant Family Identification (basal eudicots & monocots).	2
8	Plant Family Identification (core eudicots).	2
9	Plant Family Identification (core eudicots).	2
10	Plant Family Identification (grasses, sedges, rushes).	2
11	General revision.	2
	Total	24

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	Recognize introduction addresses in taxonomy, its importance, its applications, the basic rules of classification.	Interactive lecture. Discussion and dialogue.	Written tests. Oral tests.
1.2	List scientific and taxonomic keys naming, recent trends in the science of taxonomy.	Collaborative learning. Style – Wiki.	Classroom assignments. Home assignments.
1.3	Recognize some of the common and unusual families of flowering plants found locally.	Collaborative learning.	Classroom discussions and contributions.
2.0	**Skills**		
2.1	Explain and identify the relationship between cause and consequence in the different mechanisms of taxonomy.	Mental focus. Problem-solving and decision-making.	Performance of written tests.
2.2	Analyze data and information and view discussion of sound scientific	Find the collective Reciprocal teaching	Work sample tests. Student's projects.

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	debate.		Research papers.
2.3	Predict incidental problems which they face and provide appropriate solutions.	Style – Wiki. Teaching with analogies and the similes Survey Discovery.	Bags achievement - portfolio.
3.0	**Values**		
3.1	Appraise collaborative work skill.	Collaborative learning.	Organized observation.
3.2	Illustrate linking between science and technology with society.	Collective research project and writing reports and presenting its display.	Assigning students to conduct research using the internet and modern technology.
3.3	Demonstrate the operation and use of computers and means of modern technology.	Default – laboratories and illustrated presentations.	Recording student performance.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around 7th -8th week	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15 %
6	Final Exam.	Around 13th week	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:
Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Janick J., 2003. Horticultural Reviews: Volume 28, John Wiley & Sons. ISBN: 978-0-471-21542-4. Harris, J.G. and Harris M.W., 2001. Plant identification terminology: an illustrated glossary, 2nd edition. Spring Lake Pub., Spring Lake UT. ISBN-10: 0964022168. Pandey S. N. *et al.*, 2001. A Textbook of Botany: Angiosperms - Taxonomy, Anatomy, Embryology and Economic Botany Paperback. ISBN-10: 8121904048. Sivarajan V.V., 1991. Introduction to the Principles of Plant Taxonomy Cambridge University Press, Second Edition. ISBN-13: 978-0521356794.
Essential References Materials	C. Jeffery (2007): An Introduction to Plant Taxonomy. (Cambridge University Press, Second Edition. Pandey (2004): Practical botany volume I and II by B.P.

	Whitson, T.D. (2006): Weeds of the west, 9th edition. Diane Pub Co. ISBN-10: 0756711827. Fahn A. (1990). Plant Anatomy.4th. Edit. Pergamon press, Oxford.
Electronic Materials	Sciencedirect.com.
Other Learning Materials	CDs private classifies plant. Electronic programs for anatomy and mechanisms of action of various devices.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms reserved for lectures and prepared the traditional education (face to face) and E-learning (E-learning) that allow interaction between teachers and students, ordinary paper blackboard smart plasma screens *etc.* A (Stage), with an integrated audio system and microphones connected to the Internet and networks 2 Wired and wireless (optical fiber), and air conditioning system and modern suitable lighting.
Technology Resources (AV, data show, Smart Board, software, etc.)	A computer for display and uses of data with a slide show presentation. High-device "projectors" Lighting. It is assumed that each student has its own computer.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental plants , dissection instruments, light microscopes, dissection microscopes, microtome instrument, slide preparations, mixer, fluorescent microscopes, molecular instruments like gel electrophoresis, PCR centrifuge, thermal cycler, an illuminator, centrifuges, incubators, ovens and other glassware's.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and	Course coordinator	Direct

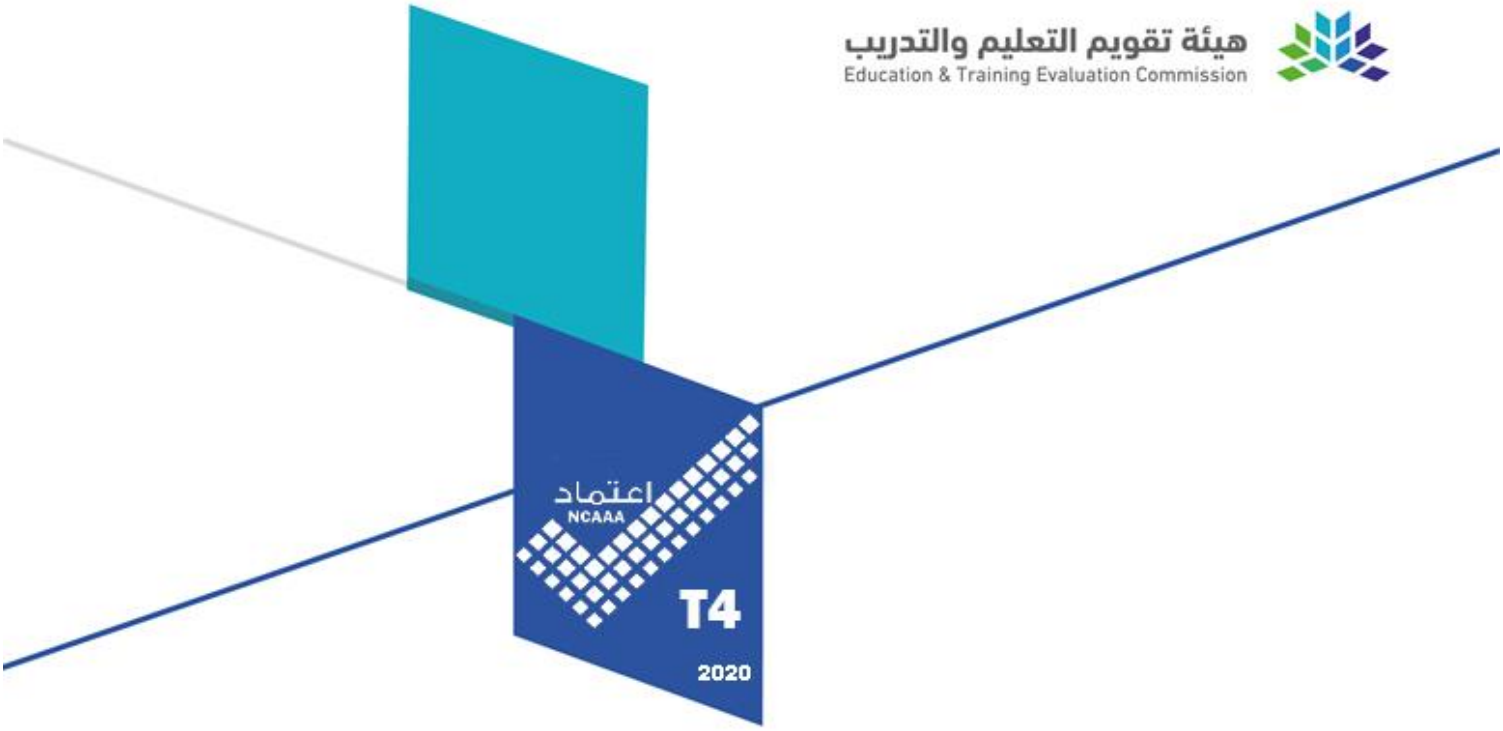
Evaluation Areas/Issues	Evaluators	Evaluation Methods
identifying changes that need to be made if necessary.		
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	**Calculus (1)**
Course Code:	**MAT 1101**
Program:	**Bachelor of Science in Biology**
Department:	**Biology**
College:	**Science**
Institution:	**Imam Mohammad Ibn Saud Islamic University**

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H. Specification Approval Data **6**

A. Course Identification

1. Credit hours:	**5 (4 Lectures, 0 Lab, 2 Tutorial)**
2. Course type	
a.	University ☐ College ☑ Department ☐ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	**Level 2/ Year 1**
4.Pre-requisites for this course (if any)**:**	**None**
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**	**72**	**100%**
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	**48**
2	**Laboratory/Studio**	**0**
3	**Tutorial**	**24**
4	**Others** (specify)	**0**
	Total	**72**

B. Course Objectives and Learning Outcomes

1. Course Description

This course describes the most important ideas, theoretical results, and examples of limit, continuity, differentiation and its applications for functions with one variable. The course includes the essential fundamentals of these topics. The emphasis is on calculations, and some applications are mentioned.

2. Course Main Objective

Understanding basics of differentiation and integration and their applications which are essential to proceed to next courses in all programs.

3. Course Learning Outcomes

	CLOs **Upon successful completion of this course, students will be able to:**	Aligned-PLOs
1	**Knowledge and Understanding**	
1.1	**Identify various types of limits of functions of one variable (graphically, numerically and algebraically)**	**K1, K2**
1.2	**Describe different techniques of differentiation and its applications.**	**K1, K2**

CLOs Upon successful completion of this course, students will be able to:		Aligned-PLOs
2	**Skills:**	
2.1	**Use differentiation and integration to solve real world problems such as rate of change, optimization, and area problems.**	**S1**
2.2	**Demonstrate the connection between area and the definite integral through Fundamental theorem of Calculus.**	**S2**
2.3	**Draw graphs of functions handily and by using CAS and online solvers.**	**S3**
2.4	**State, clearly and precisely both orally and in writing, areas and definite integrals by Riemann sums**	**S3**
3	**Values:**	
3.1	**Work individually.**	**V1, V3**
3.2	**Develop personal values and attributes such as honesty, empathy and respect for others.**	**V1, V2**

C. Course Content

No	List of Topics	Contact Hours
1	**Preliminaries:** Solving Linear Equations and Inequalities, Absolute value, Solving Inequalities Containing an Absolute Value, Equations of lines, Quadratic Equations and Inequalities, Special Product Formulas, Polynomials, Factoring Polynomials; Functions: Domain, Range, and graphs of functions, Common Functions, Composition of functions, Inverse function; Trigonometry: Unit Circle, Angles and their Measurements, Solving Equations Involving Sines and Cosines, Important Trigonometric Identities, Trigonometric Functions (Sine, Cosine, and Tangent Function), Inverses Trigonometric Functions, Exponential and Logarithmic Functions, Laws of Exponents and Logarithms.	20
2	**Limits and Continuity:** The Concept of Limit, Formal definition of limit, Limit Theorems, Limits Involving Infinity, Asymptotes, The natural number e as a limit, Continuity of functions, Operations on continuous functions, Intermediate value theorem, The Bisection Method, Formal definition of the limit.	16
3	**Differentiation:** Tangent Lines and Velocity, The Derivative, Computation of Derivatives: The Power Rule, Higher Order Derivatives, The Product and Quotient Rules, The Chain rule, Derivatives of Trigonometric Functions and their inverses, Derivatives of Exponential and Logarithmic Functions, Implicit Differentiation, The Rule Theorem, The Mean Value Theorem.	18
4	**Applications of Differentiation:** Indeterminate Forms and L'Hopital's Rule, Maxima and minima values, Monotonic functions and the first derivative test, Concavity and the second derivative test, Graphing functions.	18
Total		72

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 various types of limits of functions of one variable**	• **4 lecture hours\week**	• **Regular Exams**

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	(graphically, numerically and algebraically)	• 2 tutorial hours\week • Self-study	• Assignments • Short Quizzes
1.2	Describe different techniques of differentiation and its applications.		
2.0	**Skills**		
2.1	Use differentiation and integration to solve real world problems such as rate of change, optimization, and area problems.	• Self-study • Real-life problems	• Participations • Short Quizzes
2.2	Demonstrate the connection between area and the definite integral through Fundamental theorem of Calculus.	Self-study	Participations
2.3	Draw graphs of functions handily and by using CAS and online solvers.	Real-life problems	Short Quizzes
2.4	State, clearly and precisely both orally and in writing, areas and definite integrals by Riemann sums	Self-study	Participations
3.0	**Values**		
3.1	To work individually.	Personal questions	Participation
3.2	Develop personal values and attributes such as honesty, empathy and respect for others.	Team work and class discussions.	Homework and Mini-projects

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homeworks, Quizzes, Mini-projects	During the term	20%
2	First Midterm	Week 4-5	20%
3	Second Midterm	Week 7-8	20%
4	Final Exam	Week 13	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 :

- **There are 6 office hours per week reserved by each professor, planed on his timetable, to help the students on their problems.**
- **All department students are assigned two academic advisors who will act as a mentor, providing academic and career advice, and general counseling.**

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	***Calculus***, 4th Edition, R. T. Smith, R. B. Minton, McGraw-Hill, 2012. **(Main Reference)**
Essential References Materials	**1.** ***Calculus***; O. Swokowski, et al, PWS Pub. Co.; 6th Edition, 1994. **2.** ***Calculus: Early Transcendentals***, 7th Edition; C. Henry Edwards, David E. Penney, Pearson Prentice Hall, 2008.

	3. ***Essential Calculus with Application***; Richard A. Silverman, Dover Publications, 1989. 4. ***Schaum's Outline of Calculus***, 6th Edition; Frank Ayres, Elliott Mendelson, McGraw-Hill, 2013.
Electronic Materials	**None**
Other Learning Materials	**None**

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	▪ **Each class room should be equipped with a whiteboard and a projector.** ▪ **Laboratories should be equipped with computers and an internet connection.**
Technology Resources (AV, data show, Smart Board, software, etc.)	**The rooms should be equipped with data show and Smart Board.**
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	**None.**

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment, Quality of learning resources	**Students**	**During the semester and at the end of the course each student will complete two evaluation forms.**
Extent of achievement of course learning outcomes, Quality of learning resources	**Instructor**	**At the end of each semester the course instructor should complete the course report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.**

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	**MATHEMATICS AND STATISTICS DEPARTMENT COUNCIL**
Reference No.	**11/1444**
Date	**22/04/1444 (16/11/2022)**

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

توصيف المقرر الدراسي

Course Title:	Taxonomy of Zoology
Course Code:	BIO 1111
Program:	Bachelor of Science in Biology.
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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G. Course Quality Evaluation **8**

H. Specification Approval Data **8**

A. Course Identification

1. Credit hours:	5 (4 Lectures + 2 Laboratory + 0 Tutorials)
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	Level 3 / First Year.
4. Pre-requisites for this course (if any)**:**	BIO 1101
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	48
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	72
Other Learning Hours*		
1	**Study**	3-4hours
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	3-4hours

* 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 has titles which will introduce the basic concepts for all courses of biology in all next educational levels. So, this course shows definition, basic concept and importance of systematics and taxonomy concepts of different conventional and newer aspects in biosystematics, classification of animal kingdom-major and minor phyla and illustrates the evolutionary relationships between different organisms.

2. Course Main Objective

By the end of this course, the student must be able: To identify basic concepts and principles of taxonomy of Zoology. • To know that taxonomy of zoology provides a systematic investigation from the major Protista and animal groups. • To discuss Definition, basic concept and importance of Systematics and Taxonomy Concepts. • To illustrate the evolutionary relationships between different organisms. • To know Classification of Animal Kingdom-Major and Minor Phyla. • To identify

general characters and life cycle of each animal's group. • To know the importance of this systematics.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	Define where each animal group fits evolutionarily in the animal kingdom.	1.1
1.2	Outline how changes in animal structure (morphology) to perform his function.	1.2
2	**Skills:**	
2.1	Evaluate the general magnitude of animal evolution over time.	2.1
2.2	Develop a historical perspective of animals.	2.1
2.3	Explain how different animal structures and functions are complimentary relationships.	2.1-2.2
3	**Values:**	
3.1	Show ability to communicate effectively with class mates and teaching staff.	2.2
3.2	Use laboratory instruments and computers.	3.3
3.3	Analyze biological experiments and use various slides during laboratory classes.	3.1-3.3

C. Course Content

No	List of Topics	Contact Hours
1	Definition, basic concept and importance of Systematics and Taxonomy Concepts of different conventional and newer aspects in biosystematics • Chemotaxonomy • Cytotaxonomy • Molecular taxonomy.	4
2	Taxonomic procedures- taxonomic collections, preservation, method of identification, taxonomic keys- different types of keys. • Concepts of taxonomic terms. • Importance of classification.	4
3	Process of typification and different Zoological types • International Code of Zoological Nomenclature (ICZN): Basic Concepts • Binominal nomenclature and Trinominal nomenclature.	4
4	Classification of Animal Kingdom-Major and Minor Phyla • PROTOZOA: general characters and classification up to orders with examples. Nutrition, locomotion and reproduction in Protozoa. PORIFERA: general characters and classification up to orders with examples canal system of in porifera.	4
5	COELENTERATA: general characters and classification up to orders with examples. polymorphism in syphonophora, coral and coral reef. formation. • PLATYHELMINTHES: general characters and classification up to orders with examples, Morphology and Life History of Fasciola.	4
6	ASCHELMINTHES: general characters and classification up to orders with examples. morphology and life history of ascaris. life cycles and pathogenecity of parasites of man (plasmodium, taenia, ancylostoma,), parasitic adaptation in helminthes.	4
7	ANNELIDA: general characters and classification up to orders with examples. coelom, coelomoduct and nephridia of annelida, structure and significance of Trochophore larva • ARTHROPODA: general characters and classification up to orders with examples. appendages and digestive system of prawn. significance of peripatus in evolution.	4

8	MOLLUSCA: general character and classification up to orders with examples. digestive and nervous system of Pila, torsion in gastropoda • ECHINODERMATA: general characters and classification up to orders with examples, water-vascular system in echinodermata, larvae of Echinodermata. General characters, outline of classification and plan of body organization in chordates • PROTOCHORDATES: general characters, classification of protochordata up to suborders with examples. • HEMICHORDATA: morphology and affinities of Balanoglossus. • UROCHORDATA: structure and retrogressive metamorphosis in Urochordata.	5
9	CEPHALOCHORDATA: structure and affinities of Amphioxus. • AGNATHOSTOMATA: distinctive characters and classification, Ammocoete larva - its importance in evolution, differences between Lamprey and Hagfish. Circulatory system, nervous system and sense organ of Scoliodon. accessory respiratory organ and swim bladder in fish, migration of fishes.	5
10	AMPHIBIA: general characters, classification up to orders with examples, respiration in amphibia, parental care in amphibian. REPTILIA: general characters classification up to order with examples. anatomical peculiarities and affinities of Sphenodon, biting mechanism of poisonous snake.	5
11	AVES: Distinctive characters and classification up to orders with examples. Air sacs-significance and importance, Flight and perching mechanism in birds Migration of bird. MAMMALIA: distinctive characters and classification up to orders with examples. General organization and affinities of Monotremata and Marsupialia. Receptor and sense organs in Mammals. Dentition in Mammals.	5
Total		48

Topics to be covered (Laboratories)

No	List of Topics	Contact Hours
1	Dissection of the following invertebrate systems- (only one) 1. Leech (i) urinogenital system (ii) nervous system 2. Prawn (i) digestive system (ii) nervous system 3. Cockroach (i) nervous system (ii) reproductive system (male and female.	3
2	Mounting Temporary: - setae of earthworm, statocyst of prawn, salivary apparatus of cockroach, radula of pila Permanent: - euglena, hydra, obelia colony, crustacean larvae.	3
3	Indentification of prepared slides Polystomella, sponge spicules, T.S of asccaris, miracidium, sporocyst and Cercaria larvae of liver fluke, T.S. Of leech (through crop region), mouth parts of Mosquito (culex), glochidium and veliger larvae of mollusca, T.S of arm of Starfish, larvae of Echinodermata.	2
4	Indentification of prepared slides Polystomella, sponge spicules, T.S. of asccaris, miracidium, sporocyst and cercaria larvae of liver fluke, Of leech (through crop region), mouth parts of mosquito (culex), glochidium and veliger larvae of mollusca T.S of arm of Starfish, larvae of Echinodermata.	2
5	Flatworms exercises, molluscs.	2

6	Nematodes, rotifers.	2
7	Annelids, myriapods, exercise, chelicerates.	2
8	Crustaceans, insects.	2
9	Echinoderms, protochordates.	1
10	Vertebrate skeletal diversity.	1
11	Vertebrate tissues exercise, begin skinning fetal rat.	1
12	Fetal rat: finish skinning, identify exercise, muscles.	1
13	Fetal pig: digestive, circulatory, exercises, urogenital systems	1
14	General revision.	1
Total		24

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	Define where each animal group fits evolutionarily in the animal kingdom.	Self-Study including work on problem sheets.	Performance must include class examinations, frequent homework assignments.
1.2	Outline how changes in animal structure (morphology)to perform his function.	Three hours weekly containing Laboratory devoted to experiment	Performance must include class examinations, frequent homework assignments • Final Lab. Exam.
2.0	**Skills**		
2.1	Evaluate the general magnitude of animal evolution over time.	Self-study is an important method for students' learning.	Questions in Lectures.
2.2	Develop a historical perspective of animals	Introduce some concepts by examples from real-life problems (i.e. laboratory).	Short Quizzes and Exams.
2.3	Explain how different animal structures and functions are complimentary relationships.	Encourage Students to communicate their biology thinking to ask and answer question when they arise. Motivate students to work cooperatively with their class mates to develop individual skill	Participation through class work and Homework. • Work portfolio
3.0	**Values**		
3.1	Show ability to communicate effectively with class mates and teaching staff.	Encourage the students to solve the exercises and problems on white board.	Laboratory reports writing.
3.2	Use laboratory instruments and computers.	Virtual labs.	Laboratory performance and

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
			reports.
3.3	Analyze biological experiments and use various slides during laboratory classes.	Demonstrations.	Laboratory performance and reports.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around 7th -8th week	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15 %
6	Final Exam.	Around 13th week	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:
Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Hickman C. P. Jr. et al., Integrated Principles of Zoology. 16th ed. (2013). ISBN-13: 9780073524214. • Paul Waldau. Animal Studies: An Introduction 1st Edition (2013). ISBN-13: 9780199827039. • Barnes, R.D. Invertebrate Zoology (1982) VI Edition. Holt Saunders International Edition. • Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. & J.I., Spicer (2002) The Invertebrates: A New Synthesis. III Edition. Blackwell Science. • Barrington, E.J.W. (1979) Invertebrate Structure and Functions. II Edition. E.L.B.S. and Nelson.
Essential References Materials	Campbell, N.A. and Reece, J. B. (2008) Biology 8th edition, Pearson Benjamin Cummings, San Francisco. • Griffiths, A.J.F et al (2008) Introduction to Genetic Analysis, 9th edition, W.H. Freeman & Co. NY • Raven, P.H et al (2006) Biology 7th edition Tata mcgrawhill Publications, New Delhi
Electronic Materials	http://www.occc.edu/biologylabs/documents/Zoology/General_Zoology.htm • http://www.smccd.net/accounts/bucher/zoo.html •http://fr.slideshare.net/bayenMD/introduction-to-general-zoology
Other Learning Materials	CDs for zoology.

2. Facilities Required

Item	Resources

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students
Technology Resources (AV, data show, Smart Board, software, etc.)	The computers are equipped with different software's.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals, dissection instruments, light microscopes, dissection microscopes, centrifuges, incubators, ovens and other glass wares.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

توصيف المقرر الدراسي

Course Title:	Cell Biology
Course Code:	BIO 1113
Program:	Bachelor of Science in Biology
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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G. Course Quality Evaluation **8**

H. Specification Approval Data **8**

A. Course Identification

1. Credit hours: 3 (2 Lectures + 2 Lab + 0 Tutorials).
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: Level 3 / First Year
4. Pre-requisites for this course (if any)**:** BIO 1101
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**	√	100 %
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	24
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	48
Other Learning Hours*		
1	**Study**	4-6
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	4-6

***** 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 deals with the biology of cells of higher organisms: The structure, function, and biosynthesis of cellular membranes and organelles; cell growth and oncogenic transformation; transport, receptors, and cell signalling; the cytoskeleton, the extracellular matrix, and cell movements; regulation of cellular division.

2. Course Main Objective

By the end of this course, the student must be able:

- To recognize the structures and functions of cells from lower to higher organisms.
- To know the method of biosynthesis of cellular membranes and organelles.
- To define the abnormal cases of transformations such as oncogenic transformation.
- To outline the language of identification between different cells.

To memorize the importance extracellular matrix and nuclear structure inside each kind of cells.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge:**	
1.1	Name the components of the cell and understanding the cell functions.	1.1-1.2
1.2	Describe the structure of cell membranes.	1.1-1.2
2	**Skills:**	
2.1	Explain the intracellular mechanism of signaling pathways and describe how a cell communicate with other cells.	2.1
2.2	Summarize the fundamentals of gene expression and describe how gene expression is regulated at the protein level.	2.1-2.2
2.3	Explain all the major organelles in eukaryotic cells and their respective major functions.	2.1-2.2
3	**Values:**	
3.1	Show ability to communicate effectively with class mates and teaching staff.	3.1-3.2
3.2	Use laboratory instruments and computers.	3.3
3.3	Analyze biological experiments and use various slides during laboratory classes.	3.2-3.3

C. Course Content

No	List of Topics	Contact Hours
1	Road map of course, what is cell biology, properties and behaviors of cells.	2
2	• Structure of biological membranes, lipids and lipid modification and membrane proteins. • Pumps, channels, transporters. • Receptors, basics of signal transduction.	2
3	• Endoplasmic reticulum & Ribosomes, Type and function. • Golgi apparatus, Protein secretion, biogenesis of membrane proteins.	2
4	• Mitochondria and plastids and chemical photosynthesis and respiration. • Protein modifications and intracellular transport, glycosylation,	2

	vesicular transport, receptor mediated endocytosis, lysosomes, organelle biogenesis.	
5	• Nucleus and its components. • Regulation of the cell division cycle.	2
6	• Regulation of DNA replication.	2
7	• Regulation of mitosis. • Meiosis.	2
8	• Cell cycle checkpoints.	2
9	• The extracellular matrix, the actin-myosin & microtubule cytoskeleton.	2
10	• Signal transduction: Detailed molecular mechanisms.	3
11	• Nerve cells, ion channels, synapse, Ca^{++} regulated events.	3
Total		24

Topics to be covered (Laboratories)

No.	Topics	Contact hours
01	Safety and Laboratory, Introduction to Cytology	2
02	Study of the ultrastructure's organelles of eukaryotic and prokaryotic cells.	2
03	Cellular division and their types.	2
04	Cellular biochemical components	2
05	Cellular organelles.	2
06	Acid phosphatase kinetics	2
07	Differential white cell count	2
08	Isolation of erythrocyte membrane proteins Analysis of erythrocyte membrane proteins	2
09	Chloroplasts and the Hill reaction	2
10	Electron microscope Cell culture: basic techniques population curve	2
11	Cell culture: population curve (cont.)	2
12	General revision	2
Total		24

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	Name the components of the cell and understanding the cell functions.	Three hours weekly containing lectures and laboratory works.	Questions in Lectures, Quizzes and Exams
1.2	Describe the structure of cell membranes.	Three hours weekly containing lectures and Laboratory classes.	Questions in Lectures, Quizzes and Exams
2.0	**Skills**		
2.1	Explain the intracellular mechanism of signaling pathways and describe how a cell communicate with other cells.	Self-study is an important method for students' learning.	• Questions in Lectures. • Short Quizzes and Exams.
2.2	Summarize the fundamentals of gene expression and describe how gene expression is regulated at the protein level.	• Introduce some concepts by examples from real-life problems (i.e. laboratory). • Encourage Students to communicate their biology thinking to ask and answer question when they arise.	Participation through class work and Homework.
2.3	Explain all the major organelles in eukaryotic cells and their respective major functions.	Motivate students to work cooperatively with their class mates to develop individual skill.	Work portfolio.
3.0	**Values**		
3.1	Show ability to communicate effectively with class mates and teaching staff.	Encourage the students to solve the exercises and problems on white board.	Laboratory reports writing.
3.2	Use laboratory instruments and computers.	• Presentations. • Virtual labs.	Laboratory performance and reports.
3.3	Analyze biological experiments and use various slides during laboratory classes.	Use microscope and laboratory instruments.	Laboratory performance and reports.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around 7th -8th week	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15 %
6	Final Exam.	Around 13th week	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:
Personal office hour.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	• Bruce Alberts et al., Essential Cell Biology, Third edition, London, UK. (2009). ISBN-13: 978-0815341291. Lodish, et al. Molecular Cell Biology. 5th ed. New York, NY: W.H. Freeman and Company, (2003). ISBN: 9780716743668.
Essential References Materials	• http://ocw.mit.edu/courses/biology/7-06-cell-biology-spring-2007/syllabus/ Text Book of Cytology and Histology, Riad, N. and Fares, N., Dar Al Maaref Publishers, Cairo, Egypt.
Electronic Materials	• http://legacy.saylor.org/bio301/Intro/ • http://ocw.mit.edu/courses/biology/7-06-cell-biology-spring-2007/syllabus/ http://extension.berkeley.edu/search/publicCourseSearchDetails.do?method=load&courseId=41571
Other Learning Materials	• CD for Cell biology and life science.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students. And the laboratory room is equipped with many laboratory instruments with a maximum of 20 students.
Technology Resources (AV, data show, Smart Board, software , etc.)	The computers are equipped with different software's. and connected to data show and to smart board.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different organelles, light microscopes, centrifuges, incubators, ovens and other glass wares...

G. Course Quality Evaluation

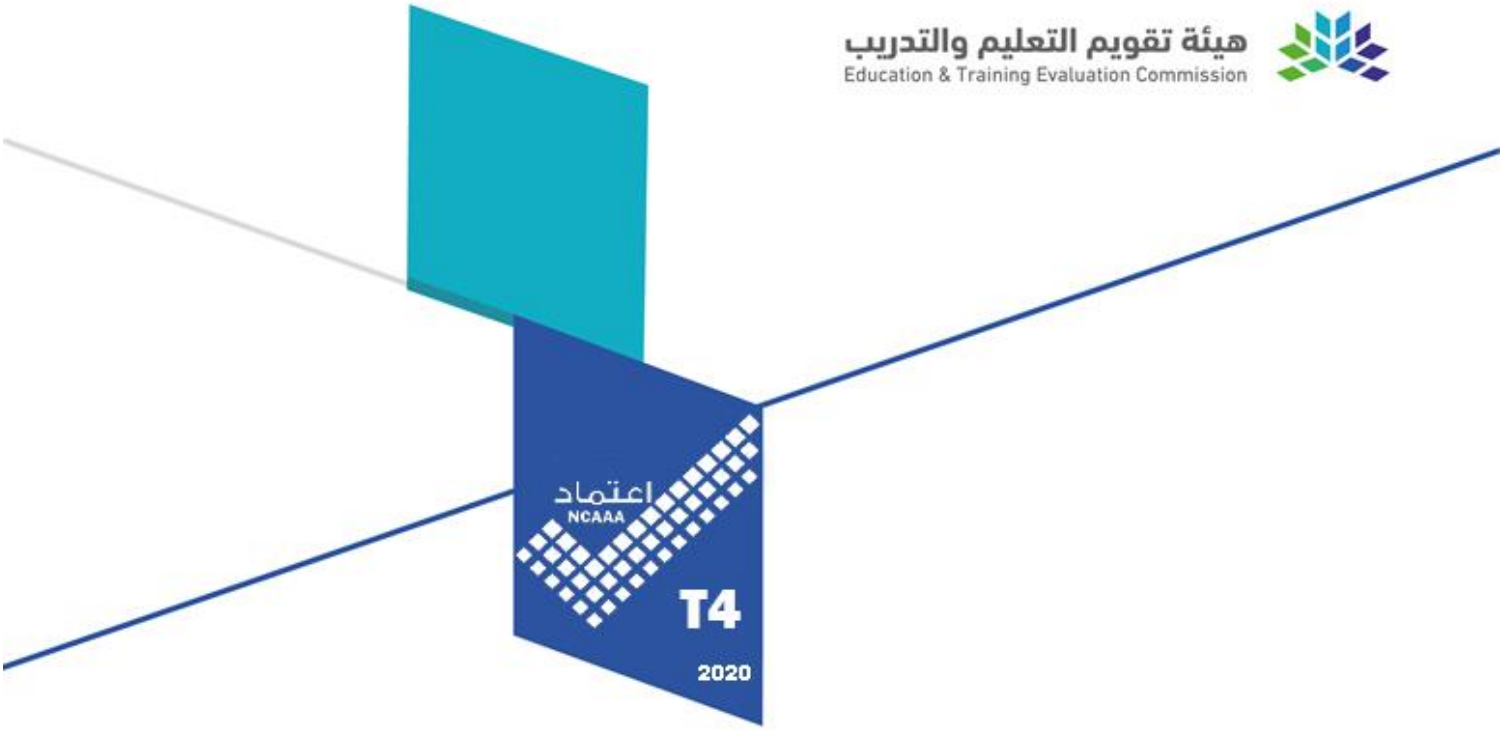
Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	**General Physics**
Course Code:	**PHY 1101**
Program:	**Bachelor of Science in Physics.** **Bachelor of Science in Applied Mathematics.** **Bachelor of Science in Chemistry.** **Bachelor of Science in Biology.**
Department:	**Physics**
College:	**Science**
Institution:	**Imam Mohammad Ibn Saud Islamic University**

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2. Facilities Required 8

G. Course Quality Evaluation **8**

H. Specification Approval Data **9**

A. Course Identification

1. Credit hours:	**5 (3 Lectures, 2 Lab, 2 Tutorial)**
2. Course type	
a.	University ☐ College ☑ Department ☐ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	**Level 1/Year 1**
4.Pre-requisites for this course (if any)**:**	**None**
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**	**84**	**100%**
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	**36**
2	**Laboratory/Studio**	**24**
3	**Tutorial**	**24**
4	**Others** (specify)	**0**
	Total	**84**

B. Course Objectives and Learning Outcomes

1. Course Description

Physics 1101 is an introductory physics course for non-science majors. This course focuses on basic physics concepts and connections to everyday life. Course topics include Motion in one dimension, Vectors, laws of motion, Work and kinetic energy, Potential energy and conservation of energy. Overall goals of this course include students' gaining an appreciation for the physical world, improved critical thinking and reasoning skills, and improved scientific literacy for a better-informed public that can make intelligent voting decision. Furthermore, the course provides an introduction to laboratory techniques and experimental methods of physics with emphasis on linking the understanding of physics concepts with "Real-Life" situations. Every class will have a short lecture introducing the procedures, concepts, formulas and instructions relevant to the experiment. The lecture will also cover what is expected in the lab-report; don't be late. Attendance and participation is mandatory. Experiments will usually be performed in groups, but each student will turn in an individual lab report.

2. Course MainObjective

- Provide the basic concepts and build a strong foundation in the principles of classical mechanics.
- Analyze different physical situations and phenomena in terms of the fundamental laws of classical mechanics.
- Understand how these principles are applied in the world around us.
- Gain an understanding of the classical laws of physics and how they are applied to real world problems.
- Observe and analyze physical data relevant to some of the experiments in Mechanics.
- Develop critical thinking and analytical problem-solving skills.

3. Course Learning Outcomes

	CLOs After successful completion of the course, students will able to:	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Describe the concepts and principles in introductory study of physics.	K1, K2
1.2	Recognize the underlying physical principles behind various daily life phenomena.	K1, K2
1.3	Describe physical phenomena using proper physical laws and theories in mechanics.	K1, K2
1.4	Define simple mathematical techniques for quantitative analysis in solving physics problems.	K1, K2
2	**Skills:**	
2.1	Explain and summarize the basic knowledge gained from studying mechanics.	S1, S2
2.2	Develop the students ability to solve and analyze problems in physics related the topics covered by the course.	S2, S3
2.3	Explain and use information from the output of experiment to draw conclusions.	S2; S3
2.4	Summarize conclusions and write reports.	S2; S3
2.5	Communicate in a clear and concise manner orally, and using IT for acquiring and analyzing information.	S2, S3
3	**Values:**	
3.1	Show the collaboration and inter-professionalism in class discussions or team works, as well as solve problems independently.	V1, V2, V3

C. Course Content

No	List of Topics	Contact Hours
1	**Motion in one dimension:**Displacement, velocity and acceleration, onedimensional motion with constant acceleration, freely falling objects.	**13**
2	**Vectors:**Vector and scalar quantities, some properties of vectors,components of a vector and unit vectors	**8**
3	**The laws of motion:** The concept of force, Newton's first law, Newton'ssecond law, the force of gravity and weight, Newton's third law, someapplications of Newton's laws, forces of friction.	**13**
4	**Work and kinetic energy:** The scalar product of two vectors, work done bya constant force, kinetic energy and the work-kinetic energy theorem.	**13**
5	**Potential energy and conservation of energy:** Potential energy, conservative and non conservative forces, conservative forces andpotential energy, conservation of mechanical energy, work done by non-conservative forces, Power.	**13**
	List of Topics *(Laboratory)*	
1	**Introduction**	**2**
2	**Experiment 1:** Measurements and uncertainties. Virtual experience.	**2**
3	**Experiment 2:** Free fall.	**2**
4	**Experiment 3:** Forces in equilibrium.	**2**
5	**Experiment 4:** Simple pendulum.	**2**
6	**Experiment 5:** Constant Spring.	**2**
7	**Experiment 6:** Simple harmonic motion.	**2**
8	**Experiment 7:** Free fall: Conservation of mechanical energy of a uniformly accelerated mass.	**2**
9	**Experiment 8:** Describe the movement of an object moving at a constant speed and constant acceleration.	**2**
10	**Experiment 9:** Friction and Newton's second law.	**2**
11	**Experiment 10:** Ohm's Law.	**2**
12	**Revision**	**2**
Total		**84**

Lab. content

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 concepts and principles in introductory study of physics.**	• Lectures. • Tutorials. • Class discussions.	▪ Exams. ▪ Participation. ▪ Discussions.
1.2	**Recognize the underlying physical principles behind various daily life phenomena.**	• Lectures. • Tutorials. • Class discussions.	▪ Exams. ▪ Homework. ▪ Quizzes.
1.3	**Describe physical phenomena using proper physical laws and theories in mechanics.**	• Lectures. • Class discussions. • Tutorials.	▪ Participation. ▪ Exams. ▪ Discussions. ▪ Homework.

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.4	**Define simple mathematical techniques for quantitative analysis in solving physics problems.**	• Lectures. • Class discussions. • Tutorials.	▪ Participation. ▪ Exams. ▪ Discussions. ▪ Homework.
2.0	**Skills**		
2.1	**Explain and summarize the basic knowledge gained from studying mechanics.**	• Lectures. • Class discussions. • Tutorials.	▪ Exams. ▪ Discussions. ▪ Participation.
2.2	**Develop the students ability to solve and analyze problems in physics related the topics covered by the course.**	• Problem classes and group tutorial. • Homework assignments as well as problems solutions.	▪ Exams. ▪ Discussions. ▪ Homework.
2.3	**Explain and use information from the output of experiment to draw conclusions.**	• Experiments setting up, data recording and calculations based on lab manual and lectures (co-requisites).	▪ Compare with standard results. ▪ Feedback and explanations.
2.4	**Summarize conclusions and write reports.**	• Experiments setting up, data recording and calculations based on lab manual and lectures (co-requisites).	▪ Compare with standard results. ▪ Feedback and explanations.
2.5	**Communicate in a clear and concise manner orally, and using IT for acquiring and analyzing information.**	• Lectures. • Class discussions. • Tutorials. • Encourage students to use electronic mail and internal network for submitting homework and assignments. • Use digital library.	▪ Exams. ▪ Participation and activities of students in the course community and blackboard. ▪ Homework.
3.0	**Values**		
3.1	**Show the collaboration and inter-professionalism in class discussions or team works, as well as solve problems independently.**	• Small team tasks • Open discussion at classroom. • Office hours.	▪ Participation. ▪ Homework. ▪ Mini-project(s).

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Class Activities (class quizzes, homework, solving problems, etc.....)	weekly	10 %
2	Laboratory	All the semester	30 %
3	Midterm Exam 1	5thweek	10 %
4	Midterm Exam 2	9thweek	10 %
5	Final Exam	13thweek	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 :

- **Students will be assigned an academic advisor to give them the appropriate academic counseling and support.**
- **The lecturer will allocate 6 office hours per week. The assigned times will be advertised on the office door and reserved by the instructor as part of his teaching schedule.**
- **Students are able to get individual consultation appointment with teaching staff via email, phone calls and department website.**

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Serway R.A. and Jewett J.W., ***Physics for Scientists and Engineers with Modern Physics,*** 9th Edition, Brooks/Cole, Belmont, CA, USA (2014).
Essential References Materials	Halliday D. and Resnick R., ***Physics***, 9thEdition, John Wiley and sons (2011).
Electronic Materials	**https://units.imamu.edu.sa/colleges/en/science/Pages/default.aspx**
Other Learning Materials	- Laboratory Manual supplied by the Department of Physics. - Laboratory Manual is available at the website of the Department of Physics.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• **Each of the class room should be equipped with a whiteboard and a projector.**
Technology Resources (AV, data show, Smart Board, software, etc.)	• **Classroomsare equipped with data show and Smart 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
Effectiveness of teaching and assessment, Quality of learning resources	• **Students** • **Second assessor**	**During the semester and at the end of the course each student will complete two evaluation forms.**
Extent of achievement of course learning outcomes, Quality of learning resources	• **Instructor** • **Second assessor**	**At the end of each semester the course instructor should complete the course report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.**

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

H. Specification Approval Data

Council / Committee	Quality Unit-Physics Department
Reference No.	Department council No. 11
Date	16/11/2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

توصيف المقرر الدراسي

Course Title:	Genetics
Course Code:	BIO 1231
Program:	Bachelor of Science in Biology.
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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D. Teaching and Assessment **5**

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E. Student Academic Counseling and Support **6**

F. Learning Resources and Facilities **6**

1.Learning Resources 6

2. Facilities Required 7

G. Course Quality Evaluation **7**

H. Specification Approval Data **8**

A. Course Identification

1. Credit hours:	5 (4 Lectures + 2 Laboratory + 0 Tutorials).
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	Level 4 / Second Year.
4. Pre-requisites for this course (if any)**:**	BIO 1113
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	48
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	72
Other Learning Hours*		
1	**Study**	3-5 hours
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	3-5 hours

* 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

Course description: This course covers principles of prokaryotic and eukaryotic cell genetics. Emphasis is placed on the molecular basis of heredity, chromosome structure, patterns of Mendelian and non-Mendelian inheritance, evolution, and biotechnological applications. Upon completion, students should be able to recognize and describe genetic phenomena and demonstrate knowledge of important genetic principles.

2. Course Main Objective

This course discusses the principles of genetics with application to the study of biological

function at the level of molecules, cells, and multicellular organisms, including humans. After completing of this course, the student will be able: To define structure and function of genes, chromosomes and genomes. To recognize the biological variation resulting from recombination, mutation, and selection, population genetics. To use the genetic methods to analyze protein function, gene regulation and inherited diseases.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	Define the mechanisms by which genetic information is transmitted to new cells in the process of cell division and gamete formation.	1.1
1.2	Describe the molecular mechanisms by which genetic information is transmitted.	1.2
2	**Skills:**	
2.1	Explain the major extensions and modifications of Mendel's principles of heredity.	2.1
2.2	Differentiate particularities of bacterial and viral genetics.	2.1
2.3	Justify how gene pool of a population shapes it and changes with time.	2.1-2.2
3	**Values:**	
3.1	Use computer programs for analyzing and processing the experimental data.	3.1
3.2	Use laboratory instruments and computers.	3.3
3.3	Analyze biological experiments and use various slides during laboratory classes.	3.2-3.3

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to genetics • Genetics: the science of heredity. • Mendel's laws of inheritance. • Dominance, dominance relations and recessiveness. • The basics of population genetics. • Sex determination in different organisms and sex-linked characters.	8
2	Structure and Biochemistry of DNA • The chromosome theory of inheritance. • The structure of DNA and the genetic code. • Replication and manipulation of DNA. • Transcription and translation.	8
3	Transmission Genetics • Basic and advanced principles of heredity. • The chromosomal basis of heredity.	8
4	Linkage, Mapping, and Chromosomes • Gene linkage and genetic mapping. Human karyotypes and chromosome behavior.	8
5	Prokaryotic Genetics • The genetics of bacteria and viruses. • Molecular mechanisms of prokaryotic gene regulation.	8
6	Genetic engineering and genomics. • Mechanisms of mutation. • Cancer.	8
Total		48

Topics to be covered (Laboratories)

No	List of Topics	Contact Hours
1	Overview of lab projects, video on human genetics.	2
2	Patterns of Mendelian inheritance.	2
3	DNA extraction from epithelial cells.	2
4	PCR amplification of mt DNA. Electrophoresis of the PCR amplicon.	3
5	Plasmid DNA extraction and spectrophotometry.	3
6	Restriction analysis of plasmid DNA.	2
7	Gene regulation– global regulatory cascades.	2
8	Sequence analysis of cloned DNA.	2
9	Sequence analysis of cloned DNA LAB.	2
10	Phylogenetic analysis.	2
11	General Revision.	
Total		24

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	Define the mechanisms by which genetic information is transmitted to new cells in the process of cell division and gamete formation.	Three hours weekly lectures with demonstration tools	Students will be evaluated on their ability to present complete solutions to problem
1.2	Describe the molecular mechanisms by which genetic information is transmitted.	Two hours weekly of laboratory devoted to genetic experiments.	Performance must include class examinations, frequent homework assignments and a final exam. (midterm 1, midterm 2, final lab. exam and final exam)
2.0	**Skills**		
2.1	Explain the major extensions and modifications of Mendel's principles of heredity.	Self-study is an important method for students' learning.	Questions in lectures. Short quizzes and exams.
2.2	Differentiate particularities of bacterial and viral genetics.	Introduce some concepts • Motivate students to work cooperatively with their class mates to develop individual skills.	Participation through class work and homework.
2.3	Justify how gene pool of a population shapes it and changes with time.	Encourage Students to communicate their biology thinking to ask	Participation through Class work and Homework.

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		and answer question when they arise.	
3.0	**Values**		
3.1	Use computer programs for analyzing and processing the experimental data.	Lectures delivered in traditional manner and/or visualized using electronic devices	Evaluating the laboratory written reports and calculation skills.
3.2	Use laboratory instruments and computers.	Virtual labs.	Laboratory performance and reports.
3.3	Explain biological experiments and use various slides during laboratory classes.	Demonstrations.	Laboratory performance and reports.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around 7th -8th week	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15 %
6	Final Exam.	Around 13th week	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:
Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Hartl, D L (2011): Essential Genetics, A Genomics Perspective. 5th edition. Sudbury, MA: Jones and Bartlett Publishers. ISBN: 978-0-7637-7364-9 / 0-7637-7364-6 • Robert j.Brooker- Gentics ,(2008): analysis and principles , edition 3. ISBN 13:9780077229726. • Griffiths, Anthony J. F., Jeffrey H. Miller, David T. Suzuki, Richard C. Lewontin, and William M. Gelbart (2000): An Introduction to Genetic Analysis. 7th ed. New York: W. H. Freeman, ISBN: 9780716735205.
Essential References Materials	http://ocw.mit.edu/courses/biology/7-06-cell-biology-spring-2007/syllabus
Electronic Materials	http://ocw.mit.edu/courses/biology/7-03-genetics-fall-2004/index.htm http://ocw.mit.edu/courses/biology/7-03-genetics-fall-2004/lecture-

	notes/
Other Learning Materials	Genetics software and CDs for genetics syllabus.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	The computers are equipped with different software's.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals, dissection instruments, light microscopes, dissection microscopes, microtome instrument, slide preparations, mixer, gel electrophoresis, thermocycler for ampliphication centrifuges, incubators, ovens and other glass wares.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

توصيف المقرر الدراسي

Course Title:	General Microbiology
Course Code:	BIO 1241
Program:	Bachelor of Science in Biology
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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G. Course Quality Evaluation **10**

H. Specification Approval Data **10**

A. Course Identification

1. Credit hours: 5 (4 Lectures + 2 Lab + 0 Tutorials).
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: Level 4 / Second Year
4. Pre-requisites for this course (if any)**:** BIO 1101
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	48
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	72
Other Learning Hours*		
1	**Study**	4 -6 hours
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	4 -6 hours

***** 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 covers principles of microbiology with emphasis on microorganisms and human disease. Topics include an overview of microbiology and
identification and control of pathogens, disease transmission, host resistance, and immunity. Upon completion, students should be able to demonstrate knowledge of microorganisms and the disease process as well as aseptic and sterile techniques.

2. Course Main Objective

Upon completion of this course students should be able to:

- To recognize the fundamentals of microbiology. To differentiate between the structure of prokaryotic and eukaryotic microorganisms.
- To identify host-microbe interactions, immunity and human infectious diseases.
- To compare and distinguish the basic groups of microbes, including prokaryotic microbes (Archaea, Bacteria), and Viruses, as well as eukaryotic microbes.

To apply culture techniques, methods of staining and the microscopic, colonial and biochemical identification of microorganisms.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	Name microorganisms and classify them.	1.1-1.2
1.2	Recall chemical principals and list microbial metabolism and growth.	1.1-1.2
2	**Skills :**	
2.1	Analyze the properties of microorganisms in terms of cellular anatomy and physiology.	2.1
2.2	Evaluate how physical and chemical methods can be used to control microbial growth.	2.1-2.2
2.3	Explain how the human body interacts with various microorganisms through symbiotic relationships and host defenses.	2.1-2.2
3	**Values:**	
3.1	Illustrate the application of microbiology concepts to current issues in human health and infectious diseases.	3.1
3.2	Use safety measures and operate laboratory instruments during laboratory sessions.	3.3
3.3	Analyze microbiological experiments and use various slides and technics during laboratory classes.	3.3

C. Course Content

No	List of Topics	Contact Hours
1	Microbes in our Lives • Naming and Classifying Microorganisms the Bacteria, The Fungus, The Protozoa, The Algae, The Virus, Multicellular Animal Parasites. • History of Microbiology: The First Observations of Hooke and Anton van Leeuwenhoek, The Debate over Spontaneous Generation; The Views of Francisco Redi, John Needham • Lazzaro Spallanzani, The Golden Age of Microbiology. Fermentation and Pasteurization o The Germ Theory of Diseases Vaccination, Modern Developments in Microbiology.	6

	• The Three Domains Classification: Binomial System of Nomenclature, Naming and Classifying Microorganisms. Chemical principal. • Structure of the Atom Chemical Elements: Chemical Bonds, Ionic, Covalent, Hydrogen • Chemical Reactions Biological Molecules: Acid and Bases, pH and Buffers, Oxidation and Reduction, Functional Groups. The Macromolecules: Carbohydrates, Lipids, Proteins, Nucleic acid.	
2	The Anatomy of the Prokaryotic cell (Comparison of Prokaryotic and Eukaryotic Cells – Overview The Prokaryotic Cell). • Size, Shape and Arrangements of Bacteria . • Structures External to the Cell Wall: Glycocalyx, Flagella, Axial Filaments, Pili and Fimbriae. • The Cell Wall: Composition and Characteristics, Cell Wall and the Gram Stain, Atypical Cell Wall and Damage to the Cell Wall. Structures Internal to the Cell Wall: The Plasma Membrane, The Cytoplasm, The Nucleoid, Plasmids and Resistance Factors, Ribosomes and Other Inclusions.	6
3	Microbial Metabolism (Catabolic and Anabolic Reactions Enzymes Energy Production Metabolic Pathways Carbohydrate Catabolism) • Glycolysis • Aerobic Respiration, The Kreb's Cycle, The Electron Transport System, Summary of ATP production . • Anaerobic Respiration and Fermentation Lipid and Protein Catabolism. Microbial Growth. • The Requirements for Growth: Physical Requirements, Chemical Requirements. • Culture Media: General Media, Selective and Differential Media, Enriched Media. • Growth of Bacterial Culture: Bacterial Division and Generation Time, The Growth Curve and Growth Phases. Measurement of Growth: Estimation of Growth by Direct Methods, Estimation of Growth by Indirect Methods.	8
4	The Protozoa • Characteristics of Protozoa, Life Cycle, Reproduction and Nutrition, Protective Structures. • Medically Important Phyla • Methods of Classification. • Examples of Each Class and the Diseases They Cause. Trypanosomiasis, Toxoplasmosis and Malaria, Protozoan Diseases of the Digestive System. The Fungus • Characteristics of Fungi • Nutrition and Cultivation • Yeast, Molds and Dimorphics • Sexual and Asexual Spores • Medically Important Phyla of Fungi	8

	• Methods of Classification Examples of Organisms in Each Class • Diseases Caused by Fungi • Superficial Mycoses • Systemic Mycoses • Fungal Diseases of the Digestive System • Histoplasmosis • Coccidioidomycosis • Pneumocystis Pneumonia • Blastomycoses • Economic Effects of Fungi • Fungi in the Food and Wine Industries • Fungi in Agriculture and Forestry Fungi and Antibiotics.	
5	Viruses, Viroids and Prions • General Characteristics of Viruses: Viral Structure • The Nucleic Acid • Capsid and Envelope • Shape and Other Morphological Features • Taxonomy of Viruses and Some Examples and the Diseases They Cause Cultivation of Viruses • The Bacteriophage: Structure, Multiplication, The Growth Curve of the Bacteriophage Viruses and Cancer.	6
6	Specific Immune Response • Antigens and Antibodies • Nature of Antigens, Classes of Antigens, Nature of Antibodies Antibody Structure, Immunoglobulin Classes • The Duality of the Immune System Cells and Humoral Immunity Immunological Memory T Cells and Cell-Mediated Immunity • Types of T Cells Interrelation of Cell-Mediated and Humoral Immunity Disorders Associated with the Immune System • Allergies (Hypersensitivities) Autoimmune Diseases • The Relationship between the Immune System and Cancer Immunodeficiencies AIDS	6
7	Diseases of the digestive tract • Structure and Function of the Digestive System • Normal Flora of the Digestive System • Bacterial Disease of the Mouth: Dental Caries, Periodontal Diseases • Bacterial Diseases of the Lower Digestive System: Staphylococcal Food Poisoning, Shigellosis (Bacillary Dysentery), Salmonellosis and Typhoid Fever, Cholera, Campylobacter Gastroenteritis and Helicobacter Peptic Ulcer Disease Diseases of the respiratory tract • Structure and Function of the Respiratory System. • Normal Flora of the Respiratory System • Microbial Diseases of the Upper Respiratory tract: Streptococcal Pharyngitis, Scarlet Fever, Diphtheria, The Common Cold	7

	• Bacterial Diseases of the Lower Respiratory Tract: Pertussis, Tuberculosis, Bacterial Pneumonia Viral Diseases of the Lower Respiratory Tract: Viral Pneumonia, Influenza	
8	Venereal Diseases Gonorrhea Syphilis Trichomoniasis Genital Herpes Genital Warts. Diseases of the Skin and Eyes Acne Measles Small Pox Chicken Pox Rubella Anthrax Gangrene Leishmaniasis.	6
Total		48

Topics to be covered (Laboratories)

No.	Topics	Contact hours
01	Laboratory Safety. The use and care of the microscope. Microscopic measurements. Aseptic Techniques. Transfer and colony selection techniques.	2
02	Bacterial smears and simple stains. Morphological features of bacteria – discussion only. The gram stain. Bacterial anatomy – discussion only. The acid-fast stain. Spore and capsule staining. Negative staining.	2
03	Bacterial culture characteristics. The use of general media for isolating pure cultures. Pour plate and streak plate methods. The use of selective and differential media. Epidemiology and related topics. Universal Precautions	2
04	Biochemical Activities – Discussion only. Extracellular degradation. Carbohydrate fermentation, Triple Sugar Iron (TSI) agar.	2
05	IMViC test, Litmus milk, SIM (Multiple Test Systems). Urease test, Nitrate reduction test, Catalase and Oxidase test.	2
06	Miniature Systems. The protozoa. The Fungi - Molds, Yeast and Mushrooms.	2
07	The effect of Temperature and pH on microorganisms. Atmospheric Oxygen Requirements. Cultivation of Anaerobes.	2
08	The inhibitory action of heavy metals*. The inhibitory action of disinfectants. Antibiotic susceptibility testing: The antibiogram.	2
09	Immunology 1. Discussion (Antigen-antibody reactions), Agglutination and Precipitation. Immunology 2. ELISA	3

10	Microorganisms of the Mouth and Dental Caries*. Pathogenic microorganisms of the Gastrointestinal Tract*. Pathogenic Microorganisms of the Respiratory Tract*. Pathogenic Microorganisms of the Urogenital System and Sexually Transmitted Diseases (STDs)*	3
11	General Revision	2
		24

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	Name microorganisms and classify them.	Three hours weekly containing lectures	Students will be evaluated on their ability to present complete solutions to problems.
1.2	Recall chemical principals and list microbial metabolism and growth.	Two hours weekly of Laboratory devoted to experiments.	Students will be evaluated on their ability to present complete solutions to problems.
2.0	**Skills**		
2.1	Analyze the properties of microorganisms in terms of cellular anatomy and physiology.	Self-study is an important method for students' learning	Questions in Lectures. Short Quizzes and Exams
2.2	Evaluate how physical and chemical methods can be used to control microbial growth.	Encourage Students to communicate their microbiology thinking to ask and answer question when they arise.	Participation through class work and Homework.
2.3	Explain how the human body interacts with various microorganisms through symbiotic relationships and host defenses.	Motivate students to work cooperatively with their class mates to develop individual skills.	Work portfolio.
3.0	**Values**		
3.1	Illustrate the application of microbiology concepts to current issues in human health and infectious diseases.	Encourage students to work cooperatively during laboratory classes.	Laboratory reports writing
3.2	Use safety measures and operate laboratory instruments during laboratory sessions.	• Presentations. • Virtual labs	Laboratory performance and reports
3.3	Analyze microbiological experiments and use various slides and technics	• Virtual labs • Demonstrations.	Examinations Laboratory

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	during laboratory classes.		performance and reports

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15 %
2	Midterm 2	Around 7th -8th week	15 %
3	Quizzes, Attendance, Participation, Home works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	.Lab Exam	Around 9th week	15 %
6	Final Exam.	Around 13th week	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 :

- By identifying office hours 6 hours a week (be adhered to and attached with the Schedule. lectures and declare for the students).
- To communicate and ask questions and inquiries by e-mail to a member of staff teaching through his Web site.
- To provide assistance and guidance to any inquiry or consultation relating to syllabus given.
- Helping students to understand the material and contribute to the academic advising process.
- Helping students in the face of any study and academic problems in this course.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• Tortora, Funke, Case: Microbiology – An Introduction; Pearson (Benjamin Cummings 11e). 12 ed, (2015). ISBN-13: 978-0321929150. • Brock's Biology of Microorganisms. (2012). Madigan, M., J.M. Martinko, D.A. Stahl and D.P. Clark. 13th edition. [Benjamin Cummings, Boston, MA). Microbiology Laboratory, New York City College of Technology. McGraw Hill Publishing.(2013). ISBN 13: 9781121951501.
Essential References Materials	http://ocw.mit.edu/courses/biology/7-06-cell-biology-spring-2007/syllabus.
Electronic Materials	• http://www.csus.edu/indiv/t/telleena/biol440/http://ocw.mit.edu/courses/biology/7-06-cell-biology-spring-2007/syllabus/ • http://www.sci.sdsu.edu/bioadvise/syllabi/Bio350_S10.pdf • http://www.csus.edu/indiv/t/telleena/biol440/ http://www.washington.edu/students/crscat/microbio.html
Other Learning Materials	CD for Microbiology and life science.

2. Facilities Required

Item	Resources

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students. And the laboratory room is equipped with many laboratory instruments with a maximum of 20 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	The computers are equipped with different software's. and connected to data show and to smart board.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different micro-organisms, light microscopes , centrifuges , incubators , ovens and other glass wares...

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

توصيف المقرر الدراسي

Course Title:	Ecology and Biodiversity
Course Code:	BIO 1251
Program:	Bachelor of Science in Biology.
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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E. Student Academic Counseling and Support **5**

F. Learning Resources and Facilities **5**

1.Learning Resources 5

2. Facilities Required 5

G. Course Quality Evaluation **5**

H. Specification Approval Data **6**

A. Course Identification

1. Credit hours:	3 (2 Lectures + 2 Laboratory + 0 Tutorials).
2. Course type	
a.	University [ ] College [ ] Department [√] Others [ ]
b.	Required [√] Elective [ ]
3. Level/year at which this course is offered:	Level 4 / Second Year.
4. Pre-requisites for this course (if any)**:**	BIO 1121
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	24
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	48

B. Course Objectives and Learning Outcomes

1. Course Description

To investigate the nature and diversity of life, from microorganisms and fungi to plants and animals. To explore the mechanism of biodiversity: evolution through natural selection. To learn how different groups of organisms interact and are dependent on their habitats and each other. To use and expand this knowledge in laboratory classes by observing and describing specimens representing the variety of organisms.

2. Course Main Objective

On successfully completing this course, students will be expected: To investigate the nature and diversity of life, from microorganisms and fungi to plants and animals. To explore the mechanism of biodiversity: evolution through natural selection. To learn how different groups of organisms interact and are dependent on their habitats and each other. To use and expand this knowledge in laboratory classes by observing and describing specimens representing the variety of organisms.

3. Course Learning Outcomes

	CLOs	Aligned-PLOs
1	**Knowledge and Understanding**	
1.1	Define the processes that lead to biodiversity and the nature and characteristics of global biodiversity.	1.1
1.2	Describe the molecular and structural unity of life.	1.2
1.3		
1...		
2	**Skills :**	
2.1	Predict whether populations of interacting organisms persist over time or become extinct.	2.1-2.3
2.2	Explain how the diversity of living things is generated and perpetuated.	2.1-2.2
2.3	Explain how interactions with the physical environment and with other organisms are involved in ecological and evolutionary change of populations.	2.1-2.2
2...		
3	**Values:**	
3.1	Use quantitative models and data to solve problems in evolution and ecology.	2.2-1.3
3.2	Use laboratory instruments and computers.	3.3
3.3	Analyze biological experiments and use various slides during laboratory classes.	3.3
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Biodiversity: What is it? Where is it? Where does it come from? □ What is biodiversity? □ Patterns in distribution of diversity □ Measuring diversity	6
2	Basics of Ecology □ Why does diversity matter? □ Ecosystem Services □ Diversity-Function Models □ Pollination: Ecosystem services and diversity □ Population Ecology: Extinction/environmental degradation □ Community Ecology: Species Interactions □ Community Ecology: Predator-Prey Activity	6
3	Ecosystem Ecology: Intro and Energetics □ Ecosystem Ecology: Intro and Energetics □ Ecosystem Ecology: Carbon Cycle and Climate Change □ Climate Change and Disease Dynamics □ Island Biogeography	6
4	Human Population Size □ Reconciliation Ecology	6
5	Biotic and abiotic factors	4
6	Animals communities and Biodiversity	4
7	Plants communities and Biodiversity	4
8	Biodiversity of Monera, Protista and Fungi	4
9	Biodiversity of Fauna and Flora of Saudi Arabia	4
10	Sustainability and the Future □ revision	4
Total		48

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 processes that lead to biodiversity and the nature and characteristics of global biodiversity.	Three hours weekly containing lectures and tutorial.	Students will be evaluated on their ability to present complete solutions to problems.
1.2	Describe the molecular and structural unity of life.	Two hours weekly of Laboratory devoted to experiments.	Students will be evaluated on their ability to present complete solutions to problems.
…			
2.0	**Skills**		
2.1	Predict whether populations of interacting organisms persist over time or become extinct.	Self-study is an important method for students' learning.	Questions in Lectures.
2.2	Explain how the diversity of living things is generated and perpetuated.	Encourage Students to communicate their biology thinking to ask and answer question when they arise.	Work portfolio.
2.3	Explain how interactions with the physical environment and with other organisms are involved in ecological and evolutionary change of populations.	Motivate students to work cooperatively with their class mates to develop individual skills.	Short quizzes and exams.
3.0	**Values**		
3.1	Use quantitative models and data to solve problems in evolution and ecology.	Encourage students to work cooperatively during tutorials, laboratory classes.	Laboratory reports writing.
3.2	Use laboratory instruments and computers.	Virtual labs.	Laboratory performance and reports.
3.3	Analyze biological experiments and use various slides during laboratory classes.	Demonstrations.	Laboratory performance and reports.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around 7th -8th week	15%
3	Quizzes, Attendance, Participation, Home		

#	Assessment task*	Week Due	Percentage of Total Assessment Score
	works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15 %
6	Final Exam.	Around 13th week	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 :
Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Smith, R. L. and Smith, T. M. Elements of Ecology 9 th edition Pearson Education(2014). ISBN13: 978-0321934185 M.J., S. Jennings, M. Attrill, Marine Ecology: Progresses, Systems, and Impacts. 2nd. ed., Oxford Univ.Press, London (2011). ISBN-13: 978-0199227020 Kalff, J. 2002. Limnology. Pearson Education, Prentice Hall. 2nd. ed., (2011) ISBN-13: 9780130337757	
Essential References Materials	http://podolskyr.people.cofc.edu//biol211/lectures.htm	
Electronic Materials	http://www.usc.edu.au/learn/courses-and-programs/courses/course-library/sci/sci102biodiversity-and-ecology http://podolskyr.people.cofc.edu//biol211/	
Other Learning Materials	CDs specialized for Ecology and Biodiversity	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	The computers are equipped with different software's.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals , dissection instruments, light microscopes , fluorescent microscopes, dissection microscopes ,microtome instrument, slide preparations, instruments special for measurement of ecological parameters , mixer, , for centrifuges , incubators , ovens and other glass wares.

G. Course Quality Evaluation

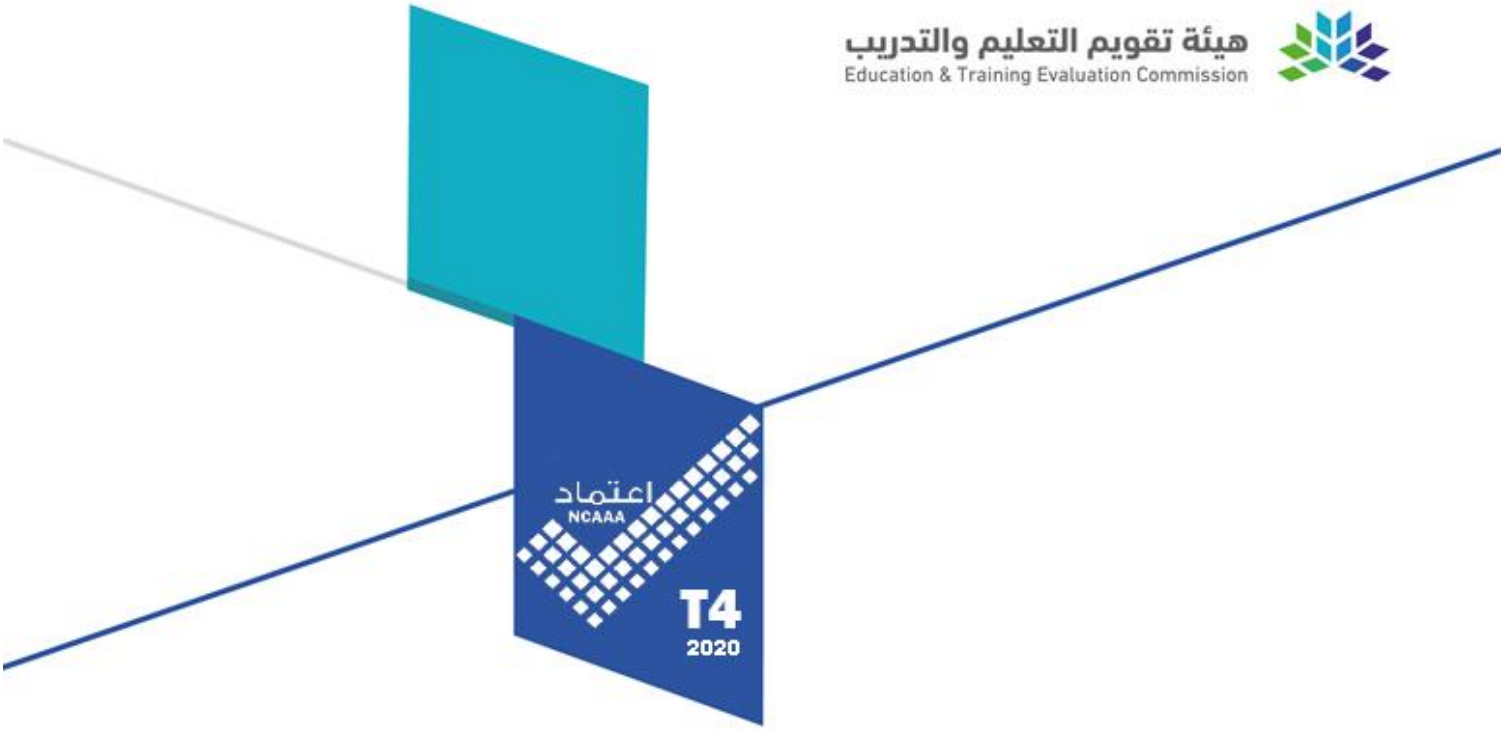
Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



توصيف المقرر الدراسي

Course Title:	Immunology
Course Code:	BIO 1212
Program:	Bachelor of Science in Biology.
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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A. Course Identification **3**

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E. Student Academic Counseling and Support **5**

F. Learning Resources and Facilities **5**

1.Learning Resources 5

2. Facilities Required 5

G. Course Quality Evaluation **6**

H. Specification Approval Data **6**

A. Course Identification

1. Credit hours:	4 (3 Lectures + 2 Lab + 0 Tutorials).
2. Course type	
a.	University [ ] College [ ] Department [√] Others [ ]
b.	Required [√] Elective [ ]
3. Level/year at which this course is offered:	Level 5 / second Year
4. Pre-requisites for this course (if any)**:**	BIO 1113
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	36
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	60
Other Learning Hours*		
1	**Study**	4 - 6 hours
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	4 - 6 hours

* 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

Introduces the principles of immunology including: development of the immune system, innate immunity, immunoglobulin structure, antigen-antibody reactions, the major histocompatibility complex reactions and antigen presentation, T cell receptors (genetics, structure, selection), T cell activation and effector functions, cytokines, phagocytic cell function, immune responses to infectious organisms and tumors, autoimmune diseases, autoimmunity, allergies, and immune deficiencies.

2. Course Main Objective

The objective of this course is to facilitate an understanding of preliminary knowledge of the immune system in humans and other mammals. On successfully completing this course, students will be expected:
 To familiarize with basic concepts in immunology. To introduce the most important theories in immunology. To introduce the different types of failures of the immune system. To present the difference between innate and adaptive immune responses. To introduce the basic concepts in t cell education, survival, and maturation. To familiarize the students with the different types of immunoglobulins and their functions.

3. Course Learning Outcomes

CLOs		Aligned-PLOs
1	**Knowledge:**	
1.1	Define the role of B-lymphocytes in the humoral response to outline the major histocompatibility complexes (MHCs) type 1 and 2 and explain their functions.	1.1-1.2
1.2	Describe the function of phagocytes in the non-specific immune system.	1.2
2	**Skills:**	
2.1	Explain how T-cells aid in eliminating pathogens from the body.	2.1
2.2	Summarize the role of B-cells and T-cells in the specific immune system.	2.1
3	**Values:**	
3.1	Demonstrate proper immunological laboratory techniques involving microscopy, biochemical.	3.1-3.2
3.2	Illustrate the ability to communicate their ideas with the instructor at all times during and after the class.	3.1-3.2
3.3	Use safety measures and operate laboratory instruments during laboratory sessions.	3.3

C. Course Content

No	List of Topics	Contact Hours
1	Introduction, basic concepts in immunology, components of the immune system, principles of innate and adaptive immunity.	4
2	Innate immunity, different lines and layers of defense, pattern recognition in innate immune system, the complement system, induced innate responses to infections.	3
3	Antigen recognition by b-cells, the structure of a typical antibody molecule, interaction between the antibody and specific antigen, diversity of immunoglobulins: VDJ recombination.	4
4	Antigen recognition by t cells, antigen processing and presentation: MHC.	3
5	Development and survival of lymphocytes, lymphocytes in bone marrow and thymus, positive and negative selection of lymphocytes, survival and maturation of lymphocytes.	4
6	The adaptive immune response, T CELL-mediated immunity and cytotoxicity, macrophage activation by armed CD4 TH1 cells, humoral immune response.	3
7	Adaptive immunity to infection, infectious agents and how they cause disease, the course of the adaptive response to infection, the mucosal immune system, immunological memory.	3
8	Failures of host defense mechanisms, how do pathogens evade the immune system, inherited immunodeficiency diseases, acquired immune deficiency syndrome.	3
9	Allergy and hypersensitivity, effector mechanisms in allergic reactions and IGE, hypersensitivity diseases.	3
10	Autoimmunity and transplantation, autoimmune responses are directed against self-antigens, responses to alloantigen and transplant rejection, self-tolerance and its loss.	3
11	Manipulation of the immune response, extrinsic regulation of unwanted immune responses, using the immune response to fight infections and attack tumors.	3
Total		36

Topics to be covered (Laboratories)

No	List of Topics	Contact Hours
1	Histological study for lymph system (thymus gland, lymph nodes, spleen, tonsils….).	2
2	Cell count with hemocytometer. Viability of the cells in normal and pathological cases.	3
3	Preparation of the blood smear. Lymphocytes isolation using ficoll hypaque technique.	3
4	Serology (agglutination). Precipitation test immunodiffusion test.	2
5	Principles of ELISA 1. ELISA 2.	2
6	Fluorescent antibody staining, fluorescent microscopy.	2
7	Allergy (type one and type two) allergy test.	2
8	Flow cytometer.	2
9	SDS Page.	2
10	Southern Blotting.	2
11	General revision.	2
Total		24

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	Define the role of B-lymphocytes in the humoral response to outline the major histocompatibility complexes (MHCs) type 1 and 2 and explain their functions.	Self-Study including work on problem sheets.	Performance must include class examinations, frequent homework assignments and a final exam. (Midterm 1, Midterm 2, Final Lab. Exam and Final Exam.
1.2	Describe the function of phagocytes in the non-specific immune system.	Two hours weekly of Laboratory devoted to experiments.	Student will be evaluated on their ability to present complete solutions to problems.
2.0	**Skills**		
2.1	Explain how T-cells aid in eliminating pathogens from the body.	Self-study is an important method for students' learning.	Questions in Lectures.
2.2	Summarize the role of B-cells and T-cells in the specific immune system.	Introduce some concepts by examples from real-life problems (i.e. laboratory).	Short Quizzes and Exams.
3.0	**Values**		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
3.1	Demonstrate proper immunological laboratory techniques involving microscopy, biochemical.	Motivate students to ask questions and to give response to the teacher's questions.	Homework's, quizzes, exams and participation.
3.2	Illustrate the ability to communicate their ideas with the instructor at all times during and after the class.	Encourage the students to use electronic mail and network in submitting home works and assignments.	Evaluating the laboratory written reports.
3.3	Use safety measures and operate laboratory instruments during laboratory sessions.	Laboratory sessions. Experimentations	Examinations

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around 7th -8th week	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15 %
6	Final Exam.	Around 13th week	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:
Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Judith A Owen; Janis Kuby; Jenni Punt; Sharon A Stranford Pat Jones, Kuby Immunology 7th ed, (2013), ISBN-13: 978-1429219198. The Immune System (TIS), 3rd edition, Peter Parham (2005), ISBN 978-0-8153-4146-8.
Essential References Materials	https://legacy.saylor.org/bio407/Intro/. http://www.scribd.com/doc/220130732/Kuby-Immunology-7th-Edition-2013#scribd).
Electronic Materials	https://alison.com/courses/Introduction-to-Immunology http://www.uth.tmc.edu/pathology/medic/immunology/Immuno/Ex1.Essay.Assignment.pdf http://mcb.berkeley.edu/courses/syllabi/mcb150l_sp2014.pdf
Other Learning Materials	CDs of immunology.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students. And the laboratory room is equipped with many laboratory instruments with a maximum of 20 students

Item	Resources
Technology Resources (AV, data show, Smart Board, software, etc.)	The computers are equipped with different software's. and connected to data show and to smart board.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals, light microscopes, microtome instrument, slide preparations, mixer, fluorescent microscopes, ELISA unit for detecting Ag-Ab reactions, centrifuges, incubators, ovens and other glass wares.

G. Course Quality Evaluation

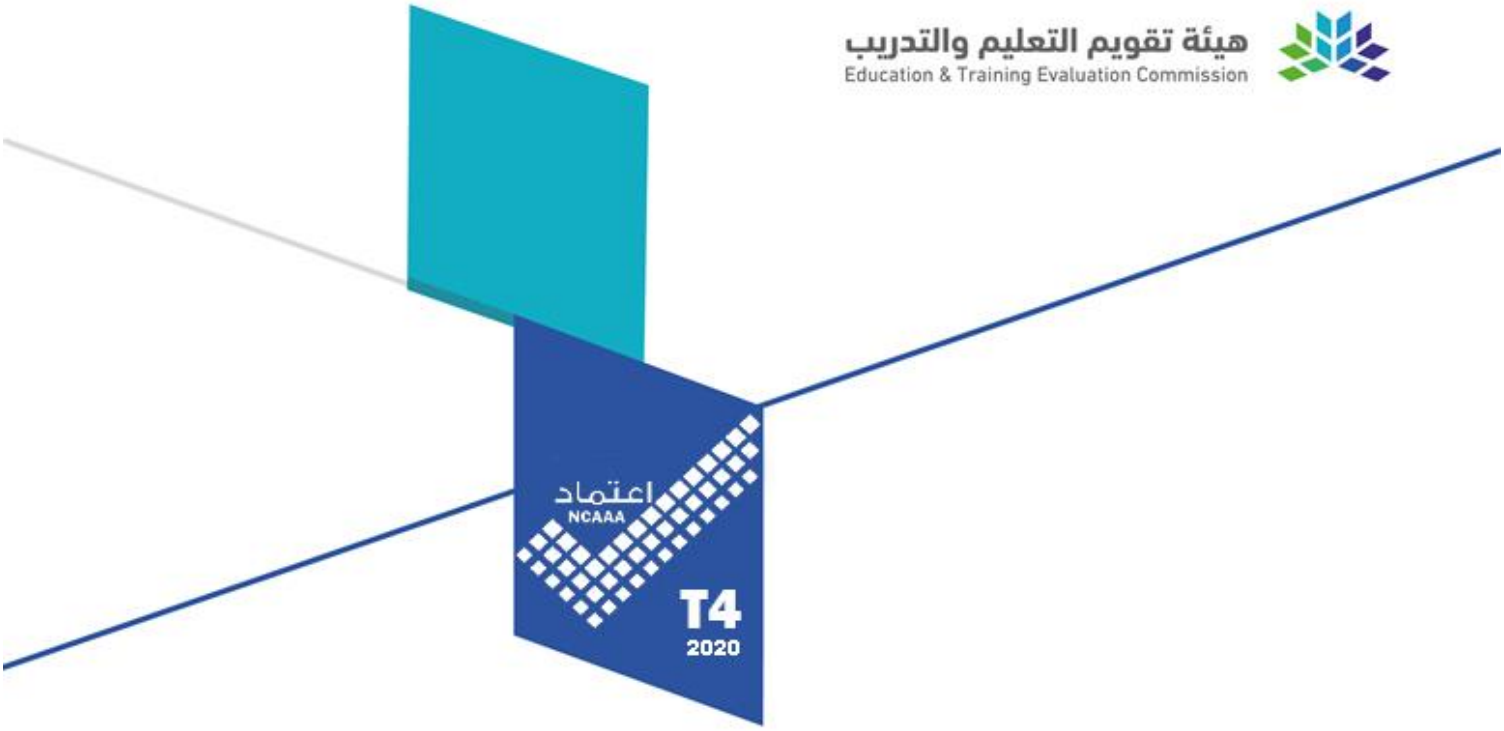
Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



توصيف المقرر الدراسي

Course Title:	Molecular Biology
Course Code:	BIO 1232
Program:	Bachelor of Science in Biology.
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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A. Course Identification **3**

6. Mode of Instruction (mark all that apply) 3

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C. Course Content **4**

D. Teaching and Assessment **4**

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods 4

2. Assessment Tasks for Students 5

E. Student Academic Counseling and Support **5**

F. Learning Resources and Facilities **5**

1.Learning Resources 5

2. Facilities Required 5

G. Course Quality Evaluation **6**

H. Specification Approval Data **6**

A. Course Identification

1. Credit hours:	4 (3 Lectures + 2 Laboratory + 0 Tutorials)
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	Level five / Second Year
4. Pre-requisites for this course (if any)**:**	BIO 1231
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	36
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	60
Other Learning Hours*		
1	**Study**	3-4 hrs.
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	3-4 hrs.

* 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

describe the molecular structure of genetic material and function. To distinguish between different molecular biology techniques that are used to isolate, separate, and probe for specific proteins, nucleic acids, and their interactions. Identify limitations of these techniques. To compare and contrast the mechanisms of bacterial and eukaryotic DNA replication, DNA repair, transcription, and translation. To explain how DNA topology and chromatin

structure affects the processes of DNA replication, repair, and transcription. To give examples of DNA and histone modifications and predict how they will affect gene expression.

2. Course Main Objective

By the end of the semester, the student should be able to: To explain and give examples of how ionic, hydrophobic, and hydrogen bonding interactions determine the structure of nucleic acids and proteins and modulate the specificity of binding between them. To describe the molecular structure of genetic material and function. To distinguish between different molecular biology techniques that are used to isolate, separate, and probe for specific proteins, nucleic acids, and their interactions. Identify limitations of these techniques. To compare and contrast the mechanisms of bacterial and eukaryotic DNA replication, DNA repair, transcription, and translation. To explain how DNA topology and chromatin structure affects the processes of DNA replication, repair, and transcription. To give examples of DNA and histone modifications and predict how they will affect gene expression. To provide examples of how homologous recombination is used to ensure genome stability and promote genetic diversity.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	Define Proteins and tools for analysis, Interactions between nucleic acids and proteins	1.2-2.2
1.2	Describe Structure of chromosome and recombination	1.2
2	**Skills:**	
2.1	Explain and identify the relationship between cause and consequence in the different mechanisms.	2.1
2.2	Analyze data and information and view discussion of sound scientific debate	2.1-2.3
2.3	Analyze the results, discuss and evaluate the information that has been deduced	2.1
3	**Values:**	
3.1	Appraise collaborative work skill	2.2-1.3
3.2	Write reports and preparation of presentations and the preparation of graphics and models by using technology.	3.2
3.3	Demonstrate manipulation of operation and use of computers and means of modern technology.	3.3

C. Course Content

No	List of Topics	Contact Hours
1	How do nucleic acids and proteins interact in a genomic context? The molecular structure of genetic material and function. Structure of chromosome and recombination.	5
2	Nucleic acids and tools for analysis. Genome sequencing and analysis. DNA topology and chromatin.	5
3	Proteins and tools for analysis. Interactions between nucleic acids and proteins.	5
4	Cell cycle and DNA replication. DNA damage and repair I. DNA damage and repair II – group work.	5
5	Regulation of Gene expression in eukaryotic and prokaryotic	5

	Mechanisms of transcription in bacteria. Chromatin and transcription in eukaryotes. RNA splicing and processing. The genetic code and translation initiation. Mechanisms and regulation of translation.	
6	Regulation of gene expression I. Regulation of gene expression II. Regulation of gene expression by small RNAs.	6
7	Tools for genome editing. Work of the map the genome and its applications.	5
Total		36

Topic to be covered (laboratories)

No	List of Topics	Contact Hours
1	Isolation of plasmids	3
2	Isolation of Plasmid DNA / agarose gel electrophoresis Enzymatically digest the DNA.) Extraction of protein,	3
3	Preparation of solutions and installation of the gel, separation process and running	3
4	Induction of Stress Protein Synthesis in E. coli	3
5	Cloning: Genomic DNA prep	2
6	Gene transfer.	2
7	Ligation, transformation, digest, gel	3
8	Polymerase chain reaction.	3
9	General revision	2
Total		24

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	Define Proteins and tools for analysis, Interactions between nucleic acids and proteins	Collaborative learning. E-learning.	Work – papers.
1.2	Describe Structure of chromosome and recombination	Laboratory method Small discussion groups	Classroom discussions and contributions
2.0	**Skills**		
2.1	Explain and identify the relationship between cause and consequence in the different mechanisms.	Mental focus Problem-solving and decision-making	Identification tests Performance
2.2	Analyze data and information and view discussion of sound scientific debate	Reciprocal Teaching Style - Wiki *	Work sample test Students projects
2.3	Analyze the results, discuss and evaluate the information that has been deduced	Reciprocal Teaching Style - Wiki *	Research papers Bags achievement portfolio
3.0	**Values**		
3.1	Appraise collaborative work skill	Collaborative	Organized

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		learning.	observation
3.2	Write reports and preparation of presentations and the preparation of graphics and models by using technology.	Reciprocal Teaching. Attend seminars and scientific meetings	Assigning students to conduct research using the Internet and modern technology
3.3	Demonstrate manipulation of the operation and use of computers and means of modern technology.	Default – laboratories. Illustrated presentations.	Recording student performance.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around 7th -8th week	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15 %
6	Final Exam.	Around 13th week	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:
Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Harvey Lodish et al. .Molecular Cell Biology (Lodish, Molecular Cell Biology) 7th (2012). ISBN-13: 978-1429234139 Bruce Alberts , Alexander Johnson etm al. Molecular Biology of the Cell, 6th Ed.(2014) , ISBN-13: 978-081534432.
Essential References Materials	1- Journals Ranked by Impact: Biochemistry & Molecular Biology".2014 Journal Citation Reports. Web of Science (Sciences ed.) (Thomson Reuters). 2015 2-American Journal of Molecular Biology, ISSN Print: 2161-6620, ISSN Online: 2161-6663
Electronic Materials	http://www.scirp.org/Journal/ajmb/
Other Learning Materials	CDs private for molecular biology Electronic programs for cell biology, genetics, molecular biology.

2. Facilities Required

Item	Resources

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms reserved for lectures and prepared the traditional education (face to face) and E-learning (E-learning) that allow interaction between teachers and students, ordinary paper blackboard smart plasma screens ... etc A (Stage), with an integrated audio system and microphones connected to the Internet and networks 2 Wired and wireless (optical fiber), and air conditioning system and modern suitable lighting.
Technology Resources (AV, data show, Smart Board, software, etc.)	A computer for display and uses of data with a slide show presentation. High-device "projectors" Lighting. It is assumed that each student has its own computer.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals , dissection instruments, light microscopes , dissection microscopes ,microtome instrument, slide preparations, mixer, fluorescent microscopes , ELISA unit for detecting Ag-Ab reactions , molecular instruments like gel electrophoresis ,PCR centrifuge , thermal cycler , an illuminator ,centrifuges , incubators , ovens and other glass wares.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty	Faculty	Indirect

Evaluation Areas/Issues	Evaluators	Evaluation Methods
member.		

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

توصيف المقرر الدراسي

Course Title:	Biochemistry
Course Code:	BIO 1237
Program:	Bachelor of Science in Biology.
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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A. Course Identification **3**

6. Mode of Instruction (mark all that apply) 3

B. Course Objectives and Learning Outcomes **3**

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2. Course Main Objective 4

3. Course Learning Outcomes 4

C. Course Content **4**

D. Teaching and Assessment **6**

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods 6

2. Assessment Tasks for Students 7

E. Student Academic Counseling and Support **7**

F. Learning Resources and Facilities **7**

1.Learning Resources 7

2. Facilities Required 7

G. Course Quality Evaluation **8**

H. Specification Approval Data **8**

A. Course Identification

1. Credit hours:	4 (3 Lectures + 2 Lab + 0 Tutorials).
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	Level 5 / Second Year
4. Pre-requisites for this course (if any)**:**	BIO 1101 and CHM 1101
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	36
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	60
Other Learning Hours*		
1	**Study**	4 - 6
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	4 - 6

* 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 covers the tools and techniques by which biological molecules are isolated, separated, identified, and analysed. Detailed discussion of experimental methods for macromolecule purification and characterization is included.

2. Course Main Objective

Upon completion of the course, the student should achieve an understanding of the following:

- Basic cellular structure.
- The special properties of water and how the aqueous environment influences the behaviour of biological macromolecules.
- The structures of amino acids, their chemical properties and their organization into polypeptides and proteins.
- Methods for isolating and characterizing proteins.
- The basic elements of protein structure.
- Key principles of protein function.
- Enzymes and how they catalyse reactions as well as enzyme kinetics.
- Structure of fundamental monosaccharaides and polysaccharides.
- Structure and basic function of nucleotides.

Structure of different classes of lipids and their roles in biological processes.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	Define the structures of macromolecules and their chemical properties.	1.1
1.2	Write about methods and approaches used in biochemical research and the basic concept about biochemical reaction for energy production.	1.1-1.2
2	**Skills:**	
2.1	Explain the role of carbohydrate in energy production and differentiate between glycolysis and gluconeogenesis.	2.1
2.2	Measure practice analytical thinking through the analysis and interpretation of the results and discussed.	2.1-3.1
3	**Values:**	
3.1	Write reports and preparation of presentations and the preparation of graphics and models by using technology.	3.2
3.2	Use of appropriate tools in a correct manner.	3.1-3.3
3.3	Use efficiently devices.	3.3

C. Course Content

No	List of Topics	Contact Hours
1	Amino acids and peptides Structure and Function. Protein structure; primary structure, secondary, tertiary and quaternary. Enzymes: role.	3
2	Carbohydrates: structure, mono saccharides disaccharides Polysaccharides. physical properties of glycogen, starch, chitin, peptidoglycan, hyaluronic acid, chondroitin sulfate; extracellular matrix.	3
3	Lipids structure and functions. Fatty acids are key constituents of Lipids. Three common types of membrane lipids. Membrane channel and pumps.	4
4	Nucleotides biosynthesis.	3

	Nucleic acids: determination of sequence; chemical synthesis. Genomics and proteomics.	
5	Glycolysis and gluconeogenesis.	3
6	The Citric acid Cycle.	3
7	Oxidative Phosphorylation.	3
8	The Light Reaction of photosynthesis.	2
9	The Calvin Cycle and Pentose.	2
10	Carbohydrates Metabolism.	2
11	Lipids Metabolism.	2
12	Protein Metabolism.	2
13	Amino acids and peptides Structure and Function. Protein structure; primary structure, secondary, tertiary and quaternary. Enzymes: role.	2
14	Carbohydrates: structure, mono saccharides disaccharides Polysaccharides. Physical properties of glycogen, starch, chitin, peptidoglycan, hyaluronic acid, chondroitin sulfate; extracellular matrix.	2
Total		36

Topics to be covered (Laboratories)

No.	Topics	Contact hours
1	Preparation of buffers (acidic, neutral and alkaline) and determination of ph. Qualitative identification of carbohydrates- glucose, fructose, ribose/xylose, maltose, sucrose, lactose, starch/glycogen.	2
2	Qualitative identification of amino acids histidine, tyrosine, tryptophan, cysteine, arginine.	2
3	Qualitative identification of lipids- solubility, saponification, acrolein test, Salkowski test, Lieberman-Burchard test.	2
4	Determination of optimum temperature for amylase. Determination of optimum pH for phosphatase.	2
5	Assay of amylase. Assay of urease. Assay of catalase.	2
6	Preparation of Ozone's and their identification. Titration curve of glycine and determination of pK and pI values.	2
7	Estimation of amino acid by ninhydrin method. Estimation of protein by Biuret method. Estimation of protein by Lowry method.	2

8	Estimation of glucose by DNS method. Estimation of glucose by Benedict's titrimetric method. Estimation of total carbohydrates by anthrone method.	2
9	Isolation of egg albumin from egg white. Isolation of cholesterol from egg yolk. Isolation of starch from potatoes. Isolation of casein from milk.	3
10	Separation of amino acids by paper chromatography. Determination of exchange capacity of resin by titrimetry. Separation of serum proteins by paper electrophoresis. Separation of plant pigments by TLC.	3
11	General revision	2
	Total	24

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	Define the structures of macromolecules and their chemical properties.	Panel of discussions and dialogue, including discussion of small groups.	Written tests. Oral tests
1.2	Write about methods and approaches used in biochemical research and the basic concept about biochemical reaction for energy production.	Laboratory method process (experiments) and view reports.	Work – papers and Research papers.
2.0	**Skills**		
2.1	Explain the role of carbohydrate in energy production and differentiate between glycolysis and gluconeogenesis.	Problem-solving and decision-making.	Identification tests.
2.2	Measure practice analytical thinking through the analysis and interpretation of the results and discussed.	Find the collective research.	Evaluating the laboratory written reports
3.0	**Values**		
3.1	Write reports and preparation of presentations and the preparation of graphics and models by using technology.	Attend seminars.	Class participation.
3.2	Use of appropriate tools in a correct manner.	Simulation and Process presentations.	Laboratory reports.
3.3	Use efficiently devices.	Laboratory work.	Practical tests.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around 7th -8th week	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15 %
6	Final Exam.	Around 13th week	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:
Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	David L. Nelson Lehninger Principles of Biochemistry Sixth Edition, (2012) ISBN-13: 978-1429234146, ISBN-10: 1429234148. Biochemistry – Lubert Stryer ISBN-13: 978-1429229364. 2010 ISBN-10: 1429229365.
Essential References Materials	Harper's Biochemistry – Murray, Granner, Mayes, and Rodwell – Prentice Hall International Inc. Text Book of Biochemistry – West, Todd, Mason, Bruggen – Amerind Publishing Co. Pvt., Ltd.
Electronic Materials	www.direct science.com
Other Learning Materials	CD for Biochemistry.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students. And the laboratory room is equipped with many laboratory instruments with a maximum of 20 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	The computers are equipped with different software's and connected to data show and to smart board.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals, dissection instruments, light microscopes, dissection microscopes, microtome instrument, slide preparations, mixer, fluorescent microscopes, spectrophotometer ELISA unit for detecting Ag-Ab reactions, molecular instruments like gel electrophoresis, PCR centrifuge ,

Item	Resources
	thermal cycler, an illuminator, some media agar and petri-dishes, centrifuges, incubators, ovens and other glass wares.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

توصيف المقرر الدراسي

Course Title:	Bacteriology
Course Code:	BIO 1242
Program:	Bachelor of Science in Biology
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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F. Learning Resources and Facilities **7**

1.Learning Resources 7

2. Facilities Required 7

G. Course Quality Evaluation **7**

H. Specification Approval Data **8**

A. Course Identification

1. Credit hours:	4 (3 Lectures + 2 Lab + 0 Tutorials).
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	Level 6 / second Year
4. Pre-requisites for this course (if any)**:**	BIO 1241
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	36
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	60
Other Learning Hours*		
1	**Study**	4-6 hours
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	4-6 hours

* 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

The course covers the fundamental principles related to bacteria mainly of bacterial organization importance and their interaction with host cells and molecular events during their replication.

2. Course Main Objective

By the end of the semester, the student should be able: □ To identify the basic shapes of bacteria. □ To describe the structure and organization of bacteria. □ To describe Bacterial requirement for growth and multiplication. □ To classify bacteria on the basis of preferred temperature range. □ To explain how microbes are classified on the basis of oxygen requirement. □ To describe Bacterial growth curve.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	List the general characteristics of bacteria and how to study them and to define the growth, metabolism and genetics of bacteria.	1.1
1.2	State how specific bacterial pathogens, interact with their host to cause disease.	1.1-1.2
2	**Skills:**	
2.1	Develop a knowledge base of principles of microbial taxonomy, structure, physiology and function.	2.1
2.2	Prepare the laboratory to diagnose infections, including appropriate specimen collection and test ordering.	2.2-2.3
3	**Values:**	
3.1	Illustrate the ability to communicate their ideas with the instructor at all times during and after the class.	2.2-3.1
3.2	Use laboratory instruments and computers.	3.3
3.3	Demonstrate the different types of microorganisms.	2.2-3.1

C. Course Content

No	List of Topics	Contact Hours
1	Cell organization Cell size, shape and arrangement, glycocalyx, capsule, flagella, endoflagella, fimbriae and pili. Cell-wall: Composition and detailed structure of gram positive and gram-negative cell walls, Archaebacterial cell wall, Gram and acid-fast staining mechanisms, lipopolysaccharide (LPS), sphaeroplasts, protoplasts, and L-forms. Effect of antibiotics and enzymes on the cell wall.	3
2	Cell Membrane: Structure, function and chemical composition of bacterial and archaeal cell membranes	3
3	Cytoplasm: Ribosomes, mesosomes, inclusion bodies, nucleoid, chromosome and plasmids	3
4	Endospore Structure, formation, stages of sporulation.	2
5	Bacteriological techniques. Pure culture isolation: Streaking, serial dilution and plating methods; cultivation, maintenance and preservation/stocking of pure cultures; cultivation of anaerobic bacteria, and accessing non-culturable bacteria.	2
6	Growth and nutrition. Nutritional requirements in bacteria and nutritional categories.	2
7	Culture media components of media, natural and synthetic media, chemically defined media, complex media, selective, differential, indicator, enriched and enrichment media.	2
8	Sterilization and Disinfection. Physical methods of microbial control: heat, low temperature, high pressure, filtration, desiccation, osmotic pressure, radiation Chemical methods of microbial control: disinfectants, types and mode of action.	2
9	Reproduction in Bacteria. Asexual methods of reproduction, logarithmic representation of bacterial populations, phases of growth, calculation of generation time and specific growth rate.	2
10	Bacterial Systematics. Aim and principles of classification, systematics	2

	and taxonomy, concept of species, taxa, strain; conventional, molecular and recent approaches to polyphasic bacterial taxonomy, evolutionary chronometers, rRNA oligonucleotide sequencing, signature sequences, and protein sequences. Differences between eubacteria and archaebacteria.	
11	Important archaeal and eubacterial groups. According to Bergey's Manual of Systematic Bacteriology (Second Edition) Archaebacteria: General characteristics, phylogenetic overview, genera belonging to Nanoarchaeota (Nanoarchaeum), Crenarchaeota (Sulfolobus, Thermoproteus) and Euryarchaeota. [Methanogens (Methanobacterium, Methanocaldococcus), thermophiles (Thermococcus, Pyrococcus, .(Thermoplasma), and Halophiles (Halobacterium, Halococcus	3
12	Eubacteria Morphology, metabolism, ecological significance and economic importance of following groups. • Gram Negative: Non proteobacteria Aquifex, Thermotoga, Deinococcus, Thermus, Chlorobium, Chloroflexus, Chlamydiae, Spirochaetes.. Alpha proteobacteria Rickettsia, Coxiella, Caulobacter, Rhizobium, Hyphomicrobium, Agrobacterium. Beta proteobacteria Neisseria, Burkholderia, Thiobacillus Gamma proteobacteria Enterobacteriaceae family, Purple sulphur bacteria, Pseudomonas, Vibrio, Beggiatoa, Methylococcus, Haemophilus. Delta proteobacteria Bdellovibrio, Myxococcus Epsilon proteobacteria Helicobacter, Campylobacter	4
13	Gram Positive: Low G+ C (Firmicutes) Mycoplasmas, Clostridium, Heliobacterium, Lactobacillus, Lactococcus, Staphylococcus, Streptococcus, Leuconostoc, Bacillus. High G+C (Actinobacteria) Arthrobacter, Bifidobacterium, Corynebacterium, Frankia, Mycobacterium, Nocardia, Streptomyces, Thermomonospora, Propionibacterium.	3
14	Cyanobacteria. Revision.	3
Total		36

Topics to be covered (Laboratories)

No	List of Topics	Contact Hours
1	Introduction Supply drawer check in General Lab rules and instructions.	2
2	Preparation of different media: synthetic media BG-11, Complex media-nutrient agar, Mc- Conkey agar, EMB agar.	2
3	Simple staining. Negative staining	3
4	Gram's staining. Acid fast staining-permanent slide only	3
5	Capsule staining.	2
6	Spore staining.	2
7	Isolation of pure cultures of bacteria by streaking method.	2
8	Estimation of CFU count by spread plate method.	2
9	Motility by hanging drop method.	2
10	Some Physiological Tests	2
11	Control of Microbial Growth.	2
Total		24

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	List the general characteristics of bacteria and how to study them and to define the growth, metabolism and genetics of bacteria.	Three hours weekly containing lectures and laboratory classes.	Students will be evaluated on their ability to present complete solutions to problems.
1.2	State how specific bacterial pathogens, interact with their host to cause disease.	To encourage making regular visits during office hours where they can ask any questions about the course.	Performance must include class examinations, frequent homework assignments midterm 1, midterm 2, final lab. Exam and final exam)
2.0	**Skills**		
2.1	Develop a knowledge base of principles of microbial taxonomy, structure, physiology and function.	Self-study is an important method for students' learning. Introduce some concepts by examples from real- life problems (i.e. laboratory)	Questions in lectures. Short quizzes and exams
2.2	Prepare the laboratory to diagnose infections, including appropriate specimen collection and test ordering.	Motivate students to work cooperatively with their class mates to develop individual skills.	Participation through class work.
3.0	**Values**		
3.1	Illustrate the ability to communicate their ideas with the instructor at all times during and after the class.	Encourage the students to use electronic mail and network in submitting home works and assignments.	Evaluating the laboratory written reports and calculation skills.
3.2	Use laboratory instruments and computers.	Presentations. Virtual labs.	Laboratory performance and reports.
3.3	Demonstrate the different types of microorganisms.	Virtual labs and demonstrations	Group work and oral presentations

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around 7th -8th week	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15 %
6	Final Exam.	Around 13th week	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:
Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Salle A. J. (2007): Fundamental Principles of Bacteriology, Even press, ISBN10: 1406707376, ISBN-13: 978-1406707373. □ Ted R. (2015): Johnson. Laboratory Experiments in Microbiology 11th ed.,ISBN-13: 9780321994936.
Essential References Materials	https://legacy.saylor.org/bio407/Intro/.
Electronic Materials	https://archive.org/details/fundamentalprinc029784mbp
Other Learning Materials	CD for Bacteriology.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students. And the laboratory room is equipped with many laboratory instruments with a maximum of 20 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	The computers are equipped with different software's. and connected to data show and to smart board.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals, dissection instruments, light microscopes, dissection microscopes, microtome instrument, slide preparations, mixer, fluorescent microscopes, ELISA unit for detecting Ag-Ab reactions, different media for cultures and sensitivities, centrifuges, incubators, ovens and other glass wares.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

توصيف المقرر الدراسي

Course Title:	Microtechnique
Course Code:	BIO 1244
Program:	Bachelor of Science in Biology.
Department:	Biology.
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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A. Course Identification **3**

6. Mode of Instruction (mark all that apply) 3

B. Course Objectives and Learning Outcomes **3**

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C. Course Content **4**

D. Teaching and Assessment **5**

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F. Learning Resources and Facilities **6**

1.Learning Resources 6

2. Facilities Required 6

G. Course Quality Evaluation **6**

H. Specification Approval Data **7**

A. Course Identification

1. Credit hours:	4 (3 Lectures + 2 Laboratory + 0 Tutorials)
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	Level 6 / Second Year
4. Pre-requisites for this course (if any)**:**	None
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	36
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	60
Other Learning Hours*		
1	**Study**	2-4 hours
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	2-4 hours

* 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

The microscopic study of different tissues and the tissue organization of organs in relation to their function using light and electron microscopy. Tissue preparation for microscopic study, histochemistry, stains and stain technology will be included. Theoretical principle and investigative based experimental activities are incorporated into this course.

2. Course Main Objective

At the end of the course the students should be able to:

- Preparation of microscopical sections & smears from different body tissues & fluids.
- Preparation of all solutions & stains used for processing.

Preservation & storage of histological specimen.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	Describe the structure of normal animal cell and its inclusions.	1.2
1.2	Define the functions of all cellular components.	1.1
2	**Skills:**	
2.1	Summarize methods of preparation of whole mounts, smears, permanent section, and paraffin embedding and sectioning using microtomes.	2.1
2.2	Differentiate between the different cellular organelles.	2.1
2.3	Predict the abnormal ultrastructure of the organelles under different treatments.	2.1
3	**Values:**	
3.1	Demonstrate ability to communicate with people based on different biological techniques used in biology.	2.2-3.1
3.2	Use laboratory instruments and computers.	3.3
3.3	Use biological experiments and use various slides during laboratory classes.	3.3

C. Course Content

No	List of Topics	Contact Hours
1	Introduction Supply drawer check in General Lab rules and instructions.	6
2	Classification of different microtechniques and methods: giving introduction about the different types of methods and techniques which used in preparing biological slides.	6
3	Stripping off: for studying view of stem and leaf epidermal cells to count stomata.	6
4	Maceration and squashing: taking root tip to study cell division.	6
5	Bone marrow collection and preparation of slide from bone marrow: to see the cells of bone marrow. Whole mount: for study the protozoa and parasites.	6
6	Paraffin method, steps of paraffin method, dissection of animal. Fixation and dehydration: explain how the specimen preserved and dehydrated as well as the properties of fixative and specimen to be preserved.	6
7	Clearing and mounting: giving information about these two steps and different chemicals and materials which used for each step. Embedding: preparing paraffin block.	6
8	Sectioning, stretching and affixing: the paraffin blocks will be sectioned by using rotary microtome, stretched and affixed on slide to be stained by different stains and dyes. Counter staining: using hematoxyline and eosin.	6
9	Freeze sectioning technique: for study the enzyme with in the cell, in which no fixation, dehydration and clearing are required.	6
10	Electron microscopic techniques and methods: show comparison with paraffin method.	6
Total		60

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	Describe the structure of normal animal cell and its inclusions.	Lectures Practice of techniques and methods	Oral test.
1.2	Define the functions of all cellular components.	Class discussion.	Report and presentation
2.0	**Skills**		
2.1	Summarize methods of preparation of whole mounts, smears, permanent section, and paraffin embedding and sectioning using microtomes.	Introduce some concepts by examples from real-life problems (i.e. laboratory).	Participation through class work and Homework.
2.2	Differentiate between the different cellular organelles.	Encourage Students to communicate their biology thinking to ask and answer question when they arise.	Work portfolio.
2.3	Predict the abnormal ultrastructure of the organelles under different treatments.	Motivate students to work cooperatively with their class mates to develop individual skills.	Work portfolio.
3.0	**Values**		
3.1	Demonstrate ability to communicate with people based on different biological techniques used in biology.	Encourage the students to solve the exercises and problems on white board	Laboratory reports writing
3.2	Use laboratory instruments and computers.	Virtual labs.	• Examinations • Laboratory performance and reports.
3.3	Use biological experiments and use various slides during laboratory classes.	Demonstrations.	• Examinations • Laboratory performance and reports.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15 %
2	Midterm 2	Around 7th -8th week	15 %
3	Quizzes, attendance, participation, home works	All the semester	10 %
4	lab reports	All the semester	5%
5	Lab exam.	Around 9th week	15%
6	Final exam.	Around 13th week	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:

- By identifying office hours 6 hours a week (be adhered to and attached with the Schedule. lectures and declare for the students).
- To communicate and ask questions and inquiries by e-mail to a member of staff teaching through his Web site.
- To provide assistance and guidance to any inquiry or consultation relating to syllabus given.
- Helping students to understand the material and contribute to the academic advising process.

Helping students in the face of any study and academic problems in this course.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	John Kiernan. Histological and Histochemical Methods: Theory and Practice, Fifth Edition ,(2015). ISBN-13: 978-1907904325. Humason, Gretchen L. Animal tissue technique, 5th ed. (2011). Course notes and handouts: prepared by the course instructors.
Essential References Materials	https://sites.google.com/a/koyauniversity.org/mit6115/description
Electronic Materials	• https://sites.google.com/a/koyauniversity.org/mit6115/home. • http://microscopy.berkeley.edu/courses/microtech/. https://www.ee.washington.edu/research/microtech/Courses.htm.
Other Learning Materials	CDs for Micro technique.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	The computers are equipped with different software's.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals , dissection instruments, light microscopes , dissection microscopes ,microtome instrument, slide preparations, mixer, fluorescent microscopes , ELISA unit for detecting Ag-Ab reactions ,(different instruments suitable for plants , animals , parasites ,…….), centrifuges , incubators , ovens and other glass ware.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete	Students	Direct

Evaluation Areas/Issues	Evaluators	Evaluation Methods
an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.		
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

توصيف المقرر الدراسي

Course Title:	Principle of Environmental Impact Assessment
Course Code:	BIO 1252
Program:	Bachelor of Science in Biology
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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A. Course Identification **3**

6. Mode of Instruction (mark all that apply) 3

B. Course Objectives and Learning Outcomes **3**

1. Course Description 3

2. Course Main Objective 3

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C. Course Content **4**

D. Teaching and Assessment **4**

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods 5

2. Assessment Tasks for Students 6

E. Student Academic Counseling and Support **6**

F. Learning Resources and Facilities **6**

1.Learning Resources 6

2. Facilities Required 6

G. Course Quality Evaluation **7**

H. Specification Approval Data **7**

A. Course Identification

1. Credit hours: 3 (2 Lectures + 2 Laboratory + 0 Tutorials).
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: Level 6 / Second Year
4. Pre-requisites for this course (if any)**:** BIO 1251
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	24
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	48
Other Learning Hours*		
1	**Study**	2-3 hours
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	2-3 hours

* 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 Understand principles, process, and necessary tools and techniques for environmental impact assessment, mitigation and monitoring. Evaluate impacts from project's activities on natural resources, ecological system and community.
2. Course Main Objective After successful completion of this course, students will be able to: Understand principles,

process, and necessary tools and techniques for environmental impact assessment, mitigation and monitoring. Evaluate impacts from project's activities on natural resources, ecological system and community.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	Define principle of environmental impact assessment.	1.1-1.2
1.2	Recognize processes of environmental impact assessment.	1.1-1.2
2	**Skills:**	
2.1	Contrast theoretical of each resource dimension to the environmental impact assessment.	2.3
2.2	Develop analytical thinking.	2.1
2.3	Interpret integrated knowledge to enhance skills on environmental impact assessment.	2.2- 2.3
3	**Values:**	
3.1	Show ability to work in a team and solve the problem regarding the environmental issues.	2.1- 2.2- 3.1
3.2	Illustrate the principle and result of assessment on environmental impact from assignment.	3.1- 3.2
3.3	Use laboratory instruments and computers.	3.3

C. Course Content

No	List of Topics	Contact Hours
1	Introduction (Background of EIA, SEA, HIA). The steps and EIA processes.	3
2	Acts, laws, and regulations. Assessment of impact on ecosystem dimension (Terrestrial ecosystem).	3
3	Assessment of impact on ecosystem dimension (Aquatic ecosystem). Assessment of impact on physical environmental dimension (soil and land use).	3
4	Assessment of impact on physical environmental dimension (water resource and air). Assessment of Quality of life dimension (health and socioeconomic).	4
5	Assessment of Quality of life dimension (health and socioeconomic). Public participation and public hearing in EIA process.	4
6	Mitigation and monitoring. Conclusion and students' presentation.	4
7	Oral presentation.	3
Total		24

Topics to be covered (Laboratories)

No	List of Topics	Contact Hours
1	Introduction Supply drawer check in General Lab rules and instructions	2
2	Microscope assignment and review, Microscope practice Wet mount, Brownian vs. Motility	2
3	Microbes in the environment Transfer of bacteria	4
4	Staining Methods: simple, acid-fast and Gram stain	2
5	Staining Methods: Special stains	2

6	Microbial metabolism	2
7	Microbial Growth	2
8	Control of Microbial Growth	2
9	Microbiology of Water	2
10	Microbiology of soil	2
11	Medical Microbiology Demonstration	2
Total		24

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	Define principle of environmental impact assessment.	Class discussion	Group work Homework.
1.2	Recognize processes of environmental impact assessment.	Self-study.	Oral test Report and presentation
2.0	**Skills**		
2.1	Contrast theoretical of each resource dimension to the environmental impact assessment.	Self-study is an important method for students' learning.	Questions in lectures. Short quizzes and exams.
2.2	Develop analytical thinking.	Introduce some concepts by examples from real life problems (i.e. Laboratory).	Participation through class work and Homework.
2.3	Interpret integrated knowledge to enhance skills on environmental impact assessment.	Encourage students to communicate their biology thinking to ask and answer question when they arise. Motivate students to work cooperatively with their class mates to develop individual skills	Work portfolio.
3.0	**Values**		
3.1	Show ability to work in a team and solve the problem regarding the environmental issues.	Motivate students to ask questions and to give response to the teacher's questions.	Homework's, quizzes, exams and participation.
3.2	Illustrate the principle and result of assessment on environmental impact from assignment.	Encourage the students to be self-starters to finish the chemical problems properly. Writing laboratory reports.	Evaluating the laboratory written reports and calculation skills.
3.3	Use laboratory instruments and computers.	Computer lab. Presentations	Examinations, Laboratory performance and

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
			reports.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around 7th -8th week	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15 %
6	Final Exam.	Around 13th week	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:
Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Eccleston HC. Environmental Impact Statements. Canada: John Wiley & Sons, Inc.; (2000). ISBN13: 978-0471358688. Lee N, George C, editors. Environmental Assessment in Developing and Transitional Countries - Principles, Methods & Practice. (2000). ISBN-13: 978-0471985570.
Essential References Materials	http://www.kryeministri-ks.net/repository/docs/Final_EIA_Veterinary_Laboratory321.pdf. http://nnsa.energy.gov/sites/default/files/nnsa/inlinefiles/Appendix%20B.pdf.
Electronic Materials	https://books.google.com.sa/books?
Other Learning Materials	CDs for Ecology.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	The computers are equipped with different software's.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals , dissection instruments, light microscopes , dissection microscopes ,microtome instrument, slide preparations, mixer, fluorescent microscopes , instruments for measurements of environmental parameters ,centrifuges ,

Item	Resources
	incubators , ovens and other glass wares.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

توصيف المقرر الدراسي

Course Title:	Animal Physiology
Course Code:	BIO 1314
Program:	Bachelor of Science in Biology.
Department:	Biology.
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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F. Learning Resources and Facilities **7**

1.Learning Resources 7

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G. Course Quality Evaluation **7**

H. Specification Approval Data **8**

A. Course Identification

1. Credit hours:	4 (3 Lectures + 2 Laboratory + 0 Tutorials)
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	Level 7 / Third Year.
4. Pre-requisites for this course (if any)**:**	BIO 1212 + BIO 1237
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	36
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	60
Other Learning Hours*		
1	**Study**	3-5 hours
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	3-5 hours

* 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

Animal physiology is the scientific study of the life-supporting properties, functions and processes of animals or their parts. The discipline covers key homeostatic processes, such as the regulation of temperature, blood flow and hormones.

2. Course Main Objective

By the end of this course, the student must be able: -

- To recognize the parts of the body which are linked into a whole functioning unit.
- To know gastrointestinal physiology and regulation of metabolism and energy balance.
- To define the homeostasis and feedback control.
- To outline cardiovascular physiology and respiratory system.

- To recall osmoregulation and excretion.
- To define the importance of endocrine glands and hormones which related to reproductive physiology.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	State how the parts of the body are linked into a functioning whole.	1.1-1.2
1.2	Define Coordination and Homeostasis in animals.	1.1-1.2
2	**Skills:**	
2.1	Develop a knowledge base of how carbon, nutrients and water interact with each other to bring about animals' growth and development under different environmental conditions.	2.1
2.2	Justify familiarity to integrate how the principles of chemistry and physics operate to maintain homeostasis in animals' bodies.	2.1-2.2
2.3	Summarize how animal function.	2.1-2.2
3	**Values:**	
3.1	Demonstrate the ability to condense raw data into meaningful values and then assessing the resulting trends is a key skill in a number of vocations, both within science and in other areas.	3.1
3.2	Use practical knowledge of physiological techniques.	3.3
3.3	Illustrate skills of group discussions.	2.2-3.1-3.2

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to course, Basic Body Organization. Homeostasis and Feedback Control.	3
2	Cellular Reactions and Metabolism. Cellular Metabolism.	3
3	Gastrointestinal Physiology.	4
4	Regulation of Metabolism and Energy Balance.	2
5	Cardiovascular Physiology.	4
6	Respiratory System. Control of Respiration.	4
7	Urinary System Kidneys and Fluid/Electrolyte Balance.	3
8	Muscle. Muscular Control.	3
9	Cells of the Nervous System, NS organization.	3
10	Endocrine Glands and Hormones.	4
11	Reproductive Physiology.	3
Total		36

Topics to be covered (Laboratories)

No.	Topics	Contact hours
Lab 01	Introduction, administrative issues, lab safety, hypothesis testing, data presentation.	2

02	Detection of Digestive enzymes.	2
03	Osmoregulation (RBCs fragility).	2
04	Determination of Blood components.	2
05	Determination of hemoglobin and hematocrit.	2
06	Blood pressure, heart rate, & rat guts.	2
07	Urine analysis.	2
08	Frog skeletal muscle.	2
09	Cardiac dynamics.	2
10	Special senses & reflexes. Vertebrate thermoregulation.	3
11	Some physiological estimation. Metabolic rate and body size.	3
	Total	24

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	State how the parts of the body are linked into a functioning whole.	Three hours weekly containing lectures.	Students will be evaluated on their ability to present complete solutions to problems.
1.2	Define Coordination and Homeostasis in animals.	Two hours weekly of laboratory devoted to experiments.	Students will be evaluated on their ability to present complete solutions to problems.
2.0	**Skills**		
2.1	Develop a knowledge base of how carbon, nutrients and water interact with each other to bring about animals' growth and development under different environmental conditions.	Self-study is an important method for students' learning.	Questions in Lectures, short Quizzes and Exams.
2.2	Justify familiarity to integrate how the principles of chemistry and physics operate to maintain homeostasis in animals' bodies.	Introduce some concepts by examples from real-life problems (i.e. laboratory).	Work portfolio.
2.3	Summarize how animal function.	• Encourage Students to communicate their	Participation through class work and

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		biology thinking to ask and answer question when they arise. Motivate students to work cooperatively with their class mates to develop individual skills.	Homework.
3.0	**Values**		
3.1	Demonstrate the ability to condense raw data into meaningful values and then assessing the resulting trends is a key skill in a number of vocations, both within science and in other areas.	Motivate students to ask questions and to give response to the teacher's questions	Homeworks, quizzes, exams and participations.
3.2	Use practical knowledge of physiological techniques.	Virtual labs and Demonstrations	Group work and oral presentations.
3.3	Illustrate skills of group discussions.	Writing laboratory reports.	Team work learning.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15 %
2	Midterm 2	Around 7th -8th week	15 %
3	Quizzes, Attendance, Participation, Home works and Lab reports.	All the semester	10 %
4	Lab Exam.	Around 9th week	20 %
5	Final Exam.	Around 13th week	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:

- By identifying office hours 6 hours a week (be adhered to and attached with the Schedule. lectures and declare for the students).
- To communicate and ask questions and inquiries by e-mail to a member of staff teaching through his Web site.
- To provide assistance and guidance to any inquiry or consultation relating to syllabus given.
- Helping students to understand the material and contribute to the academic advising process.

Helping students in the face of any study and academic problems in this course.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Moyes and P.M. Schulte. Principles of Animal Physiology 2nd Edit (2013). ISBN: 0-8053-5351-8. Richard W. Hill , Gordon A. Wyse , Margaret Anderson, Animal Physiology, 3rd Edit, (2012), ISBN-10: 0878938982.
Essential References Materials	SCHMIDT-NIELSON, K. 1997. Animal Physiology. 5th Edition. Cambridge UP, Cambridge
Electronic Materials	http://bio.classes.ucsc.edu/bio131/.
Other Learning Materials	CDs for Physiology

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students
Technology Resources (AV, data show, Smart Board, software, etc.)	The computers are equipped with different software's.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals, dissection instruments, light microscopes, dissection microscopes, microtome instrument, slide preparations, mixer, fluorescent microscopes, counter and coulter for hematological parameters, spectrophotometer physiological chemistry, centrifuges, incubators, ovens and other glass wares.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct

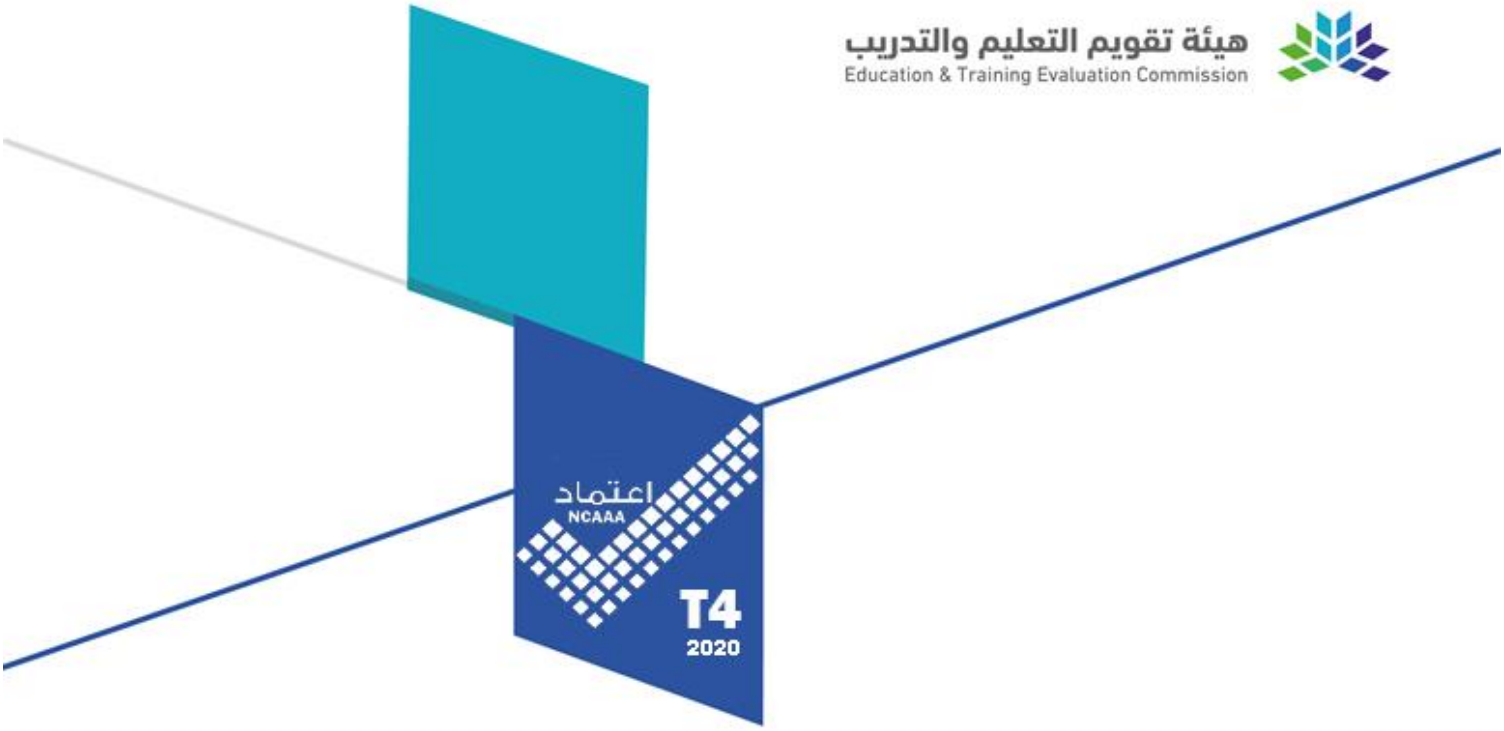
Evaluation Areas/Issues	Evaluators	Evaluation Methods
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



توصيف المقرر الدراسي

Course Title:	Plant Anatomy
Course Code:	BIO 1322
Program:	Bachelor of Science in Biology.
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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A. Course Identification **3**

6. Mode of Instruction (mark all that apply) 3

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E. Student Academic Counseling and Support **6**

F. Learning Resources and Facilities **7**

1.Learning Resources 7

2. Facilities Required 7

G. Course Quality Evaluation **8**

H. Specification Approval Data **8**

A. Course Identification

1. Credit hours:	4 (3 Lectures + 2 Lab + 0 Tutorials).
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	Level 7 / Third Year
4. Pre-requisites for this course (if any)**:**	BIO 1251
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	36
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	60
Other Learning Hours*		
1	**Study**	4-6 hours
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	4-6 hours

* 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 has titles which will introduce the plant cell histology. So, this course involves types of microscopy, basic plant cell histology, basic plant cell types, functional tissue systems, supportive systems, protective systems, absorptive systems, transport systems, photosynthetic systems, and secretory/excretory systems.

2. Course Main Objective

By the successful completion of the course the student will be able:

- To Describe the relationships between structure and function in plant cells, tissues, and

organs
- To Explain how patterns of development are regulated by genetically determined processes
- To Appreciate the contributions of modern research methods like genome sequencing, mutation
- To analysis, transgenics, and imaging to our understanding plant structure and development
- To interpret the results of scientific experiments
- To Read and understand scientific papers.
- To compare and contrast vegetative and reproductive anatomy, including leaves, stems roots, flowers, and fruits.
- To compare and contrast the mechanism of each wind, water and insect's pollination.
- To discuss the economic and social importance of local plants.
- To understand the morphology and anatomy of plants at the cell, tissue, and organ level.

To recognize and be able to describe features of plant anatomy at the cell, tissue and organ level.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	Recognize introduction addresses in anatomy and morphology and its importance.	1.1
1.2	Describe the relationships between structure and function in plant cells, tissues, and organs	1.2
2	**Skills:**	
2.1	Explain and identify the relationship between cause and consequence in the different mechanisms.	2.1
2.2	Analyze data and information and view discussion of sound scientific debate.	2.1-2.3
2.3	Interpret the results, discuss and evaluate the information.	2.1-2.3
3	**Values:**	
3.1	Appraise collaborative work skill.	2.2-3.1
3.2	Write reports and preparation of presentations and the preparation of graphics and models by using technology.	3.2
3.3	Use appropriate tools in a correct manner.	3.3

C. Course Content

No	List of Topics	Contact Hours
1	Microscopy Introduction to the Class & the "Paperless" Environment History of Plant Anatomy. Types of Microscopy Digital Microscopy	3
2	Basic Plant Cell Histology: Cell contents. .Plant extracellular matrix	3
3	Basic Plant Cell Types. Apical Meristem; Vascular Cambium; Phellogen.	4

	Epidermis; Guard Cells. Parenchyma; Collenchyma. . Sclereids; Fibers	
4	Tracheids; Vessel Elements. Sieve Cells; Sieve Tube Elements Laticifers	3
5	Functional Tissue Systems Supportive Systems Protective Systems	2
6	Protective Systems Absorptive Systems	4
7	Transport Systems Xylem Transport Systems Phloem	3
8	Transfer Cells Analysis of plant genes	3
9	Photosynthetic Systems C3, C4 & CAM Plants	3
10	Storage Systems Water & Elaborated Reserves; Secretory/Excretory Systems - Hydathodes Secretory/Excretory Systems - Stinging Hairs & Glandular Trichomes	8
Total		36

Topics to be covered (Laboratories)

No.	Topics	Contact hours
1,2	The Microscope and Plant Cell Structure General Anatomy and Morphology	4
3	Cell Types and Tissues Hand Sectioning and Histology of Cell Contents.	3
4,5	Xylem Phloem Vascular Architecture Primary Roots Primary Stems	4
6,7	Primary Root and Stem Development Secondary Growth. Wood Anatomy. Leaves.	4
8,9	Trichomes, Secretory Structures, and Idioblasts. Reproductive Structures and Life Cycle.	4
10	Seeds and Seedlings. Fruits.	3
11	General revision	2
	Total	24

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	Recognize introduction addresses in anatomy and morphology and its importance.	Interactive lecture. Discussion and dialogue.	Written tests. Oral tests. Classroom discussions and contributions.
1.2	Describe the relationships between structure and function in plant cells, tissues, and organs.	Small discussion groups.	Research papers.
2.0	**Skills**		
2.1	Explain and identify the relationship between cause and consequence in the different mechanisms.	Mental focus. Problem-solving and decision-making.	Performance of written tests.
2.2	Analyze data and information and view discussion of sound scientific debate.	Find the collective Reciprocal teaching	Work sample tests. Student's projects. Research papers.
2.3	Interpret the results, discuss and evaluate the information.	Problem-solving and decision-making.	Identification tests. Research papers.
3.0	**Values**		
3.1	Appraise collaborative work skill.	Collaborative learning.	Organized observation.
3.2	Write reports and preparation of presentations and the preparation of graphics and models by using technology.	Attend seminars and scientific meetings.	Evaluation of collective research project and writing reports and presentations its own.
3.3	Use appropriate tools in a correct manner.	Process presentations.	Laboratory reports.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around 7th -8th week	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15 %
6	Final Exam.	Around 13th week	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: Personal office hour

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Charles B. Beck (2010). An Introduction to Plant Structure and Development: Plant Anatomy for the Twenty-First Century 2nd Ed ISBN-13: 978-0521518055. James D. Mauseth Plant Anatomy (2008). ISBN-13: 978-1932846171. Amiet, C.F., and J.E. Bidlack. (2015). Laboratory Guide to Plant Anatomy. Twelfth Edition. Dickison, W. C. (2000). Integrative Plant Anatomy. Academic Press. Meicenheimer, R. D. (2005). Electronic Plant Anatomy Laboratory Exercises.
Essential References Materials	Meicenheimer, R. D. (2005). CD-ROM Plant Cell Expert System. Esau's Plant Anatomy (2006) 3rd Edition Ray F. Evert (Author), Susan E. Eichorn (Author) A. John Wiley & Sons, Inc., Publication. Teaching Plant Anatomy Though Creative Laboratory Exercises (2008) R. Larry Peterson et al., (Author). Fahn A. (1990). Plant Anatomy. 4th.Edit. Pergamon press, Oxford.
Electronic Materials	Sciencedirect.com.
Other Learning Materials	CDs private classifies plant. Electronic programs for anatomy and mechanisms of action of various devices.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms reserved for lectures and prepared the traditional education (face to face) and E-learning (E-learning) that allow interaction between teachers and students, ordinary paper blackboard smart plasma screens *etc.* A (Stage), with an integrated audio system and microphones connected to the Internet and networks 2 Wired and wireless (optical fiber), and air conditioning system and modern suitable lighting.
Technology Resources (AV, data show, Smart Board, software, etc.)	A computer for display and uses of data with a slide show presentation. High-device "projectors" Lighting. It is assumed that each student has its own computer.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental plants , dissection instruments, light microscopes, dissection microscopes, microtome instrument, slide preparations, mixer, fluorescent microscopes, molecular instruments like gel electrophoresis, PCR centrifuge, thermal cycler,

Item	Resources
	an illuminator, centrifuges, incubators, ovens and other glassware's.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

توصيف المقرر الدراسي

Course Title:	Parasitology.
Course Code:	BIO 1343
Program:	Bachelor of Science in Biology.
Department:	Biology.
College:	Science.
Institution:	Imam Mohammad Ibn Saud Islamic University.

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H. Specification Approval Data **9**

A. Course Identification

1. Credit hours: 4 (3 Lectures + 2 Laboratory + 0 Tutorials).
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: Level 7 / Third Year.
4. Pre-requisites for this course (if any)**:** BIO 1111
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	36
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	60
Other Learning Hours*		
1	**Study**	4-6 hours
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	4-6 hours

***** 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

Course description: The lectures for this course will provide you with an introduction to the general biology of the parasitic protozoans, helminths, and arthropods of humans and domestic animals. Lectures will emphasize the morphology, form and function, life cycles, symptomatology, and pathogenesis of representative taxa from these major parasitic groups. This information will be useful to you when you study animal and protozoan parasites in the laboratory.

2. Course Main Objective

By the end of this course, the student must be able: -

1. To develop an understanding of and appreciation for the nature of parasitic associations.
2. To develop an understanding of the terminology used in parasitology.
3. To understand the ecology and life cycles of a variety of host-parasite associations.
4. To develop an understanding of the modifications (physiological, morphological, and behavioral) needed to assume a parasitic lifestyle.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	Describe the basics of parasitology.	1.1-1.2
1.2	Recognize the benefits of the recent research scientific exchange.	1.1-1.2
2	**Skills:**	
2.1	Prepare data from of internet and computer programs.	2.1
2.2	Explain how to make search in the internet and to learn more about using the library system.	2.1-2.2
3	**Values:**	
3.1	Demonstrate proper parasitology laboratory techniques involving microscopy, biochemical tests and diagnostic media to characterize microorganisms of significance to human health.	3.1
3.2	Use laboratory instruments and computers.	3.3
3.3	Evaluate different diagnostic techniques to predict the causative organism and show the proper antibiotics for their treatment.	3.1-3.2

C. Course Content

No	List of Topics	Contact Hours
1	• Course Introduction Grading; significance of parasitism in world affairs; general principles and concepts; transmission; factors influencing parasitism; outcomes and implications of parasitism Outline of “areas of responsibility” for selected groups of parasites.	3
2	• Introduction to the protozoa. Terminology, structures, major life cycle events, and systematics.	3
3	• Amoebae. General: structure, life history Amebiasis: course of infection, pathology, treatment and prognosis Epidemiology: of intestinal amoebae Diagnosis: various techniques.	3

4	Flagellates (intestinal and urogenital). General: structure, life history.	3
5	Hemoflagellates of humans. General: structure and life history Leishmania: Kala azar, cutaneous and mucocutaneous Trypanosomes: trypanosomiasis & world affairs, African and American trypanosomiasis.	4
6	• Apicomplexa. General: anatomy, structure, life history General Coccidiosis: economic impact in animals, role as human pathogens Toxoplasma, Eimeria & Cryptosporidium: epidemiology and course of infection.	4
7	• Plasmodium. General: life history and course of infection Malaria: pathology, symptoms, treatment and prognosis Malaria and human affairs Current research on malarial control Malaria and the genetics of resistance.	3
8	• Introduction to Trematoda General: Adult anatomy/ reproductive biology; life cycles/development.	3
9	• Schistosomes. General: course of infection, histopathology, treatment and prognosis Schistosomiasis and human affairs: antigenic mimicry Ecological models: approaches to parasite control Cercarial dermatitis.	2
10	• Other Trematdoes. Liver flukes: life histories, epidemiology, and pathology Lung flukes: life histories, epidemiology, and pathology.	2
11	• Cestodes. General: life history patterns among cestodes Pseudophyllidea of humans: dibothriocephaliasis and sparganosis Cyclophyllidiea of humans: Taenia and Echinococcus Larval tapeworms: human disease.	2
12	• Nematodes. Enterobia: clinical manifestations, treatment/prognosis, parasitism & human institutions Trichinella: course of infection, diagnosis/treatment, epidemiology, moral implications Intestinal nematodes of humans: the diseases, intestinal nematodes and human nutrition Hookworm disease Filariasis: course of infection, pathology, treatment and control.	2
13	• Parasitism and World Affairs Molecular techniques in control and prevention of parasitic disease Why are there no vaccines?	2
Total		36

Topics to be covered (Laboratories)

No.	Topics	Contact hours
01	Discussion of major course project & lab requirements.	2
02	Protozoa – Flagellates.	2
03	Protozoa - Amoebas, myxozoa, ciliates.	2
04	Protozoa - Plasmodium spp.	2
05	Hemoflagellates.	2

06	Apicomplexa: Coccidia, gregarines and Plasmodium.	2
07	Platyhelminthes: Trematoda.	2
08	Platyhelminthes - Monogenea and Digenea.	3
09	Platyhelminthes: Cestoda.	2
10	Nematoda. Acanthocephala and Arthropods.	3
11	General revision	2
	Total	24

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	Describe the basics of parasitology.	Two hours weekly containing lectures and tutorial.	Students will be evaluated on their ability to present complete solutions to problems.
1.2	Recognize the benefits of the recent research scientific exchange.	To encourage making regular visits during office hours where they can ask any questions about the course.	Students will be evaluated on their ability to present complete solutions to problems.
2.0	**Skills**		
2.1	Prepare data from of internet and computer programs.	Self-study is an important method for students' learning.	• Questions in Lectures. • Short Quizzes and Exams.
2.2	Explain how to make search in the internet and to learn more about using the library system.	• Introduce some concepts by examples from real- life problems (i.e. laboratory). • Encourage Students to communicate their biology thinking to ask and answer question when they arise • Motivate students to work cooperatively with their class mates to develop individual skills.	• Participation through class work and homework. • Work portfolio

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
3.0	**Values**		
3.1	Demonstrate proper parasitology laboratory techniques involving microscopy, biochemical tests and diagnostic media to characterize microorganisms of significance to human health.	• Motivate students to ask questions and to give response to the teacher's questions. • Encourage the students to solve the exercises and problems on white board.	HomeWorks, quizzes, exams and participation.
3.2	Use laboratory instruments and computers.	• Virtual labs. • Demonstrations	Examinations.
3.3	Evaluate different diagnostic techniques to predict the causative organism and show the proper antibiotics for their treatment.	• Computer lab. • Presentations.	Laboratory performance and reports.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around 7th -8th week	15%
3	Quizzes, attendance, participation, home works	All the semester	10%
4	lab reports	All the semester	5%
5	Lab exam.	Around 9th week	15%
6	Final exam.	Around 13th week	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:

- By identifying office hours 6 hours a week (be adhered to and attached with the Schedule. lectures and declare for the students).
- To communicate and ask questions and inquiries by e-mail to a member of staff teaching through his Web site.
- To provide assistance and guidance to any inquiry or consultation relating to syllabus given.
- Helping students to understand the material and contribute to the academic advising process.

Helping students in the face of any study and academic problems in this course.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• Ruth Leventhal and Russell F. Cheadle (2011) Medical Parasitology. A self-instructional text (6th edition) X. F.A. Davis Co., Philadelphia ISBN: 080362543.

	• Roberts & Janvy. Foundations of Parasitology, 8th edition, (2008). ISBN-13: 978-0073028279.2015. Practical guide to diagnostic parasitology (2nd edition) American Society for Microbiology, Washington DC, USA.ISBN: 1555814573.
Essential References Materials	Atlas of Human Parasitology (5th edition) ISBN: 0891891676 American Society for Clinical Pathology, Chicago, U.S.A. • Lynne S. Garcia (2006).
Electronic Materials	http://whqlibdoc.who.int/publications/9241544104_(part1).pdf . http://whqlibdoc.who.int/publications/9241544104_(part2).pdf).
Other Learning Materials	CDs for Parasitology.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	The computers are equipped with different software's.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals, dissection instruments, light microscopes, dissection microscopes, microtome instrument, slide preparations, mixer, fluorescent microscopes, ELISA unit for detecting Ag-Ab reactions special for parasitology and specific stains, centrifuges, incubators, ovens and other glass wares.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each	Peer Reviewer	Indirect

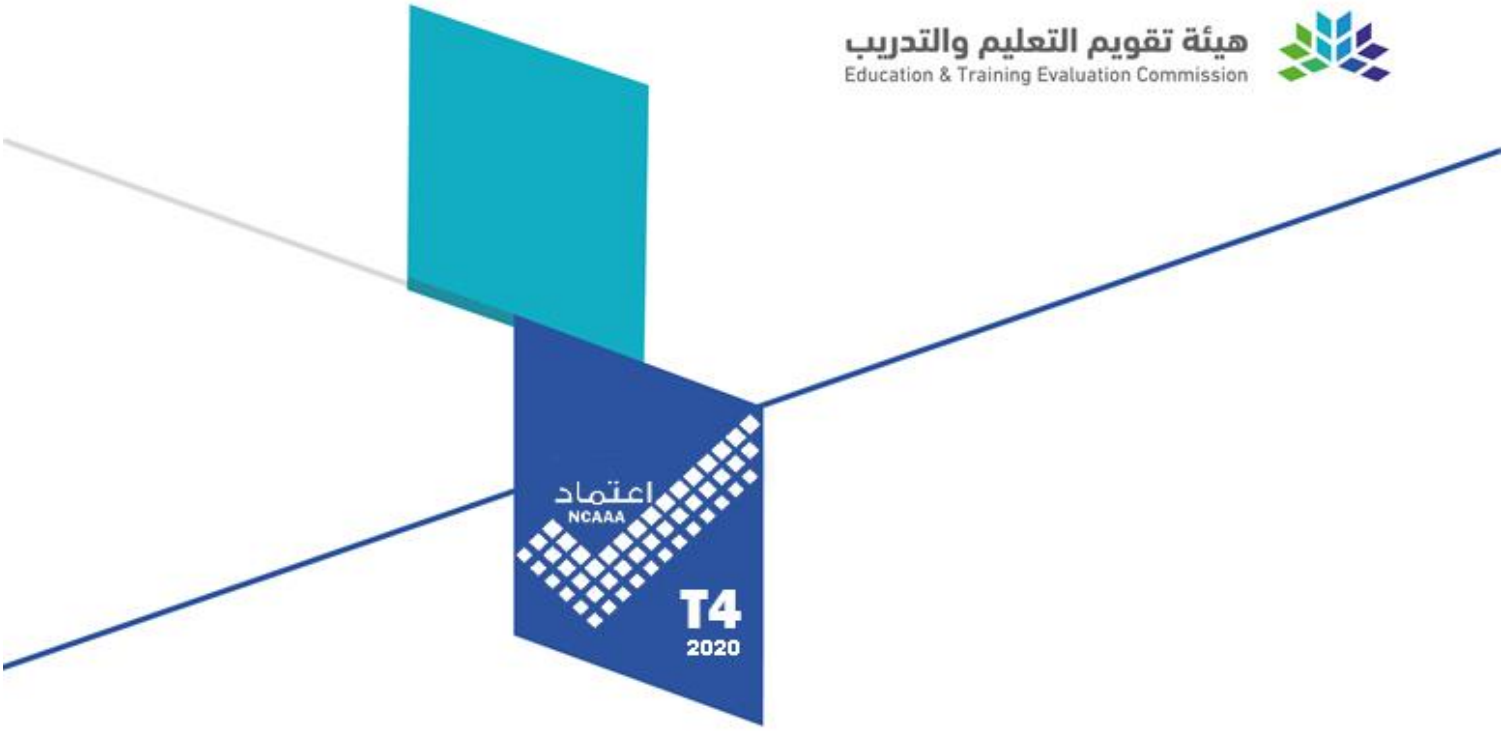
Evaluation Areas/Issues	Evaluators	Evaluation Methods
semester.		
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



توصيف المقرر الدراسي

Course Title:	Plant Physiology
Course Code:	BIO 1323
Program:	Bachelor of Science in Biology.
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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F. Learning Resources and Facilities **6**

1.Learning Resources 6

2. Facilities Required 6

G. Course Quality Evaluation **7**

H. Specification Approval Data **7**

A. Course Identification

1. Credit hours:	4 (3 Lectures + 2 Laboratory + Tutorials).
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	Level 8 / Third Year
4. Pre-requisites for this course (if any)**:**	BIO 1322
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	36
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	60
Other Learning Hours*		
1	**Study**	4-6
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	4-6

* 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 provides an introduction to basic principles of plant function, primarily covering physical processes in plants, metabolism, secondary products, cell physiology, and introducing principles of growth and development.

2. Course Main Objective

By the end of this course, the student must be able: - □ To describe vital objects in botany. □ To state the background in understanding of plant physiology. □ To define Coordination and

Homeostasis in plants. To outline the principle of mineral and organic nutrition. To compare the obtaining of energy of each photosynthesis and respiration. To explain how Cellular Communication and Plant Defense take place

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	Define Coordination and Homeostasis in plants.	1.1
1.2	Describe vital objects in botany.	1.2
2	**Skills:**	
2.1	Develop growth and development under different environmental conditions.	2.1-2.3
2.2	Develop a knowledge base of how carbon, nutrients and water interact with each other.	2.1-2.3
2.3	Justify familiarity to integrate how the principles of chemistry and physics.	2.1
3	**Values:**	
3.1	Show ability to work as a team (Many labs will require you to work in teams, a task that will involve effective organization, problem solving, communication, coordination).	2.2-3.2
3.2	Demonstrate scientific communication (written and oral), data analysis, thinking, planning and decision-making skills.	3.1-3.2
3.3	Use laboratory instruments and computers.	3.3

C. Course Content

No	List of Topics	Contact Hours
1	What is Plant Physiology? Botany Review.	4
2	Plant and Cell Architecture.	4
3	Water potential. Water Balance and Transport in Plants.	4
4	Membrane Potential and Solute Transport.	4
5	Mineral Nutrition. Mineral Assimilation. Phloem Transport.	4
6	Biochemistry and Metabolism Respiration and Lipid Metabolism. Photosynthesis: The light reactions. Photosynthesis: Carbon reactions.	4
7	Photosynthesis: Physiological and Ecological considerations. Cellular Communication	3
8	Plant Defenses: Surface protection and secondary metabolites	3
9	Growth and Development. Development and differentiation.	3
10	Hormones Auxins, Gibberellins, Cytokinins, Ethylene, Abscisic Acid, Phytochrome.	3
Total		36

Topic to be covered (laboratories)

No	List of Topics	Contact Hours
1	Plant Water Potential Plant Pressure Bomb; Transpiration	2
2	Start Mineral Nutrition; discuss and design independent projects.	2

3	Mineral Nutrition (cont'd).	2
4	Amylase induction during Seed Germination.	2
5	Analysis of α-amylase by glucose accumulation.	2
6	Analysis of α-amylase by starch hydrolysis.	2
7	Analysis of Mineral Nutrition and Hormonal induction during seed germination or independent lab.	2
8	Measurement and characterization of Photosynthesis. Measurement of the CO2 dependence of photosynthesis. Measurement of Photorespiration in C3 and C4 plants.	4
9	SDS-PAGE and Electro blotting of proteins.	2
10	Immunoblot-localization of cytoskeletal proteins in plant cells.	2
11	General revision	2
Total		24

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	Define Coordination and Homeostasis in plants.	Discussion and dialogue.	Written tests. Oral tests.
1.2	Describe vital objects in botany.	Three hours weekly containing lectures and tutorial.	Students will be evaluated on their ability to present complete solutions to problems.
2.0	**Skills**		
2.1	Develop plant growth and development under different environmental conditions.	Self-study is an important method for students' learning.	Short Quizzes and Exams.
2.2	Develop a knowledge base of how carbon, nutrients and water interact with each other.	Self-study is an important method for students' learning.	Questions in Lectures.
2.3	Justify familiarity to integrate how the principles of chemistry and physics.	Introduce some concepts by examples from real life problems (i.e. laboratory).	Short Quizzes and Exams.
3.0	**Values**		
3.1	Show ability to work as a team (Many labs will require you to work in teams, a task that will involve effective organization, problem solving, communication, coordination).	Encourage students to work cooperatively during tutorials, laboratory classes.	Laboratory reports writing.
3.2	Demonstrate scientific communication (written and oral), data analysis, thinking, planning and decision-making skills.	Whole-part-whole technique: The skill is demonstrated 3 times	Laboratory performance and reports.
3.3	Use laboratory instruments and	Presentations. Virtual labs.	Laboratory performance and

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	computers.		reports.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around 7th -8th week	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15 %
6	Final Exam.	Around 13th week	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:
Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Taiz, L., and E. Zeiger. Plant Physiology. 5th ed. Sinauer Associates, Inc. Publishers, Sunderland, MA (2010). ISBN: 978-0-87893-866-7 (casebound). Available at bookstore or online. William G. Intoduction to plant physiology.4 ed., university of weseren.(2008). ISBN 978-0470-24766-2.
Essential References Materials	International journal of plant physiology.
Electronic Materials	http://www.valdosta.edu/colleges/education/program-assessment-analyticsevaluation/documents/syllabi/BIOL3400.pdf.
Other Learning Materials	CDs for plant Physiology.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	The computers are equipped with different software's.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals , dissection instruments, light microscopes , dissection microscopes ,microtome instrument, slide preparations,

Item	Resources
	mixer, fluorescent microscopes , spectrophotometer physiological chemistry ,centrifuges , incubators , ovens and other glass wares.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد NCAAA T4 2020

Course Specifications

Course Title:	**Analytical Chemistry**
Course Code:	**CHM 1337**
Program:	**Bachelor of Science in Biology**
Department:	**Biology**
College:	**Science**
Institution:	**Imam Mohammad Ibn Saud Islamic University**

A. Table of Contents

A. Course Identification 3

6. Mode of Instruction (mark all that apply) 3

B. Course Objectives and Learning Outcomes 3

1. Course Description ..... **Error! Bookmark not defined.**

2. Course Main Objective ..... **Error! Bookmark not defined.**

3. Course Learning Outcomes 4

C. Course Content 4

D. Teaching and Assessment 5

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods 5

2. Assessment Tasks for Students 6

E. Student Academic Counseling and Support 7

F. Learning Resources and Facilities 7

1.Learning Resources 7

2. Facilities Required 7

G. Course Quality Evaluation 8

H. Specification Approval Data 8

B. Course Identification

1. Credit hours:	**5 (4 Lectures, 2 Lab, 0 Tutorial)**
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	**Level 8/Year 3**
4. Pre-requisites for this course (if any)**:**	**General Chemistry 1 – CHM 1101**
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**	**72**	**100%**
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	**48**
2	**Laboratory/Studio**	**24**
3	**Tutorial**	**0**
4	**Others** (specify)	**0**
	Total	**72**

C. Course Objectives and Learning Outcomes

1. Course Description:

This course is an introduction to the theory, principles, and practices of quantitative analytical chemistry. The course covers the fundamentals of analytical chemistry: concentration units, statistical data analysis, Acids-Bases Equilibria, Introduction to titration and types of titrations.

2. Course Main Objective: ***This course is intended:***

- To provide a basic knowledge and understanding of essential principles of analytical chemistry.
- To express the concentration of substances in different forms.
- To verify the correctness of the analytical measurements using statistical concepts.
- To introduce the basic analytical techniques and practical aspects of volumetric analysis.
- To solve problems related to titrimetric analysis and interpret analytical results.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Rcognize the main principles of analytical chemistry.	K1
1.2	State formula related to statistics and the effect of different errors on the analytical results	K2
1.3	List some of the analytical chemistry methods and types of concentration expressions.	K1, K3
2	Skills :	
2.1	Differentiate between the types of statistical errors and predict results obtained from chemical analysis statistically.	S1, S3
2.2	Design accurate chemical analysis through accurate preparation of standards and reagents.	S1, S3
2.3	Prepare the experimental set-up, Operate different laboratory instruments during laboratory classes and evaluate statistical data to justify analytical measurements. To demonstrate ability to use mail and Network to communicating with others	S4, S3; K4
2.4	Appraise oral communication skills by presenting seminars before his class mates and teaching staff, to write reports about real pollution cases in his community and operate electronic mail and Network skills in communicating with others.	S2, S3
3	Values:	
3.1	Appraise self-confidence attitudes through single and team work practical sessions, presentations, and discussions. Avoid over consumption of materials and chemicals and keep the lab instruments and equipment clean and safe.	V1, V2; V3

D. Course Content

No	List of Topics	Contact Hours
	Topics to be covered	
1	**Introduction to analytical chemistry:** Relationship between Analytical Chemistry and other branches of science, General steps in chemical analysis, Measurements, Fundamental SI units, Derived SI units, other units, Conversion to SI units, Prefixes, Chemical concentrations, Molarity, Molality, Percentage composition, ppm and ppb, Preparing Solutions, Dilution, Stoichiometry Calculations.	**4**
2	**Stoichiometric Calculations:** Chemical concentrations expressions, molarity, molality, Normality and equivalent weight, percentage composition(w/w), (v/v) and (w/v) ppm, ppb and ppt., preparing solutions, Dilution, Stoichiometry.	**8**
2	**Statistics and data analysis in analytical chemistry:** Experimental Errors, Significant Figures, Significant Figures in arithmetic, Addition and Subtraction, Multiplication and Division. Graphs, logarithms and antilogarithms, Types of Errors, Systematic and Random Errors, Precision and Accuracy.	**4**
3	**Acids-Bases Equilibria:** Electrolytes and Nonelectrolytes, Acids & Bases, Conjugate Acids and Bases, Salts, Autoprotolysis, pH, Strong Acids and Strong Bases, Weak Acids and Their Ionization Constants, Finding the pH of a Weak Acid, Weak Bases and Their Ionization Constants, Finding the pH of a Weak Base, The Relationship Between the Ionization Constants, Polyprotic Acids and Bases, Buffer Solution.	**4**
4	**Introduction to titration:** Some terms used in volumetric Titrimetry, Standard solutions, Primary standard substances, Indicators, titration error, The	**4**

	requirements of a titration, Types of titrations, Back-titration, Direct titration, Indirect titration, Percent Purity Calculations.	
5	**Acid/Base Titrations:** Types of acid-base titration, titration of strong acid with strong base, Regions of equivalence point, before, at and after equivalence point, Acid\Base Titration curve, Finding the End Point with Indicators, Common indicators used in acid-base Titration.	**6**
6	**Oxidation/Reduction Titrations:** Redox titration, Visual Detection of the End Point, Self-Indication, Redox indicators, Starch indicator, Titrations Involving Iodine: Iodimetry and Iodometry.	**6**
7	**Complexometric Titrations**: Introduction to Complexometric titration, Types of Complexing Ligands, Metal-Chelate Complexes, EDTA, EDTA Complexes, Metal ions Indicators, EDTA Titrations Techniques, Masking, Water Hardness.	**6**
8	**Precipitation Titrations:** Introduction to Precipitation Titrations, Argentometric titrations, Precipitation Titration Curves, Methods of Precipitation Titrations, Mohr method, Volhard method.	**6**
Total		**48**
Topics to be covered (Laboratories)		
1	Preparing Chemical Solutions by Physical Methods (w/v%, g/L, ppm) Making a standard solution using solid reagents.	**3**
2	Part 1: Preparation and standardization of solutions by Chemical method [Molarity, Normality and molality]. Part 2: Dilution of Solutions by different methods.	**3**
3	Quality Control and Assurance of Weight Measurements. (A) Statistical Evaluation of Measurements (Panadol Tablets). (B) Quality Control Chart.	**3**
4	Preparation of Buffers: [Preparation of buffer pH= 9.5, Preparation of buffer pH= 5], buffer capacity and range.	**3**
5	Determination of the citric acidic content in lemon juice (Direct titration).	**2**
6	Determination of calcium carbonate (back titration).	**2**
7	Preparation of triodide solution (I3-). Iodimetric titration of Vitamin C tablets.	**2**
8	Iodometric titration: Determination of Copper (II) using sodium thiosulfate.	**2**
9	Complexometric Titrations: Determination of calcium by EDTA using EBT (back titration).	**2**
10	Precipitation Titration: Standardization of Silver Nitrate Solution, and determination of Chloride by the Mohr Method.	**2**
Total		**24**

E. 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 main principles of analytical chemistry.	lecturing	Short quizzes
1.2	State formula related to statistics and the effect of different errors on the analytical results	Lecturing, solving problems, group discussions, Homework and assignment	Homework and assignment marks and written exams

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.3	;ist some of the analytical chemistry methods and types of concentration expressions.	Discussions, Laboratory classes	Quizzes and MCQs, laboratory reports
2.0	**Skills**		
2.1	Differentiate between the types of statistical errors and predict results obtained from chemical analysis statistically.	Lecturing, oral discussion and laboratory experiments	Short quizzes Exams, Homework assignment and laboratory reports
2.2	Design accurate chemical analysis through accurate preparation of standards and reagents.	Lecturing and oral discussion supported by laboratory experiments	Homework assignment, Examination and laboratory report
2.3	Prepare the experimental set-up, Operate different laboratory instruments during laboratory classes and evaluate statistical data to justify analytical measurements. To demonstrate ability to use mail and Network to communicating with others	• Provide student with manual and instructions. • Group discussions and virtual labs. • Use network and computer's software Use blackboard to submit homework	• Laboratory performance evaluation • Laboratory reports and sheet • Oral tests and assignments marks Assignments and homework
2.4	Appraise oral communication skills by presenting seminars before his class mates and teaching staff, to write reports about real pollution cases in his community and operate electronic mail and Network skills in communicating with others.	• Oral participation • Group discussions and lab experiment and reports • Encourage students to use electronic mail to submit homework and assignments.	• Oral tests and lab performance, reports and sheets Marks • Assignments and homework marks
3.0	**Values**		
3.1	Appraise self-confidence attitudes through single and team work practical sessions, presentations, and discussions. Avoid over consumption of materials and chemicals and keep the lab instruments and equipment clean and safe.	• Group discussion, assignments and homework • Lab-reports • Virtual labs and demonstrations	• Oral tests, lab performance, Lab-reports and sheets Marks • Assignments and homework marks

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	**Quizzes, Attendance, Participation, Homework**	**All the semester**	**10 %**
2	**Laboratory**	**All the semester**	**30 %**
3	**Midterm Exam 1**	**Around 5th -6th week**	**20 %**
4	**Final Exam**	**Around 13thweek**	**40 %**

#	Assessment task*		Week Due	Percentage of Total Assessment Score
5	**Total**			**100%**

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

F. Student Academic Counseling and Support

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

- **There are two office hours per week reserved by each staff member, planned on his timetable, to help the students to solve their problems.**
- **Each department has an academic advisor who will act as a mentor, providing academic and career advice and general counselling.**

G. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	• Gary D. Christian, Purnendu K. (Sandy) Dasgupta, Kevin A. Schug. ***Analytical Chemistry***, 7th Edition. ISBN: 978-0-470-88757-8.
Essential References Materials	• Douglas A. Skoog, Donald M. West, F. James Holler, Stanley R. Crouch. ***Fundamentals of analytical chemistry***, 9th Edition. ISBN-13: 978-0-495-55828-6. • Daniel C. Harris. ***Quantitative Chemical Analysis,*** 8th edition,2010, W. H. Freeman & Co., New York, ISBN: 9781429218153.
Electronic Materials	• **Blackboard** • **http://highered.mcgrawhill.com/classware/ala.do?isbn=0073048518&alaid=ala 1136810&protected=true&showSelfStudyTree=true** • **http://www.chem1.com/acad/webtext/virtualtextbook.html** • **http://www.shodor.org/UNChem/index.html**
Other Learning Materials	**Internal server: www. Elesevier.com**

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	**Each of the classroom should be equipped with a whiteboard and a projector, with a maximum of 20 students.**
Technology Resources (AV, data show, Smart Board, software, etc.)	**The rooms are equipped with data show, Smart Board, WI-FI access.**
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	**None**

H. Course Quality Evaluation

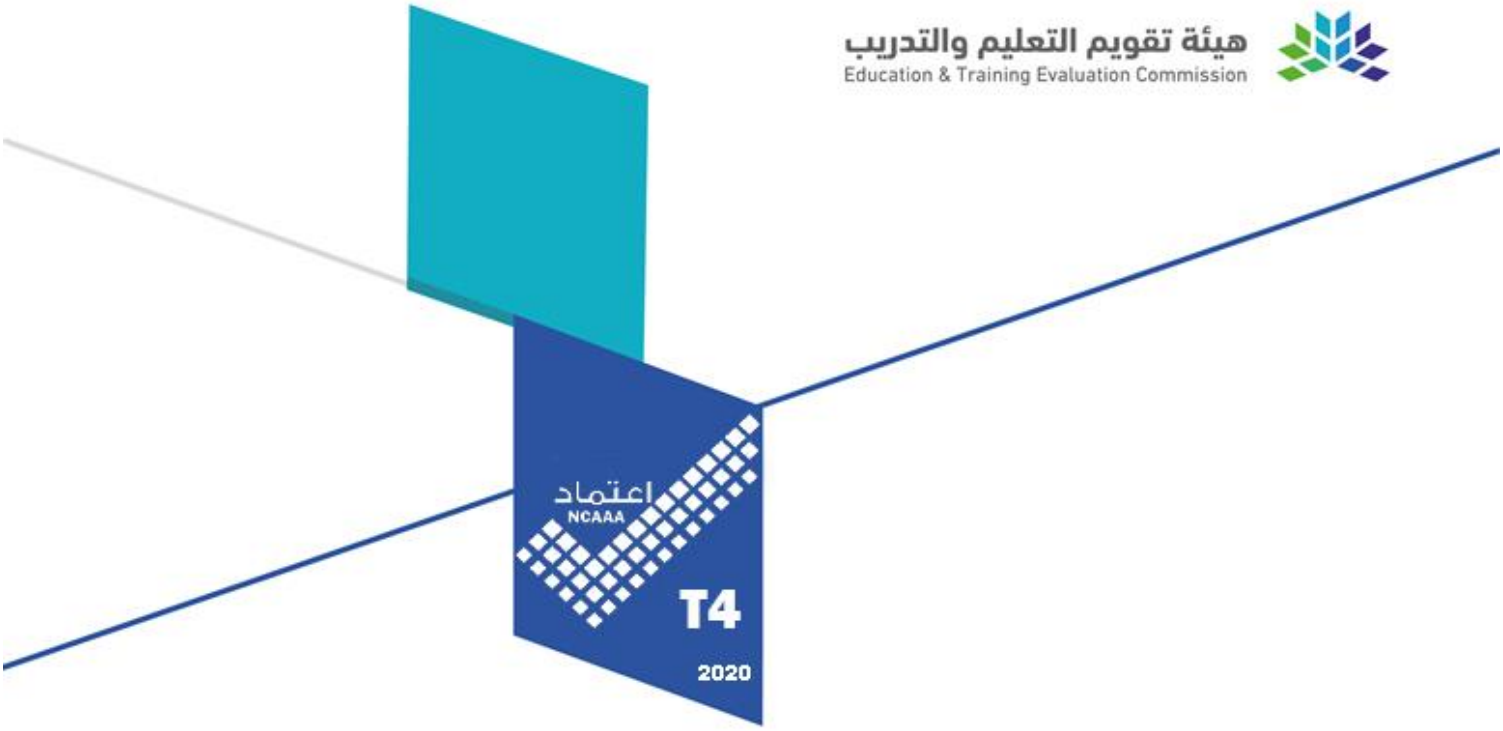
Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	Students	**Direct:** Questionnaire.
	Course Responsible	**Direct:** Course e-Portfolio. **Indirect:** Second examiner checklist-Course report.
	Peer Reviewer	**Direct:** Questionnaire. **Indirect:** External assessor report.
Effectiveness of assessment	Program Leaders	**Direct:** Course e-Portfolio. **Indirect:** Course report.
Extent of achievement of course learning outcomes	Course Responsible	**Direct:** Exams - Course e-Portfolio. **Indirect:** Second examiner checklist-Course report.
	Program Leaders	**Indirect:** Exams.
Quality of learning resources	Students	**Indirect:** Second examiner checklist-Course report.
	Faculty (Academic Advisory)	**Direct:** course Entrance/Exit. **Indirect:** Observations - Accreditation review.
	Program Leaders	**Direct:** Course e-Portfolio. **Indirect:** Course evaluation survey- Observations- Syllabus review- Accreditation review.
Lab Performance	Students	**Direct:** Lab reports, Final Lab exam, Course e-Portfolio.
	Course Responsible	

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)

I. Specification Approval Data

Council / Committee	**Council of Biology Department**
Reference No.	
Date	November, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	Community Health & Epidemiology
Course Code:	COMH 1311
Program:	Bachelor of Science in Biology
Department:	
College:	Medicine
Institution:	Imam Mohammad Ibn Saud Islamic University

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H. Specification Approval Data **8**

A. Course Identification

1. Credit hours:	2 (2 Lectures + 0 Lab + 0 Tutorials).
2. Course type	
a.	University ☐ College ☐ Department ☐ Others ☑
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	Level 8 / Third Year
4. Pre-requisites for this course (if any)**:**	BIO 1101+ BIO 1241
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	24
2	**Laboratory/Studio**	0
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	24

B. Course Objectives and Learning Outcomes

1. Course Description

2. Course Main Objective

This course is planned and developed by a cooperative multi-disciplinary partnership of the College of Medicine and the community-based health services providers. The course is responsive to the evolving social and health systems of Saudi Arabia. It serves undergraduate students by providing community-centered learning experiences. The course utilizes active, self-directed, problem-based learning by presenting students with real cases and situations in the community. It is a longitudinal program consisting of three experiential parts, all integrated with the other curriculum components. The course includes tutorials & symposia in the community, and field visits in the community. Also integral to the course is the Community Oriented Research Project, wherein students undertake a field research project that explores relevant community health issues, such as prevalence of disease and illness and factors affecting them.

3. Course Learning Outcomes

CLOs	Aligned PLOs

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Define the integrative role of the physician in health and healthcare.	1.1
1.2	Recognize supportive attitudes about health concerns of communities.	1.1-1.2
1.3	Recall scientific perspectives and efficacious methods of intervention capable of producing changes in the health status of individuals and communities.	
1...		
2	**Skills :**	
2.1	Develop bio-psychosocial knowledge, skills, and attitudes about the range of appropriate, effective and affordable approaches to the health of individuals and communities.	2.1
2.2	Design proper scientific research relevant to common health problems in the community.	2.1-2.2
2.3	Appraise a fundamental grounding in a range of individual and community health and illness dimensions preparatory for the Community Clerkship Experience.	2.1-2.2
2...		
3	**Values:**	
3.1	Demonstrate working appropriately as an efficient team member.	3.1-3.2
3.2	Show leadership qualities when dealing with issues that require these qualities.	3.3
3.3	Demonstrate utmost responsibility in situations that require these attributes.	3.2-3.3
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Community health	2
2	The determinants of health	2
3	Personal health and fitness	2
4	Nutrition and healthy eating	1
5	The structure of the healthcare system in Saudi Arabia	1
6	The relationship between health and the social and physical determinants of health	2
7	Disease prevention and control	2
8	Prevention of substance use and abuse (alcohol, tobacco, drugs)	1
9	The role of Ministry of Education in promoting school health	1
10	The most common health problems among school children	1
11	The screening programs in school health	1
12	Safety and injury prevention	1
13	The most common health related occupational problems in the community	1
14	Introduction to WHO	2
15	Primary Health Care	1

16	Occupational and Environmental health	1
17	Prevention of Tobacco abuse	1
18	Community Mental Health	1
Total		24

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 integrative role of the physician in health and healthcare.	Three hours weekly contain lectures.	Students will be evaluated on their ability to present complete solutions to problems.
1.2	Recognize supportive attitudes about health concerns of communities.	Two hours weekly of Laboratory devoted to experiments. Self-Study including work on work sheets.	Performance must include class examinations and homework assignments
1.3	Recall scientific perspectives and efficacious methods of intervention capable of producing changes in the health status of individuals and communities.		
2.0	**Skills**		
2.1	Develop bio-psychosocial knowledge, skills, and attitudes about the range of appropriate, effective and affordable approaches to the health of individuals and communities.	Self-study is an important method for students' learning.	Questions in Lectures.
2.2	Design proper scientific research relevant to common health problems in the community.	Introduce some concepts by examples from real-life problems.	Participation through class work and Homework.
2.3	Appraise a fundamental grounding in a range of individual and community health and illness dimensions preparatory for the Community Clerkship Experience.	Motivate students to work cooperatively with their class mates to develop individual skills.	Short Quizzes and Exams.
3.0	**Values**		
3.1	Demonstrate working appropriately as an efficient team member.	PBL tutorials & seminars.	Laboratory reports writing.
3.2	Show leadership qualities when dealing with issues that require these qualities.	Student-centered role playing and practical session.	Laboratory performance and reports.
3.3	Demonstrate utmost responsibility in situations that require these attributes.	Student-centered role playing and practical session.	Laboratory performance and

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
			reports.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around 7th -8th week	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15 %
6	Final Exam.	Around 13th week	40 %
7			
8			

***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 involved in this course will prepare office hours tables and affix them in the doors of their offices and make themselves available during the times specified in those tables to mentor and advice students.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• Promoting Health Through Schools .World Health Organization Global School Health Initiative, Latest Edition. • Improving School Health Programs: Barriers and Strategies. WHO/HPR/HEP/96.2 Geneva, Latest Edition. (This document can be obtained from: WHO Publications Center, 49 Sheridan Ave., Albany, NY 12210, Tel: 1-800-877-2693, 1-518(436-9686), Fax: 518-436-7433.
Essential References Materials	
Electronic Materials	• Eva Marx, Susan Frelink Wooley, and Daphne Northrop, editors. Health Is Academic: A Guide To Coordinated School Health Programs. January Latest Edition. http://www.schoolhealth.org/. • http://www.healthinschools.org/home.asp. National Standards for School Health • Education:http://www.ericfacility.net/databases/ERIC_Digests/ed387483.html

Other Learning Materials	None

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	The computers are equipped with different software's and connected to 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
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of department
Reference No.	
Date	November, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

توصيف المقرر الدراسي

Course Title:	Biotechnology
Course Code:	BIO 1333
Program:	Bachelor of Science in Biology.
Department:	Biology.
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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2. Facilities Required 8

G. Course Quality Evaluation **8**

H. Specification Approval Data **9**

A. Course Identification

1. Credit hours: 5 (4 Lectures + 2 Laboratory + 0 Tutorials)**.**
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: Level 9 / Third Year.
4. Pre-requisites for this course (if any)**:** BIO 1232 + BIO 1244
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	48
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	72
Other Learning Hours*		
1	**Study**	**3-4 hrs**
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	**3-4 hrs**

***** 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

Course description: This course is designed to acquaint students with the field of biotechnology including historical development, current technologies and future trends. An overview of the molecular and genetic principles and processes used to manipulate living

organisms and their products will be presented, as well as forensic, medical, agricultural and industrial applications. The course will also examine the ethical implications of biotechnology and genetic engineering.

2. Course Main Objective

This course aims to identify the student scientific understanding of the ways by which proves that biotechnology has a direct impact on our lives.
In addition to the study of biotechnology in multiple-fields (Medical, agricultural and industrial) and to clarify the application on a commercial level scale.

So, by the successful completion of the course the student will be able :

- To describe the fundamental aspects of the biotechnology.
- To underline the principles of recombinant DNA technology.
- To describe the applications of micro-organisms in industry, environment, agriculture and biomedical fields.
- To underline the applications of recombinant DNA technology in plant and animal biotechnology.
- To give examples of biotechnology products and biotechnology techniques.
- To discuss the importance of transgenic plants, bacteria and animals.
- To define what are bio-informatics and its importance for analysis of data related to biotechnological applications.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge:**	
1.1	Define the basics animal and plant biotechnology for different objects.	1.1-1.2
1.2	Tell the structure of DNA, Recombinant DNA, and polymerization technique of DNA	1.1-1.2
2	**Skills:**	
2.1	Estimate basics of animal and plant biotechnology on the different objects.	2.1
2.2	Explain the role of the genetic material in biotechnology.	2.1-2.2
2.3	Prepare the method to isolate and sequence the genetic material to analyze the recombinant DNA.	2.1-2.2
3	**Values:**	
3.1	Show pride in their religious and cultural identity.	3.1-3.2
3.2	Demonstrate linking between science and technology with society.	3.1-3.2
3.3	Use of computers and means of modern technology.	3.3

C. Course Content

No	List of Topics	Contact Hours
1	Basics of biotechnology in animal and plant.	3
2	Basics of biotechnology in micro-organisms.	3
3	Biomedical technical foundations.	3
4	Agricultural, industrial and environmental biotechnology foundations.	6
5	The role of genetics in biotechnology.	6
6	Biotechnology types.	6
7	Isolate and arrangement of genetic material.	4

8	Structure of DNA.	4
9	Commercial biotechnological applications on micro-organisms. Commercial biotechnological applications on plants. Commercial biotechnological applications on animals.	10
10	A general revision of what has been studied and responded to queries.	3
Total		48

Topics to be covered (laboratories)

No.	Topics	Contact Hours
1	Fermenters.	2
2,3	Tissue culture.	4
4	Hybridization.	3
5,6	Cloning.	4
7	Genetic modification of living organisms.	2
8	Genetic fingerprinting.	3
9,10	Biological database.	4
11	General revision.	2
	Total	24

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	Define the basics animal and plant biotechnology for different objects.	• Interactive lectures and teaching experts. • Guest speaker teaching.	• Written tests. • Oral tests. • Classroom assignments.
1.2	Tell the structure of DNA, Recombinant DNA, and polymerization technique of DNA.	Learning colleagues and Mental focus.	Bags achievement portfolio.
2.0	**Skills**		
2.1	Estimate basics of animal and plant biotechnology on the different objects.	• Mental focus. • Problem-solving and decision-making	Performance of written tests – projects.
2.2	Explain the role of the genetic material in biotechnology.	• Find the collective • Research and mental focus. • Problem-solving and decision-making.	Identification tests. Students Research papers.
2.3	Prepare the method to isolate and sequence the genetic material to	Reciprocal teaching.	Work sample tests.

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	analyze the recombinant DNA.		
3.0	**Values**		
3.1	Show pride in their religious and cultural identity.	Collaborative learning.	Organized observation and self-report – methods.
3.2	Demonstrate linking between science and technology with society.	Collective research project, writing reports and presenting its display.	Evaluation of collective research project, writing reports and presentations its own.
3.3	Use of computers and means of modern technology.	• Default – laboratories. • Illustrated presentations.	Laboratory reports.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15 %
2	Midterm 2	Around 7th -8th week	15 %
3	Quizzes, attendance, participation and home works	All the semester	10 %
4	lab reports	All the semester	5%
5	Lab exam.	Around 9th week	15 %
6	Final exam.	Around 13th week	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:

- By identifying office hours 6 hours a week (be adhered to and attached with the Schedule.
  lectures and declare for the students).
- To communicate and ask questions and inquiries by e-mail to a member of staff teaching through his Web site.
- To provide assistance and guidance to any inquiry or consultation relating to syllabus given.
- Helping students to understand the material and contribute to the academic advising process.

Helping students in the face of any study and academic problems in this course.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• William Bains, Biotechnology from A to Z .,3rd ed (2004). ISBN - 13: 97801198524984. • William J. Thieman, Michael A. Palladino, Introduction to Biotechnology, 2/E. Benjamin Cummings, (2009). ISBN-10: 0321491459. • B. R. Glick and J. J. Pasternak (2003). Molecular Biotechnology: Principles and Applications of Recombinant DNA. American Society for Microbiology. ISBN-13: 978-1555811365.
Essential References Materials	• Bernard R., Glick., Molecular Biotechnology 4 edition (2009). ISBN-13:9781555814984. • by William J. Thieman (Author), Michael A. Palladino (Author). • Michael Wink, An Introduction to Molecular Biotechnology: Molecular Fundamentals, Methods and Applications in Modern Biotechnology, Wiley-VCH, 2006. • Environmental Biotechnology: Theory and Application by Gareth M. Evans and Judith C. Furlong.Applied Biochemistry and Biotechnology, by A. M. ULCHANDANI, HUMANA PRESS (2005).
Electronic Materials	• Genetic Links. • Clinical Genetics Site. • Genetic and the internet. • Genetic Catalog - Genetics Web Site Searrh Engines. • Genetic Links. • Genetic Disorders & Birth Defects - Sri Lanka Collection. • Links, for Gene Therapy. • Nature Technology Corporation's Homepage. • NCBI Homepage. OMNI the UK's Gateway to High Quality Internet Resources in Health and Medicine.
Other Learning Materials	• Genetics Software. • Electronic biological programs. • Electronic and genetic programs. • Special curriculum CDs. • Professional standards such as security and safety measures in the laboratory. SOFTWARES: • Biology Software Documentation. • Biocomputing Service Page. • Click It Graph Home. • Genomics Software Seek - Molecular Biology and Biochemistry Software and Online Tools Database. • Genetic Computer Resources. • Genetics - Computer Resources. • Health Web Genetics Software.

	• MDL Information Systems – Downloads. • Molecular Biology Notebook www resource. • Population Biology Simulations. • Research Tools. Software for Population Genetic Analyses.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.). • Classrooms reserved for lectures and prepared the traditional education (face to face) and E-learning (E-learning) that allow interaction between teachers and students, ordinary paper blackboard smart plasma screens ... etc. • A (Stage), with an integrated audio system and microphones connected to the Internet and networks 2 Wired and wireless (optical fiber), and air conditioning system and modern suitable lighting. • Laboratories equipped with the latest electrical appliances, chemical and all chemicals and tools Safety and means to study the practical courses. Hall dedicated to lectures e-learning.
Technology Resources (AV, data show, Smart Board, software, etc.)	A computer for display and uses of data with a slide show presentation. High-device "projectors" Lighting. It is assumed that each student has its own computer.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals , dissection instruments, light microscopes , dissection microscopes ,microtome instrument, slide preparations, mixer, fluorescent microscopes , ELISA unit for detecting Ag-Ab reactions , molecular instruments like gel electrophoresis ,PCR centrifuge , thermal cycler , an illuminator ,centrifuges , incubators , ovens and other glass wares.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester	Course coordinator	Direct

Evaluation Areas/Issues	Evaluators	Evaluation Methods
the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.		
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

توصيف المقرر الدراسي

Course Title:	Virology
Course Code:	BIO 1345
Program:	Bachelor of Science in Biology.
Department:	Biology.
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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A. Course Identification

1. Credit hours: 4 (3 Lectures + 2 Laboratory + 0 Tutorials).
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: Level 9 / Third Year.
4. Pre-requisites for this course (if any)**:** BIO 1242
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	36
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	60
Other Learning Hours*		
1	**Study**	4-6 hrs.
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	4-6 hrs.

* 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

Viruses have been shown to infect all forms of life and this course provides the fundamental background for studying the way in which viruses interact with their hosts. Surprisingly these interactions may be beneficial as well as deleterious. The course will cover both sides of this dynamic interplay including virus disease in humans, animals and plants as well as molecular aspects of the nature of viruses, their evolution, replication, applications in genetic engineering and gene therapy, detection and control by both vaccines and antiviral strategies. The course will familiarize students with practical skills relevant to the isolation, purification and characterization of animal and plant viruses. These include tissue culture techniques and virus growth, as well as molecular aspects of the detection and study of viral genes and expressed proteins, and the application of virus vectors in cell biology and biotechnology.

2. Course Main Objective

By the end of this course the student will be able:

- To have the scientific background about virus structure and replication, their pathogenesis, host immune responses against them, and their control.
- To know how to deal with samples containing viral particles, the method used for virus isolation.
- To deal with the common viral diseases that affect animal and poultry flocks, regarding laboratory diagnosis, prevention and control.
- To recognize the multiplicity of virus transmission factors.
- To compare human diseases, animals and plants by viruses.
- To clarify the role of viruses in transforming normal cells into cancerous.

To remember the role of viruses in the vaccination and immunization.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	Define the Introduction, structure and methods of multiplication of viruses.	1.1-1.2
1.2	Outline the virus classification, transmission and spread of viruses in host.	1.1-1.2
2	**Skills:**	
2.1	Reconstruct information about the functions of the organs and arrange them logically and sequentially.	2.2
2.2	Explain and identify the relationship between cause and consequence in the different mechanisms.	2.1
2.3	Analyze data and information and view discussion of sound scientific debate.	2.2
3	**Values:**	
3.1	Write reports and preparation of presentations and the preparation of graphics and models by using technology.	3.1-3.2
3.2	Use of computers and means of modern technology.	3.2-3.3
3.3	Illustrate the collaborative work.	3.1

C. Course Content

No	List of Topics	Contact Hours
1	• Introduction • Discovery of viruses, nature and definition of viruses, general properties of viruses. • Concept of viroids, virusoids, satellite viruses and prions. Theories of viral origin.	4
2	• Structure of viruses. • Capsid symmetry, enveloped and non-enveloped viruses. • Isolation, purification and cultivation of viruses.	4
3	• Viral Taxonomy. • Classification and nomenclature of different groups of viruses infecting microbes, plants and animals.	4
4	• Salient features of viral genomes. • Unusual bases (TMV, T4 phage), overlapping genes (ΦX174, Hepatitis B virus). • Alternate splicing (Picornavirus), terminal redundancy (T4 phage), and terminal cohesive. • Ends (lambda phage), ambiences genomes (arena virus), partial double stranded. • Genomes (Hepatitis B), long terminal repeats (retrovirus), segmented (influenza). • Virus and non-segmented genomes (picornavirus), capping and tailing (TMV).	4
5	• Bacteriophages. • Diversity, classification, one step multiplication curve, lytic and lysogenic phages. • (Lambda and P1 phage), concept of early and late proteins, regulation of transcription. • In lambda phage and applications of bacteriophages.	4
6	• Viral multiplication and replication strategies. • Interaction of viruses with cellular receptors and entry of viruses. • Replication strategies of viruses as per Baltimore classification. • Assembly, maturation and release of virions. • Concept of defective particles.	4
7	• Transmission of viruses. • Persistent and non-persistent mode.	3
8	• Oncogenic viruses. • Types of oncogenic DNA and RNA viruses. Concepts of oncogenes, proto24. • oncogenes and tumor suppressor genes.	3
9	• Prevention and control of viral diseases. • Antiviral compounds, interferon's and viral vaccines.	3
10	• Applications of Virology. • Use of viral vectors in cloning and expression, Gene therapy and Phage display.	3
Total		36

Topics to be covered (laboratories)

No.	Topics	Contact Hours
1	Introduction include the identification of the syllabus and security and safety precautions.	2
2,3	To study structure of important animal viruses (rhabdo, influenza, paramyxo, Hepatitis B & retroviruses) using electron micrographs.	4
4,5	To study structure of important bacterial viruses (λ, T4 & ϕX174) using electron micrographs.	4
6	To study structure of important plant viruses (calico, gemini, tobacco ring spot, cucumber mosaic & alpha-alpha mosaic viruses) using electron micrographs.	3
7	Isolation and enumeration of bacteriophages from water/sewage sample using double agar layer technique.	3
8	Isolation and propagation of animal viruses by cell culture and chick embryo techniques.	2
9	Study of cytopathic effects using photographs.	2
10	To perform local lesion technique for assaying plant viruses.	2
11	General revision	2
		24

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	Define the Introduction, structure and methods of multiplication of viruses.	Interactive lectures.	• Written tests. • Oral tests.
1.2	Outline the virus classification, transmission and spread of viruses in host.	Panel of discussions and dialogue, including discussion of small groups.	• Classroom assignments. • Home assignments.
2.0	**Skills**		
2.1	Reconstruct information about the functions of the organs and arrange them logically and sequentially.	• Mental focus. • Problem-solving and decision-making, Survey / discovery.	• Performance of written tests. • Identification tests.
2.2	Explain and identify the relationship between cause and consequence in the different mechanisms.	Reciprocal teaching.	Research papers.
2.3	Analyze data and information and view discussion of sound scientific	Style – Wiki.	Bags achievement – portfolio.

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	debate.		
3.0	**Values**		
3.1	Write reports and preparation of presentations and the preparation of graphics and models by using technology.	• Cooperative Education. • Practical training and the guided discovering.	Evaluation of collective research project and writing reports.
3.2	Use of computers and means of modern technology.	• Default – laboratories. • Illustrated presentations.	Recording student performance.
3.3	To illustrate the collaborative work.	Seminars.	self-report – methods.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th-5th week	15%
2	Midterm 2	Around 7th-8th week	15%
3	Quizzes, attendance, participation, home works	All the semester	10%
4	lab reports	All the semester	5%
5	Lab exam.	Around 9th week	15%
6	Final exam.	Around 13th week	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:
Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• Alan J. Cann Principles of Molecular Virology, 6th Edition (2015). ISBN-13: 978-0128019467. • John Carter, Virology: Principles and applications, (2014) ,2nd ed. ISBN: 13: 97811999142.
Essential References Materials	Flint et al. Principles of virology .3rd eds.2008, ISBN: 13: 9781555814434.
Electronic Materials	http://en.wikipedia.org/wiki /virology.
Other Learning Materials	• Electronic biological programs. • CDs to biological viruses. • Electronic programs for isolating viruses and their development ways.

	• Electronic programs include the most prominent diseases caused by viruses. • Research Tools.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students. And the laboratory room is equipped with many laboratory instruments with a maximum of 20 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	• A computer for display and uses of data with a slide show presentation. • High-device "projectors" Lighting. • It is assumed that each student has its own computer.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals , dissection instruments, light microscopes , dissection microscopes ,microtome instrument, slide preparations, mixer, fluorescent microscopes , ELISA unit for detecting Ag-Ab reactions , molecular instruments like gel electrophoresis ,PCR centrifuge , thermal cycler , an illuminator ,centrifuges , incubators , ovens and other glass wares.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees	Specialized committees	Indirect

Evaluation Areas/Issues	Evaluators	Evaluation Methods
devoid of bias and criticism.		
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

توصيف المقرر الدراسي

Course Title:	Entomology
Course Code:	BIO 1353
Program:	Bachelor of Science in Biology.
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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F. Learning Resources and Facilities **6**

1.Learning Resources 7

2. Facilities Required 7

G. Course Quality Evaluation **7**

H. Specification Approval Data **8**

A. Course Identification

1. Credit hours:	4 (3 Lectures + 2 Laboratory + 0 Tutorials).
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	Level 9 / Third Year.
4. Pre-requisites for this course (if any)**:**	BIO 1111
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	36
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	60
Other Learning Hours*		
1	**Study**	4-6 hrs.
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	4-6 hrs.

* 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

Course description: an introduction to the study of entomology. Designed to acquaint students with our dependence on and interaction with insects in today's world. Biology of insects, including evolution and diversity, anatomy and physiology, behavior, ecology, insects as medical and agricultural pests, and insects as beneficial organisms. Laboratory sessions are devoted primarily to the identification of major families of insects, study exterior shape typical insect, anatomy of typical insects to get to know various internal organs, various appendages of body and its modifications and histological examination of the parts of the gastrointestinal

tract.

2. Course Main Objective

On successfully completing this course, students will be expected:

- To appreciate the value and importance of insects.
- To learn about the classification, biology, ecology, behaviour, and control of insects.
- To identify major orders and families of insects and acquire their general characteristics.
- To acquire practical skills in collecting, mounting, preserving insects for scientific study.
- To understand the general external and internal anatomy and physiology insects.

To appreciate the impacts of insects on humans and the environment.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	Define the insect world and their position in the animal kingdom.	1.1
1.2	Outline the reasons for the spread of insects, general characteristics and morphology of insects.	1.1-1.2
2	**Skills:**	
2.1	Reconstruct information about the functions of the organs and arrange them logically and sequentially.	2.2
2.2	Compare organs of the body and the interpretation of its mechanisms.	2.1
2.3	Explain and identify the relationship between cause and consequence in the different mechanisms.	2.1
3	**Values:**	
3.1	Illustrate the collaborative work and to accept criticism from others.	3.1
3.2	Illustrate non-verbal understanding and effective cooperation and discussion.	3.1-3.2
3.3	Use of computers and means of modern technology.	3.3

C. Course Content

No	List of Topics	Contact Hours
1	• Insects position in the animal kingdom, General traits of Insects • The reasons for enormous proliferation of insects.	4
2	• The body wall: Structure and its characteristics. • study of Metamorphosis process.	4
3	• Study parts of the body and its extensions and various modifications study of head, antennae, and mouth parts.	4
4	• Chest study: its composition, legs, movement, Wings, aviation and mechanical factors affecting it. • Study abdomen: abdominal appendages and non-genital and Genital.	3
5	• Study the structure of various organs in the body of the insect Including: Digestive system: the gut and its supplementary • Process of food and nutrition needs.	3
6	• Circulatory system: blood vessel, blood circulation, and blood cells, blood clot. • Respiratory system: the structure of bronchial device, operation of breathing in terrestrial, aquatic and parasitic insects.	3

7	• Nervous system: its divisions, nerve conduction, the members of the Sense, mechanical and chemical receptors, members of hearing and vision.	3
8	• Muscular system: muscle types, their structure. • Excretory system: excretory organs and excretory process.	3
9	• Reproductive system: its structure, methods of reproduction.	3
10	• A brief study of the growth after embryonic including types of Transformation.	3
11	• Study the types of larvae and pupae in insects.	3
Total		36

Topics to be covered (laboratories)

No.	Topics	Contact Hours
1	Introduction include the identification of the syllabus and Security and safety precautions.	3
02	Study exterior shape typical insect like cockroach.	3
3,4	Various appendages of body and its modifications: mouth parts, Antennae, legs, wings, growths Abdomen.	4
5, 6	Anatomy of typical insects to get to know Various internal organs: Digestive, Circulatory Excretory, Nervous, Reproductive.	4
7, 8	Histological examination of the parts of the gastrointestinal tract.	4
9	Study examples illustrate the shift of the types of insects after study after embryonic growth.	2
10	Study the types of larvae and pupae.	2
11	General revision	2
	Total	24

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	Define the insect world and their position in the animal kingdom.	Interactive lectures.	• Written tests. • Oral tests.
1.2	Outline the reasons for the spread of insects, general characteristics and morphology of insects.	Collaborative learning.	Home assignments.
2.0	**Skills**		
2.1	Reconstruct information about the	• Mental focus	• Performance of

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	functions of the organs and arrange them logically and sequentially.	• Problem-solving and decision-making.	written tests. • Identification tests.
2.2	Compare organs of the body and the interpretation of its mechanisms.	• Find the collective Research. • Reciprocal teaching.	• Performance - mimicry tests • Work sample tests.
2.3	Explain and identify the relationship between cause and consequence in the different mechanisms.	• Find the collective research. • Reciprocal teaching.	Student's research and Students projects papers.
3.0	**Values**		
3.1	Illustrate the collaborative work and to accept criticism from others.	Teaching colleagues. Attend meetings scientific forums.	• Evaluation of colleagues. • Self-report – methods.
3.2	Illustrate non-verbal understanding and effective cooperation and discussion.	• Interactive lectures • Seminars and mental focus.	• Class participation - • Assignments and worksheet.
3.3	Use of computers and means of modern technology.	• Default – laboratories. • Illustrated presentations.	Recording student performance.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around 7th -8th week	15%
3	Quizzes, attendance, participation, home works	All the semester	10%
4	lab reports	All the semester	5%
5	Lab exam.	Around 9th week	15%
6	Final exam.	Around 13th week	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:
Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• Howard E. Evans Insect Biology: A Textbook of Entomology ISBN-13: 978-0201119817 ISBN-10: 0201119811. • P. J. Gullan The Insects: An Outline of Entomology 3rd Edition ISBN-13: 978-1405111133 ISBN-10: 1405111135, 2010. • William S. Romoser The Science of Entomology 4th Edition ISBN-13: 978-0697228482 ISBN-10: 0697228487.
Essential References Materials	• Rtiplehorn, C. A .and Johnson, N.F. (2005). Borror and DeLong's Introduction to the study of insects.7th Edition. Thomson Brooks / Cole, US. Chapman. R.F. (1982). The Insects: Structure and function. Cambridge, Massachusettes, Harvard University. Press.
Electronic Materials	http://www.ent.iastate.edu/LIST. http://www.chenowith.k12.or.us/TECH/subject/science/bugs.html.
Other Learning Materials	• Electronic biological programs. • CDs to biological and medical insects. • Electronic programs for overcoming the highlight problems of insect's anatomy. • Electronic programs include the most prominent diseases caused by insects. Research tools.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students. And the laboratory room is equipped with many laboratory instruments with a maximum of 20 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	• A computer for display and uses of data with a slide show presentation. • High-device "projectors" Lighting. It is assumed that each student has its own computer.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals especially different insects from different locations and countries, dissection instruments, light microscopes, dissection microscopes, microtome instrument, slide preparations, mixer, fluorescent microscopes, centrifuges, incubators, ovens and other glass wares.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it	Students	Direct

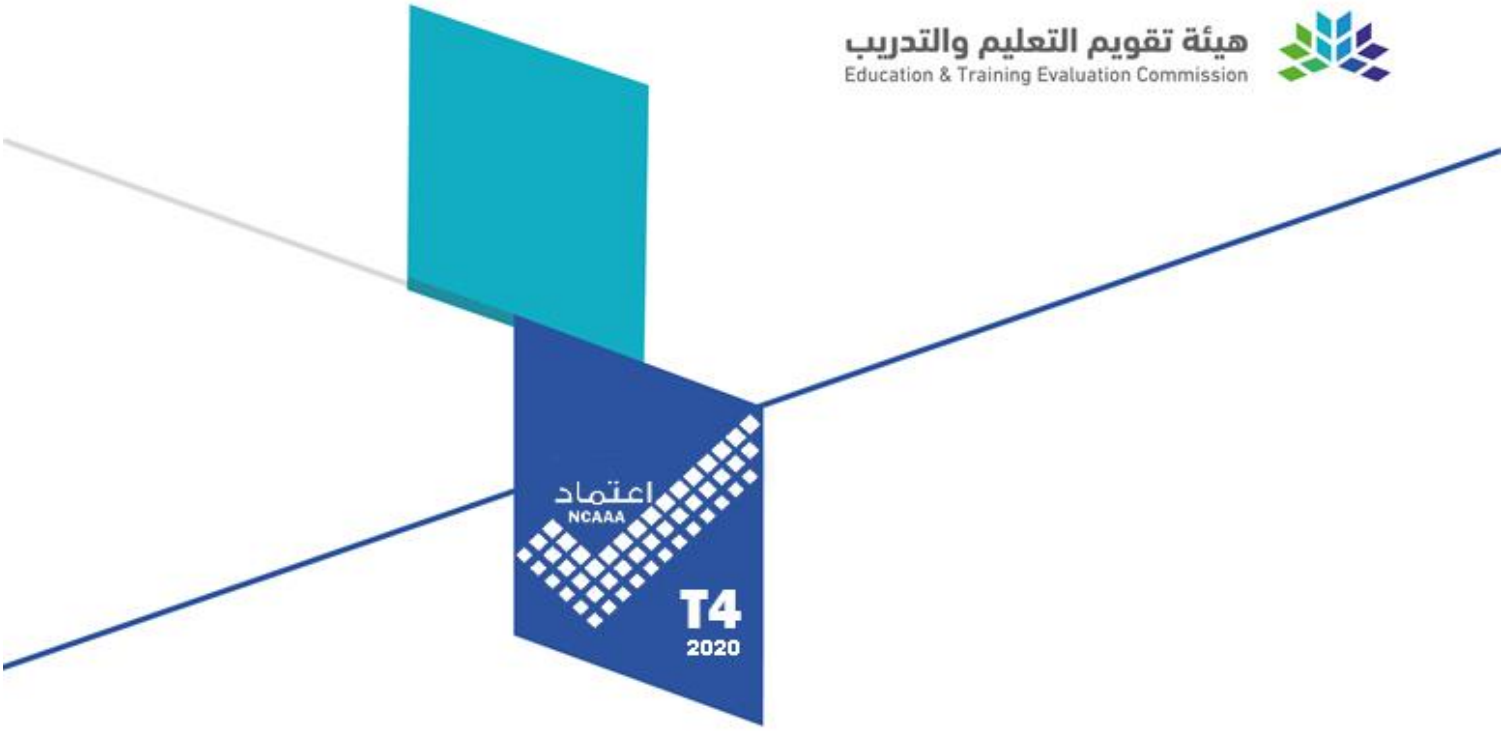
Evaluation Areas/Issues	Evaluators	Evaluation Methods
will be used by the faculty to evaluate the course feedback and the instructor.		
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



توصيف المقرر الدراسي

Course Title:	Embryology
Course Code:	BIO 1415
Program:	Bachelor of Science in Biology.
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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6. Mode of Instruction (mark all that apply) 3

B. Course Objectives and Learning Outcomes **3**

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C. Course Content **4**

D. Teaching and Assessment **6**

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods 6

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E. Student Academic Counseling and Support **7**

F. Learning Resources and Facilities **7**

1.Learning Resources 7

2. Facilities Required 7

G. Course Quality Evaluation **8**

H. Specification Approval Data **8**

A. Course Identification

1. Credit hours: 5 (4 Lectures + 2 Lab + 0 Tutorials).
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: Level 10 / Fourth Year.
4. Pre-requisites for this course (if any)**:** BIO 1314
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	48
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	72
Other Learning Hours*		
1	**Study**	4-6 hours
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	4-6 hours

* 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 On-Line Embryology course is designed to provide MBS students with a foundation in human embryonic and fetal development from fertilization to birth. This course focuses on the morphological changes that take place during development. Underlying molecular mechanisms and relevant congenital anomalies may be briefly considered.

2. Course Main Objective

By the successful completion of the course the student will be able:

- To address the developmental events during all stages of prenatal development.
- To emphasize human development but with a comparative approach to illustrate key differences in embryological development across animals.
- To study the normal cellular and molecular events associated with development.
- To examine abnormal development and teratological defects to understand how and why things go wrong during development. Through consideration of birth defects and teratology.
- To study the fundamental relationship between structure (anatomy) and function (physiology) will be considered, so that students gain an understanding of the fundamental importance of structure that allows normal physiology, and how anomalies in structure arising from abnormal development adversely affect the normal functioning of a structure.
- To devote an introduction to embryology, gametogenesis, fertilization, and the development of embryo from zygote to neural tube formation.
- To examine the development of organ systems, including the nervous, respiratory, cardiovascular, urogenital, and digestive systems, as well as a look into the development of sensory organs (eyes and ears).
- To be well an excellent hands-on experience in embryology.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	List basic concepts and principles of Embryology.	1.1
1.2	Tell an understanding and appreciation of Embryo development.	1.1-1.2
2	**Skills:**	
2.1	Compose ideas as well as facts by requiring students to read material on ethical probes that have no easy answers.	2.1-2.2
2.2	Develop and test hypotheses based on discovery-based activities by the mean of laboratories that emphasize observation and hands-on.	2.1-2.2
2.3	Appraise critical thinking by requiring students to evaluate a body of evidence, separate assumptions form observations, and reach some conclusion based on evidence.	2.1-2.2
3	**Values:**	
3.1	Show ability to communicate effectively with class mates and teaching staff. Appraise team work and management of resources and time.	2.2-3.1
3.2	Use laboratory instruments and computers.	3.3
3.3	Analyze biological experiments and use various slides during laboratory classes.	3.2-3.3

C. Course Content

No	List of Topics	Contact Hours
1	• Introduction & Welcome to Embryology! • The saga of the sex cells: gametogenesis overview. • Female sex cells: oogenesis.	4

	• Male sex cells: spermatogenesis & spermatogenesis. • Transport of gametes & fertilization.	
2	Cleavage.	2
3	• Gastrulation - becoming trilaminar.	3
4	• Implantation Embryonic membranes.	3
5	Twining.	4
6	• Neurulation. • Nervous system.	4
7	• Maternal support & fetal interactions. Critical periods in development.	4
8	Determination and Differentiation.	4
9	• Organogenesis. • Regeneration.	4
10	• Congenital Malformation. • Embryonic cells and Tumor.	4
11	Tissues and Embryonic Cells Culture.	4
12	Stem cells.	4
13	Assisted reproductive technologies.	4
Total		48

Topics to be covered (Laboratories)

No.	Topics	Contact hours
01	Introduction to embryology and microscopy.	2
02	Female anatomy. Male anatomy.	2
03	Sperm motility.	2
04	Frog cleavage, gastrulation, & neurulation (4.7.10 mm) Staging frog embryos.	2
5,6	Limbs. Live 11 mm frog embryos.	4
07	Digestive. Chick cleavage, gastrulation, & neurulation (33.48 hr chick).	3
08	72-hr chick.	3
09	Planarian regeneration. Live chick embryos.	2
10	Finish planarian regeneration & checkout slides.	2
11	General revision	2
		24

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	List basic concepts and principles of Embryology.	Three hours weekly contain lectures.	Students will be evaluated on their ability to present complete solutions to problems.
1.2	Tell an understanding and appreciation of Embryo development.	Three hours weekly of Laboratory devoted to experiments.	Performance must include class examinations, frequent homework assignments and a final exam.
2.0	**Skills**		
2.1	Compose ideas as well as facts by requiring students to read material on ethical probes that have no easy answers.	Self-study is an important method for students' learning.	• Questions in Lectures. • Short Quizzes and
2.2	Develop and test hypotheses based on discovery-based activities by the mean of laboratories that emphasize observation and hands-on.	Introduce some concepts by examples from real-life problems (i.e. laboratory).	Participation through class work and Homework.
2.3	Appraise critical thinking by requiring students to evaluate a body of evidence, separate assumptions form observations, and reach some conclusion based on evidence.	Encourage Students to communicate their biology thinking to ask and answer question when they arise.	Work portfolio.
3.0	**Values**		
3.1	Show ability to communicate effectively with class mates and teaching staff. Appraise team work and management of resources and time.	Encourage the students to solve the exercises and problems on white board.	Laboratory reports writing.
3.2	Use laboratory instruments and computers.	• Virtual labs. • Demonstrations.	• Examinations, • Laboratory performance and reports.
3.3	Analyze biological experiments and use various slides during laboratory classes.	• Virtual labs. • Demonstrations	• Examinations.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%

#	Assessment task*	Week Due	Percentage of Total Assessment Score
2	Midterm 2	Around 7th -8th week	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15 %
6	Final Exam.	Around 13th week	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:
Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• Scott. f. Gilbert Developmental Biology, 10th ed, (2013). ISBN-13: 978-0878939787. • Bruce M. Carlson MD PhD .Human Embryology and Developmental Biology: With Student Consult Online Access, 5e 5th Edition,(2013). ISBN-13: 978-1455727940 • Pankaj Talwar Manual of Assisted Reproductive Technologies and Clinical Embryology (2012). ISBN-13: 978-9350255063. • Laboratory Manual: Schoenwolf, G. C. 1995. Laboratory Studies of Vertebrate and Invertebrate Embryos. 7th ed. Prentice Hall. ISBN 0-02-407602-3.
Essential References Materials	• Essentials of Domestic Animal Embryology by Poul Hyttel et al. (Dec 6, 2009) **Published:** SEP-2009 **ISBN 10:** 0-7020-2899-1, ISBN **13:** 978-0-7020-2899-1. Atlas of Descriptive Embryology (Book Review), a Descriptive Embryology Atlas by Gary Schoenwolf and Willis Mathews.2008.
Electronic Materials	Publications and magazine of biological and life sciences.
Other Learning Materials	CD for developmental biology and embryology.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	The computers are equipped with different software's. and connected to data show.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals, dissection instruments, light microscopes, dissection

Item	Resources
	microscopes, microtome instrument, slide preparations, mixer, fluorescent microscopes, specific instruments for embryological parameters, centrifuges, incubators, ovens and other glass wares.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

توصيف المقرر الدراسي

Course Title:	Human and Genetic Engineering
Course Code:	BIO 1436
Program:	Bachelor of Science in Biology.
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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G. Course Quality Evaluation **8**

H. Specification Approval Data **8**

A. Course Identification

1. Credit hours:	4 (3 Lectures + 2 Laboratory + 0 Tutorials).
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	Level 10 / Fourth Year
4. Pre-requisites for this course (if any)**:**	BIO 1231 + BIO 1333
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	36
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	60
Other Learning Hours*		
1	**Study**	4-6 hrs.
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	4-6 hrs.

* 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

Course description: The course is designed to introduce methods and applications of genetic engineering, including gene manipulation and transfer techniques in prokaryotes and eukaryotes. Emphasis on applications of recombinant DNA technology in the elucidation of gene function. Consideration of recent technological developments in molecular genetics, such as cloning, gene therapy, the patenting and release of genetically engineered organisms, and societal issues related to these developments.

2. Course Main Objective

Genetic engineering, also called genetic modification, is the direct manipulation of an organism's genome using biotechnology. It is therefore a set of technologies used to change the genetic makeup of cells, including the transfer of genes within and across species boundaries to produce improved or novel organisms. An organism that is generated through genetic engineering is considered to be a genetically modified organism (GMO). So, by the successful completion of the course the student will be able:

To gain an understanding of basic principles and new advances in genetics.

To gain appreciation of how genetics can impact humans.

To evaluate the risks and benefits of different applications of genetic Knowledge.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	Recognize the basics of genetics applications in human populations with a focus on cellular and chemical genetics.	1.1
1.2	Record Population genetics and family's studies. In addition to clinical and forensic medicine applications concepts organisms.	1.1-1.2
2	**Skills:**	
2.1	Create the ability to apply the basics of genetics in human populations with a focus on cellular genetics.	2.1
2.2	Explain the ability on biochemical studies of populations and family's heredity.	2.1-2.2
2.3	Analyze genetic databases data and the ability to deal with animal models to search for human diseases.	1.2-2.2
3	**Values:**	
3.1	Appraise collaborative work skill.	3.1-3.2
3.2	Analyze linking between science and technology with society.	3.1-3.3
3.3	Use of computers and means of modern technology.	3.3

C. Course Content

No	List of Topics	Contact Hours
1	Formal Analysis of the Transmission of Genes from Generation to Generation. Mendelian Inheritance and the Role of Chromosomes. Population Genetics. Quantitative Inheritance.	4
2	The Nature of Genes. Definition of Genes: Mutation, Open Reading Frames, Complementation, Activities of Gene Products. Location of Genes: Recombination Mapping, Restriction Mapping.	4
3	Manipulation of Genes. Natural Genetic Engineering. Lysogeny. Transposition.	4

	Genetic Engineering by Human Intervention; Gene Therapy.	
4	Molecular Mechanisms of Genetic Processes. Regulation of Gene Action. DNA Replication.	4
5	Human Genetics. Human Genomics.	4
6	Genetic Disease.	3
7	Speculations on Genetic Engineering, Eugenics, and Human Evolution	3
8	Methods and issues relating to micro-organisms a genetic engineered.	3
9	Methods and topics related to genetic engineered plants.	2
10	Organisms of Genetic engineering techniques (cloning).	2
11	Applications for engineer genetic beings.	3
Total		36

Topic to be covered (laboratories)

No.	Topics	Contact Hours
1	Cytology preparations for human chromosomes.	2
2	Study of packages on human chromosomes.	2
3	Chromosomal abnormalities (quantitative and structural) in Human.	2
4	Genes cloning.	2
5	Library of DNA.	2
6	Extraordinary Measures.	3
7	Identify and know the sequences.	3
8,9	Gene transfer.	4
10	Human genome sequence databases.	2
11	General revision.	2
		24

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	Recognize the basics of genetics applications in human populations	Interactive lecture.	• Written tests. • Oral tests.

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	with a focus on cellular and chemical genetics.		• Classroom assignments.
1.2	Record Population genetics and family's studies. In addition to clinical and forensic medicine applications concepts organisms.	• Discussion and dialogue. • Collaborative learning.	• Home assignments. • Classroom discussions and contributions.
2.0	**Skills**		
2.1	Create the ability to apply the basics of genetics in human populations with a focus on cellular genetics.	• Mental focus. • Problem-solving and decision-making.	• Performance of written tests. • Identification tests.
2.2	Explain the ability on biochemical studies of populations and family's heredity.	• Find the collective reciprocal teaching.	• Performance - simulation tests. • Work sample tests.
2.3	Analyze genetic databases data and the ability to deal with animal models to search for human diseases.	• Survey / discovery • Modeling and Simulation.	Bags achievement portfolio.
3.0	**Values**		
3.1	Appraise collaborative work skill.	Mental focus.	Evaluation of colleagues.
3.2	Analyze linking between science and technology with society.		
3.3	Use of computers and means of modern technology.	• Default – laboratories. • Illustrated presentations.	Recording student performance.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around 7th -8th week	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15 %
6	Final Exam.	Around 13th week	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:
Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Desmond S. T. Nicholl, an Introduction to Genetic Engineering, Cambridge University Press, (2008). Recombinant DNA (Paperback), ISBN-13: 978-0521615211. Stefan Surzycki Human Molecular Biology Laboratory Manual 1st Edition. (2003). ISBN-13: 978-0632046768. Rasko C.S. Downes, Genes in Medicine: Molecular biology and human genetic disorders, Publisher: Springer; 1st edition (1994) ISBN-10: 0412373408.
Essential References Materials	Human genetics concepts and application. Ricki Lewis 2011.10th ed.ISBN 13 : 978-0073525303 Medical Genetics (2006). by Lynn B. Jorde. Human Genetics: Concepts and Applications, by Ricki Lewis (2007).
Electronic Materials	Genetic Links. Clinical Genetics Site. Genetic and the Internet. Genetic Catalog - Genetics Web Site Searrh Engines. Genetic Links. Genetic Disorders & Birth Defects - Sri Lanka Collection. Links, For Gene Therapy. Nature Technology Corporation's Homepage. Ncbi Homepage. Omni The Uk's Gateway to High Quality Internet Resources in Health and Medicine. Research Tools. The Human Genome. Usu TeleGenetics.
Other Learning Materials	CDs and Electronic biological programs and genetics Software. Electronic programs for genetic engineering.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms reserved for lectures and prepared the traditional education (face to face) and E-learning (E-learning) that allow interaction between teachers and students, ordinary paper blackboard smart plasma screens ... etc. A (Stage), with an integrated audio system and microphones connected to the Internet and networks 2 Wired and wireless (optical fiber), and air conditioning system and modern suitable lighting
Technology Resources (AV, data show, Smart Board, software, etc.)	A computer for display and uses of data with a slide show presentation. High-device "projectors" Lighting.

Item	Resources
	It is assumed that each student has its own computer.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals , dissection instruments, light microscopes , dissection microscopes ,microtome instrument, slide preparations, mixer, fluorescent microscopes , ELISA unit for detecting Ag-Ab reactions , molecular instruments like gel electrophoresis ,PCR centrifuge , thermal cycler , an illuminator ,some media agar and petri-dishes ,centrifuges , incubators , ovens and other glass wares.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد NCAAA T4 2020

Course Specifications

Course Title:	**Biostatistics**
Course Code:	**STA 1417**
Program:	**Bachelor of Science in Biology**
Department:	**Mathematics and Statistics**
College:	**Science**
Institution:	**Imam Mohammad Ibn Saud Islamic University**

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D. Teaching and Assessment **5**

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F. Learning Resources and Facilities **5**

1.Learning Resources 5

2. Facilities Required 6

G. Course Quality Evaluation **6**

H. Specification Approval Data **7**

A. Course Identification

1. Credit hours:	**4 (3 Lectures, 0 Lab, 2 Tutorial)**
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	**Level 10 / Year 4**
4.Pre-requisites for this course (if any)**:**	**MAT 1101**
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	5	100%
2	Blended		
3	E-learning		
4	Distance learning		
5	Other		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	36
2	Laboratory/Studio	0
3	Tutorial	24
4	Others (specify)	0
	Total	60

B. Course Objectives and Learning Outcomes

1. Course Description

This course describes the most important ideas, practical results, and examples of Descriptive Statistics, Probabilities and Distributions, Estimation, Hypothesis Testing, Inferences, Correlation and Regression, and Multinomial Experiments. The course includes the essential fundamentals of these topics. The emphasis is on calculations, and some applications are mentioned.

2. Course Main Objective

- **Describe discrete data graphically and compute measures of centrality and dispersion**
- **Compute probabilities by modeling sample spaces and applying rules of permutations and combinations, additive and multiplicative laws and conditional probability**
- **Compute probabilities based on practical situations using the binomial and normal distributions.**
- **Teach students techniques of estimations**

- **Learn and use some tests of hypothesis.**
- **Estimate and the use of the linear regression Line.**
- **Use the ANOVA analysis.**

3. Course Learning Outcomes

	CLOs	Aligned-PLOs
1	**Knowledge and Understanding**	
1.1	**Recognize several techniques of counting and calculus (series, integrals…) to calculate probabilities, mean, and variance.**	**K2**
1.2	**Outline sampling experiments, sampling distribution, confidence interval, and hypothesis testing.**	**K2**
2	**Skills:**	
2.1	**Develop techniques of problem solving.**	**S1, S2**
2.2	**Calculate mathematics clearly and precisely both orally and in writing.**	**S2, S3**
2.3	**Appraise using Internet in searching for scientific information.**	**S1, S2**
2.4	**Compose calculations orally and mentally.**	**S2**
3	**Values:**	
3.1	**Appraise working individually.**	**V1**
3.2	**Appraise working in groups.**	**V2, V3**

C. Course Content

No	List of Topics	Contact Hours
1	***Descriptive Statistics:*** Types of Data, Design of Experiments, Frequency Distributions, Visualizing Data, Measures of Center, Measures of Variation, Measures of Relative Standing, Exploratory Data Analysis.	**9**
2	***Probabilities and Distributions:*** Fundamentals, Addition Rule, Multiplication Rule, Condition Probability, Bayes' Theorem, Risks and Odds, Rates of Mortality, Fertility, and Morbidity. Random variables, Mean, Variance, Standard deviation, Binomial Distribution, Poisson Distribution, Standard Normal Distribution, Applications of Normal Distributions, Sampling Distributions and Estimators, The Central Limit Theorem, Normal as Approximation to Binomial, Assessing Normality.	**10**
3	***Estimates and Sample Sizes with One Sample:*** Estimating a Population Proportion, Estimating a Population Mean (sigma known and unknown), Estimating a Population Variance.	**9**
4	***Hypothesis Testing with One Sample:*** Basics of Hypothesis Testing, Testing Claim about Proportion, Testing Claim about Mean (Sigma Known and unknown), Testing Claim about Standard Deviation and Variance.	**8**
5	***Inferences from Two Samples:*** Inferences about Two Proportions, Inferences about two Means: Independent Samples, Inferences from Matched Pairs, Odds Ratios, Comparing Variations in Two Samples.	**8**
6	***Correlation and Regression:*** Correlation, Regression, Variation and Prediction Intervals, Multiple Regression	**8**
7	***Multinomial Experiments:*** Multinomial Experiments: Goodness-of-Fit, Contingency Tables: Independence and Homogeneity, One-Way ANOVA.	**8**
	Total	**60**

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 several techniques of counting and calculus (series, integrals...) to calculate probabilities, mean, and variance.	• 2 lecture hours\week • 1 tutorial hour\week • Self-study	• Regular Exams • Assignments • Short Quizzes
1.2	Outline sampling experiments, sampling distribution, confidence interval, and hypothesis testing.		
2.0	**Skills**		
2.1	Develop techniques of problem solving.	• 1 lab hour • Self-study • Real-life problems	• Lab Exam • Participations • Short Quizzes
2.2	Calculate mathematics clearly and precisely both orally and in writing.		
2.3	Appraise using Internet in searching for scientific information		
2.4	Compose calculations orally and mentally.		
3.0	**Values**		
3.1	Appraise working individually.	Personal questions	Participation
3.2	Appraise working in groups.	Team work	Homework and Mini-projects

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homeworks, Quizzes, Mini-projects	During the semester	20%
2	First Midterm	Week 4-5	20%
3	Second Midterm	Week 7-8	20%
4	Final Exam	Week 13	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 :

- There are 6 office hours per week reserved by each professor, planed on his timetable, to help the students on their problems.
- All department students are assigned two academic advisors who will act as a mentor, providing academic and career advice, and general counseling.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	***Biostatistics for Biological and Health Sciences*, M.M. Triola & M.F. Triola, Pearson, 2006.** ISBN-10: 0321194365 ISBN-13:

	9780321194367 **(Main Reference)**
Essential References Materials	▪ ***Biostatistical Analysis*, 5th Edition, Jerrold H. Zar, Pearson Education. Inc., 2010.** ISBN-10: 0131008463 ISBN-13: 9780131008465 ▪ ***The Analysis of Biological Data*, M.C. Whitlock, D. Schluter, Roberts & Company Publishers, 2015.** ISBN: 9781936221486 ▪ ***Intuitive Biostatistics*, 3rd Edition, Oxford University Press, Harvey J. Motulsky, 2013.** ISBN13: 978-0199946648 ISBN10: 0199946647 1. ***Basic Biostatistics: Statistics for Public Health Practice*, 2nd Edition, B. Burt Gerstman, Jones & Barlett Learning, 2015.** ISBN-13: 9781284036015
Electronic Materials	**None**
Other Learning Materials	**None**

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	▪ **Each class room should be equipped with a whiteboard and a projector.** ▪ **Laboratories should be equipped with computers and an internet connection.**
Technology Resources (AV, data show, Smart Board, software, etc.)	**The rooms should be equipped with data show and Smart Board.**
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	**None.**

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment, Quality of learning resources	**Students**	**During the semester and at the end of the course each student will complete two evaluation forms.**
Extent of achievement of course learning outcomes, Quality of learning resources	**Instructor**	**At the end of each semester the course instructor should complete the course report, including a summary of student**

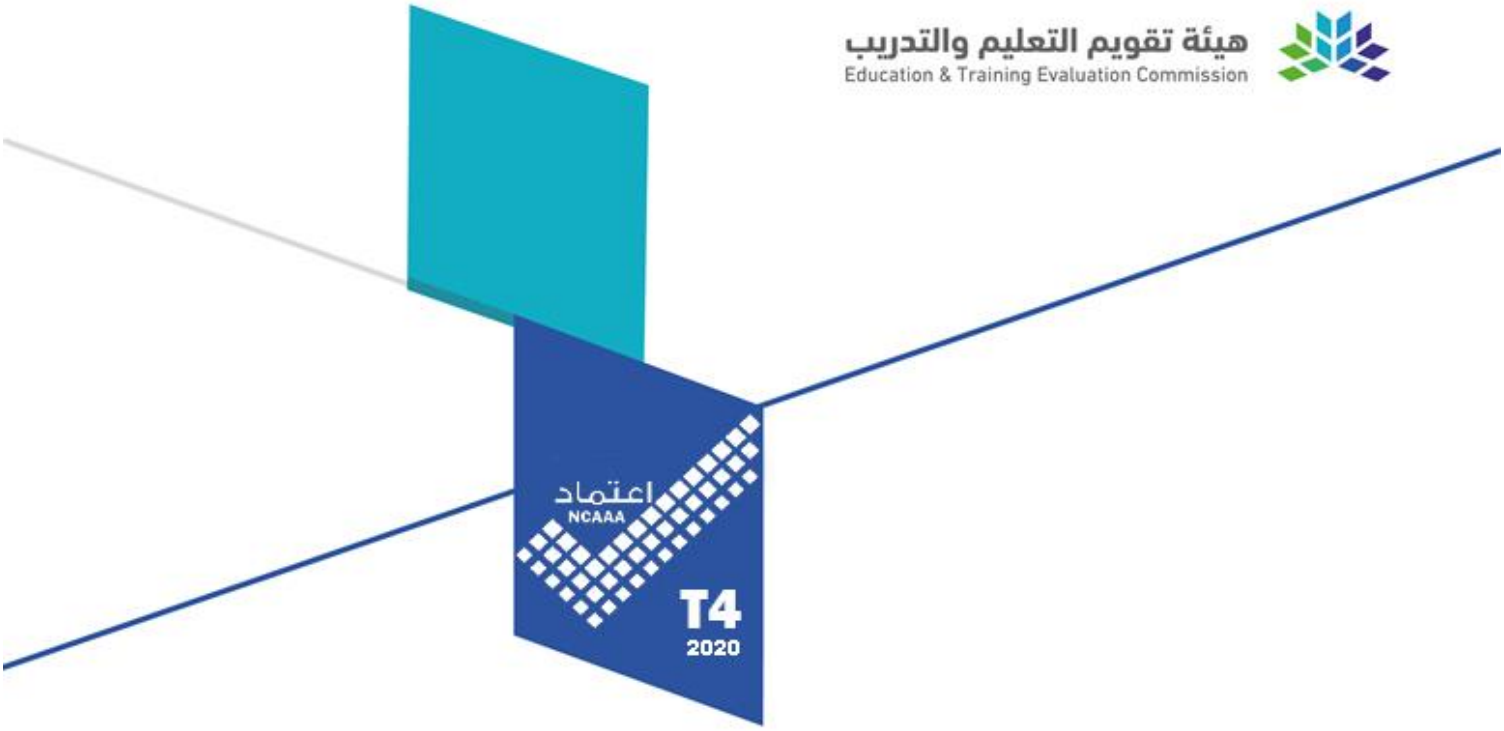
Evaluation Areas/Issues	Evaluators	Evaluation Methods
		questionnaire responses appraising progress and identifying changes that need to be made if necessary.

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	Head of department
Reference No.	
Date	November, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



توصيف المقرر الدراسي

Course Title:	Bioinformatics
Course Code:	BIO 1434
Program:	Bachelor of Science in Biology.
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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D. Teaching and Assessment **5**

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods 5

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E. Student Academic Counseling and Support **6**

F. Learning Resources and Facilities **6**

1.Learning Resources 6

2. Facilities Required 7

G. Course Quality Evaluation **7**

H. Specification Approval Data **8**

A. Course Identification

1. Credit hours: 4 (3 Lectures + 0 Laboratory + 2 Tutorials).
2. Course type **a.** University ☐ College ☐ Department √ Others ☐ **b.** Required √ Elective ☐
3. Level/year at which this course is offered: Level eleven / Fourth Year.
4. Pre-requisites for this course (if any)**:** STA 1417
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	36
2	**Laboratory/Studio**	0
3	**Tutorial**	24
4	**Others** (specify)	0
	Total	60
Other Learning Hours*		
1	**Study**	2-4 hrs.
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	2-4 hrs.

* 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

Course description: The course is designed to introduce the most important and basic concepts, methods, and tools used in Bioinformatics. Topics include (but not limited to) bioinformatics databases, sequence and structure alignment, protein structure prediction, protein folding, protein-protein interaction. Emphasis will be put on the understanding and utilization of these concepts and algorithms. The objective is to help the students to reach rapidly the frontier of bioinformatics and be able to use the bioinformatics tools to solve the problems on their own research.

2. Course Main Objective

Bioinformatics is an interdisciplinary field that develops methods and software tools for understanding biological data. As an interdisciplinary field of science, bioinformatics combines computer science, statistics, mathematics, and engineering to analyze and interpret biological data.

This course aims to identify the biological sequences data and the analysis of similar DNA sequences and proteins. So, successful completion of the course, the student will be able:

To illustrate bio-data sequences.

To describe similar sequences DNA.

To describe similar protein sequences.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	Recognize the study of biological sequences data.	1.1
1.2	Describe the analysis of Similar DNA sequences.	1.1-1.2
2	**Skills:**	
2.1	Analyze the biological sequences data.	2.1
2.2	Analyze and compare methods and topics related to microorganisms.	2.1-2.2
2.3	Analyze and compare methods and topics related to bioinformatics for plants and animals.	2.1-2.2
3	**Values:**	
3.1	Appraise collaborative work skill.	3.1-3.2
3.2	Appraise understanding the views of the other aspects of the temporal, spatial and personality	3.1-3.2
3.3	Use of computers and means of modern technology.	3.3

C. Course Content

No	List of Topics	Contact Hours
1	Class Introduction. Bioinformatics: What and why?	3
2	Genomic sequences. Online databases. Intro to sequence alignment.	3
3	Sequence alignment. Scoring Matrices. Pairwise alignment Gaps.	3
4	Database searching; BLAST. Limits of detection, significance.	3
5	Advanced BLAST: PSI-BLAST, Genomic DNA. Find-a-gene project.	3
6	Multiple sequence alignment. Relevance to inferences about evolution.	3
7	Midterm review; molecular phylogeny introduction.	3
8	Molecular phylogeny and evolution. mRNA and gene expression introduction. Unigeneric.	3
9	Statistics for differential expression, multiple testing. Functional interpretation of array data.	4
10	Characterizing eukaryotic genomes. Human variation and disease.	4
11	Linking genes and disease. Sequence variation, phenology, and comparative genomics. Personalized medicine. Multiple testing revisited.	4
Total		36

Topic to be covered (Tutorial)

No.	Topics	Contact Hours
1	Finding information in online databases.	2
2, 3	Pairwise sequence alignment.	4
4, 5	BLAST.	4
6, 7	Advanced BLAST and find-a-gene help.	4
8	Using online multiple sequence alignment tools.	3
9	Molecular phylogeny.	3
10	Finding differentially expressed genes.	2
11	Interpreting expression variation.	2
		24

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	Recognize the study of biological sequences data.	• Interactive lecture, discussion and dialogue • Collaborative learning	• Written tests. • Oral tests.
1.2	Describe the analysis of Similar DNA sequences.	Style – Wiki.	• Classroom assignments. • Classroom discussions and contributions.
2.0	**Skills**		
2.1	Analyze the biological sequences data.	• Mental focus • Find the collective Problem-solving and decision-making	Performance of written tests.
2.2	Analyze and compare methods and topics related to microorganisms.	Style - Wiki	Students' projects.
2.3	Analyze and compare methods and topics related to bioinformatics for plants and animals.	Teaching with analogies and the similes. Reciprocal teaching.	Research papers. Identification tests.
3.0	**Values**		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
3.1	Appraise collaborative work skill.	Teaching colleagues.	Evaluation of colleagues.
3.2	Appraise understanding the views of the other aspects of the temporal, spatial and personality	Practical training and the guided discovering.	Class participation.
3.3	Use of computers and means of modern technology.	• Default - laboratories • Illustrated presentations	Recording student performance.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around 7th -8th week	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15 %
6	Final Exam.	Around 13th week	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:

- By identifying office hours 6 hours a week (be adhered to and attached with the Schedule lectures and declare for the students.
- To communicate and ask questions and inquiries by e-mail to a member of staff teaching through his Web site.
- To provide assistance and guidance to any inquiry or consultation relating to syllabus given,
- Helping students to understand the material and contribute to the academic advising process.

Helping students in the face of any study and academic problems in this course.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Marketa Zvelebil Jeremy Baum Understanding Bioinformatics, Publisher: Garland Science; 1 edition (August 29, 2007), ISBN-10: 0815340249. Teresa Attwood, David Parry-Smith Hal Introduction to Bioinformatics Paperback, 240 pages; March 8, 1999, 1st edition; Prentice. ISBN: 0582327881.
Essential References Materials	Pavel pevezer, Bioinformatics for biologists.1th ed. 2011.ISBN: 13: 978-1107648876. Cynthia Gibas and Per Jambeck. Developing Bioinformatics Computer Skills, (2001).

Electronic Materials	• Genetic Links • Clinical Genetics Site • Genetic and The Internet • Genetic Catalog - Genetics Web Site Searrh Engines • Genetic Disorders & Birth Defects - Sri Lanka Collection • Links, For Gene Therapy.
Other Learning Materials	CDs and Electronic biological programs and genetics Software Mathematical Genetics and Bioinformatics

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students. And the laboratory room is equipped with many laboratory instruments with a maximum of 20 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	A computer for display and uses of data with a slide show presentation. High-device "projectors" Lighting. It is assumed that each student has its own computer.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals, dissection instruments, light microscopes, dissection microscopes, microtome instrument, slide preparations, mixer, fluorescent microscopes, ELISA unit for detecting Ag-Ab reactions, molecular instruments like gel electrophoresis, PCR centrifuge, thermal cycler , an illuminator, computers and their connections, centrifuges, incubators, ovens and other glass wares.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct

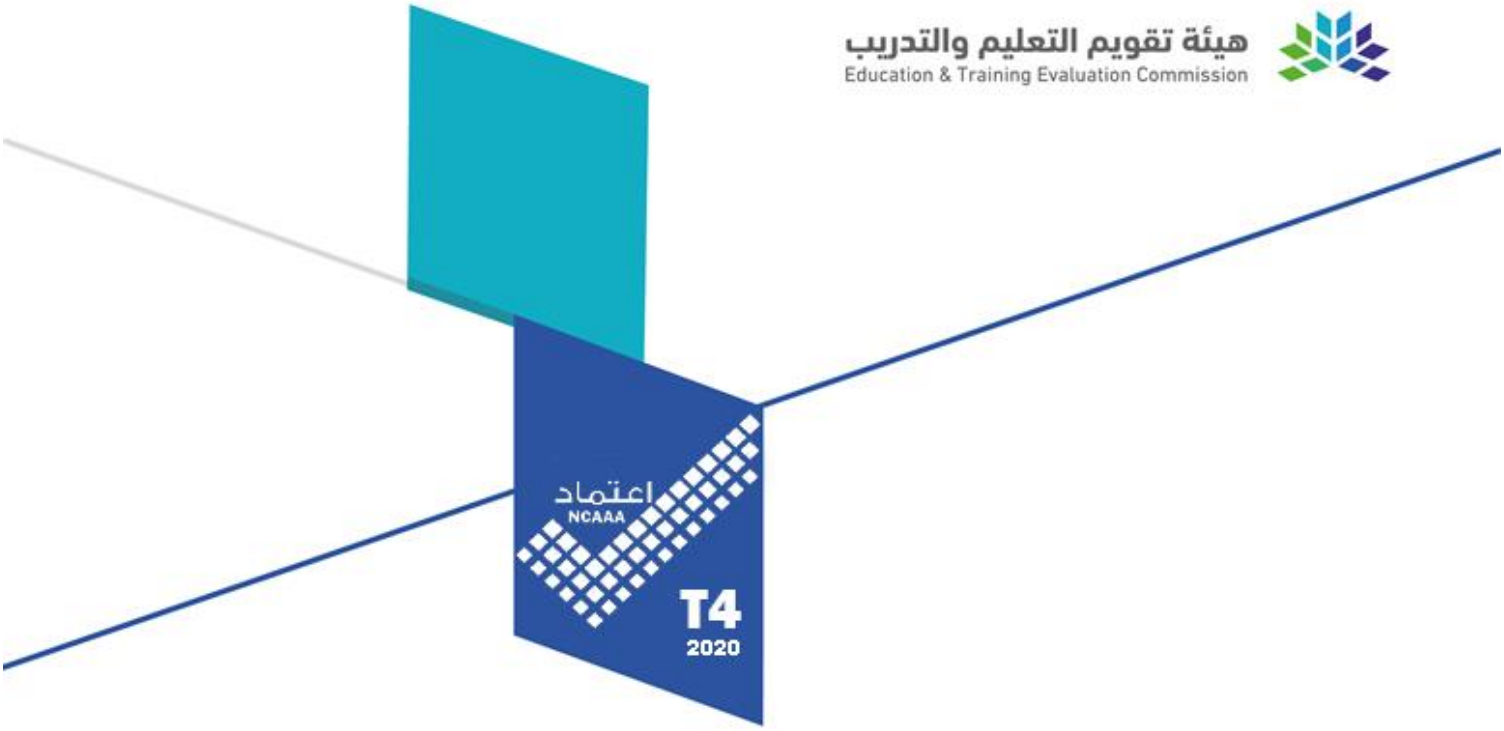
Evaluation Areas/Issues	Evaluators	Evaluation Methods
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



توصيف المقرر الدراسي

Course Title:	Microbial pollution
Course Code:	BIO 1454
Program:	Bachelor of Science in Biology.
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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A. Course Identification

1. Credit hours:	4 (3 Lectures + 2 Lab + 0 Tutorials).
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	Level 11 / fourth Year
4. Pre-requisites for this course (if any)**:**	BIO 1242 + BIO 1345
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	36
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	60
Other Learning Hours*		
1	**Study**	4 - 6 hours
2	**Assignments**	
3	**Library**	
4	**Projects/Research Essays/Theses**	
5	**Others** (specify)	
	Total	4 - 6 hours

* 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

Introduce microbial processes of environmental and geochemical significance and provide detailed information on the most up to date methods for the study of microbial communities. A survey of modern micro-organisms and their activities of environmental and geochemical importance is an important foundation for the module as is the way that metabolic processes catalysed by micro-organisms are related to major elemental cycles, biogeochemical processes and contamination.

2. Course Main Objective

The most up to date molecular methods used to study the diversity and activity of micro-organisms in their natural habitats are detailed along with their and limitations.
So, it is expected to be after the study that course the student be able:

- To describe microbes contaminated air, water and food.
- To comparing pollution treatment methods with microorganisms.

To determine the damage caused by these microorganisms.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	Describe the contamination with micro-organisms in the environment (water – air –soil).	1.2
1.2	Recognize treatment with micro-organisms for contaminated soil, water and air.	1.1
2	**Skills:**	
2.1	Reconstruct the ability to a conclusion information about the general pathogenic microbial features.	2.1
2.2	Design and conduct experiments and evaluate the results of the work through the development of standards and criteria for evaluation.	2.1
2.3	Reconstruct the ability to a conclusion information about the general pathogenic microbial features.	2.1
3	**Values:**	
3.1	Appraise team work and participation in scientific skill groups.	2.2-3.1
3.2	Write reports, preparation of presentations and the preparation of graphics and models by using technology.	3.2
3.3	Use of computers and means of modern technology.	3.3

C. Course Content

No	List of Topics	Contact Hours
1	Air pollution with micro-organisms.	4
2	Soil contamination with micro-organisms.	3
3	Water pollution with micro-organisms. Microorganisms caused for polluting.	4
4	Methods of studying viruses.	3
5	Sources of pollution with micro-organisms.	4
6	Problems of microbiological contamination, and means of preventing.	3
7	The role of microorganisms in the detection of environmental pollution.	3

8	Reagents with micro-organisms for air pollution.	3
9	Reagents with micro-organisms for soil pollution. Reagents with micro-organisms for water pollution.	3
10	Microorganisms and treatment of environmental pollution.	3
11	Treatment with micro-organisms for contaminated air, soil and water.	3
Total		36

Topics to be covered (Laboratories)

No.	Topics	Contact hours
01	Introduction.	2
02	Safety precautions.	2
03	Detecting of air pollution.	2
04	Detecting of soil contamination.	2
05	Detecting contamination of some food.	2
06	The study of mechanisms of contamination with micro-organisms.	3
07	Treatment pollution in the soil with micro-organisms.	2
08	Treatment pollution in the water with micro-organisms.	3
09	Treatment pollution in the food with micro-organisms.	2
10	Treatment the pollution in air with micro-organisms.	2
11	General revision.	2
	Total	24

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	Describe the contamination with micro-organisms in the environment (water – air –soil).	Interactive lectures. Panel of discussions and dialogue.	Written tests assignments.
1.2	Recognize treatment with micro-organisms for contaminated soil, water and air.	Learning colleagues and mental focus	Written tests assignments.
2.0	**Skills**		
2.1	Reconstruct the ability to a conclusion information about the general	Mental focus.	Performance of written tests.

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	pathogenic microbial features.		Identification tests
2.2	Design and conduct experiments and evaluate the results of the work through the development of standards and criteria for evaluation.	Find the collective Research.	Work sample tests.
2.3	Reconstruct the ability to a conclusion information about the general pathogenic microbial features.	Problem-solving and decision-making.	Bags achievement portfolio.
3.0	**Values**		
3.1	Appraise team work and participation in scientific skill groups.	Scientific forums.	Self-report - methods.
3.2	Write reports, preparation of presentations and the preparation of graphics and models by using technology.	Seminars and mental focus.	Assigning students to conduct research using the Internet and modern technology.
3.3	Use of computers and means of modern technology.	Default - laboratories Illustrated presentations	Laboratory reports and recording student performance.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around 7th -8th week	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15 %
6	Final Exam.	Around 13th week	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:
Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Ross E .Mckinney, Environmental Pollution Control Microbiology. A Fifty-Year Perspective, (2004). ISBN 9780824754938. Tulasi Satyanarayana, Micro-orgaanisms in Environmental management: Microbes and Environment (2012) ISBN-13: 978-9400722286.
Essential References Materials	Bulletins and - Periodicals of King Abdul-Aziz City for Science and Technology
Electronic Materials	Electronic programs include highlights problems resulting from pollution with micro-organisms.

Other Learning Materials	CDs belonging to microbial pollution.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students. And the laboratory room is equipped with many laboratory instruments with a maximum of 20 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	The computers are equipped with different software's. and connected to data show and to smart board.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals, dissection instruments, light microscopes, dissection microscopes, microtome instrument, slide preparations, mixer, fluorescent microscopes, ELISA unit for detecting Ag-Ab reactions, molecular instruments like gel electrophoresis, PCR centrifuge, thermal cycler, an illuminator, some media agar and petri-dishes, centrifuges, incubators, ovens and other glass wares.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

توصيف المقرر الدراسي

Course Title:	**Field Training**
Course Code:	**BIO 1497**
Program:	**Bachelor of Science in Biology**
Department:	**Biology**
College:	**College of Science**
Institution:	**Imam Mohammad Ibn Saud Islamic University**

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A. Field Experience Identification

1. Credit hours: 4	**Contact hours: 5**
2. Level/year at which this course is offered:	**12/4 (last term of the program).**
3. Dates and times allocation of field experience activities. • Number of weeks: 12 • Total number of contact hours: 60 hours Student Workload Information Guide	
4. Pre-requisites to join field experience (if any)**:** Student must have completed a minimum number of 160 credits	

B. Learning Outcomes, and Training and Assessment Methods

1. Field Experience Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding** At the end of the field experience, the student is able to:	
1.1	Recognize knowledge of the context of the professional career before graduation.	K1 & K2
1.2	Record a range of professional interests in related fields of her/his academic program on Biology.	K1 & K2
1.3	List all opportunities for learning, development and mentoring throughout the duration of the training.	K1 & K2
2	**Skills:** At the end of the field experience, the student is able to:	
2.1	Develop what has been learned in classroom to real-world situations	S1
2.2	Appraise being critical and innovative for problem solving, thinking analysis and making practical decisions with confidence and rigor.	S2
2.3	Appraise communicating information in a manner that reflects professional social work skills	S3
2.4	Create collaborations with other professionals	S3
3	**Values:** At the end of the field experience, the student is able to:	
3.1	Demonstrate discipline, self and social responsibility	V1-V3
3.2	Use ethic principles of the profession.	V1-V3
3.3	Demonstrate integrity and honesty	V1-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	Recognize knowledge of the context of the professional career before graduation.	Participation with the field supervisor at work place.	Discussion Specific rubric
1.2	Record a range of professional	Subject-based study	Rubric of evaluation

Code	Learning Outcomes	Training Methods/Activities	Assessment Methods
	interests in related fields of her/his academic program on Biology.	essays written-short answer/long answer/report	
1.3	List all opportunities for learning, development and mentoring throughout the duration of the training.	Oral test Presentation Written report	Evaluate student's Discussion
2.0	**Skills** **The student is able to:**		
2.1	Develop what has been learned in classroom in the real-world situations.	workplace performance; Oral Presentations	• Portfolio • Student's diary/journal.
2.2	Appraise being critical and innovative for problem solving, thinking analysis and making practical decisions with confidence and rigor.	Written research questions/ Reflection	Student portfolio
2.3	Appraise communicating information in a manner that reflects professional social work skills	Written tasks Discussion	Evaluation of Report and mails.
2.4	Create collaborations with other professionals	group tasks	Portfolio Specific rubric Direct observation
3.0	**Values** **The student is able to:**		
3.1	Demonstrate discipline, self and social responsibility	Discussion, behavior	Portfolio and direct observation
3.2	Use ethic principles of the profession.	Discussion, behavior	Direct observation portfolio
3.3	Demonstrate integrity and honesty	Discussion, behavior	Direct observation

3. Field Experience Learning Outcomes Assessment

a. Students Assessment Timetable

#	Assessment task*	Assessment timing (Week)	Percentage of Total Assessment Score
1	Depends on the workspace and the assessment plan of the field experience in collaboration between teaching staff and the assigned field supervisor before starting the training.	During the 10 weeks of the training.	- 20% for the evaluation of the teaching staff (5% on the attendance of the orientation session, 5% related to the performance during the field visit, 10% for the appreciation on student's performance by using supervisor's reports and student's weekly) - 40% reserved to the field supervisor regarding overall performance and progress during

#	Assessment task*	Assessment timing (Week)	Percentage of Total Assessment Score
			the training. - 20% for the final report

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

b. Assessment Responsibilities

#	Category	Assessment Responsibility
1	**Teaching Staff**	The teaching staff supervisor assesses: • the attendance and participation of the student in the orientation session, • the performance during the field visit, • Student's performance by using supervisor's reports and student's weekly, which express the application of student's knowledge to actual practice.
2	**Field Supervisor**	The field supervisor assesses overall performance and progress of the student during the training.
3	**Others** (specify)	**N.A.**

C. Field Experience Administration

1. Field Experience Locations

a. Field Experience Locations Requirements

Suggested Field Experience Locations	General Requirements*	Special Requirements**
List of potential companies and institutions (public/private sectors)	The workplace is registered and approved by the competent Saudi instances. Legal status as determined by the law in Saudi Arabia. efficiency and safety	The field experience location activities are appropriate and consistent with the mission of Imam Mohammad Ibn Saud Islamic University and the requirements for field experience learning outcomes.

*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

Before starting the process for field experience, the college should state a range of partnerships with potential training organizations that may provide high-level training opportunities.
The list of partnerships should be available in college of science website.
These partnerships should be based on requirements listed above.
The college should communicate the present document (including qualifications and responsibilities) to the training organization to ensure skills requirements to determine an appropriate field supervisor.

2. Supervisory Staff

a. Selection of Supervisory Staff

Selection Items	Field Supervisor	Teaching Staff
Qualifications	A permanent member of the training organization.	A member of the teaching staff at the department of Biology is assigned authority and responsibility of supervising and evaluating the overall components of the field experience according the present specifications document.
Selection Criteria	depending to the training organization criteria.	• Ability to supervise a team, to establish priorities and manage competing deadlines for self and others. • Experience in the supervision and leadership of staff. • Well-developed oral and written communication skills. • Ability to build and maintain effective working relationships and act with diplomacy and discretion when dealing with sensitive and confidential issues • Ability to develop effective social and professional networks.

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.)

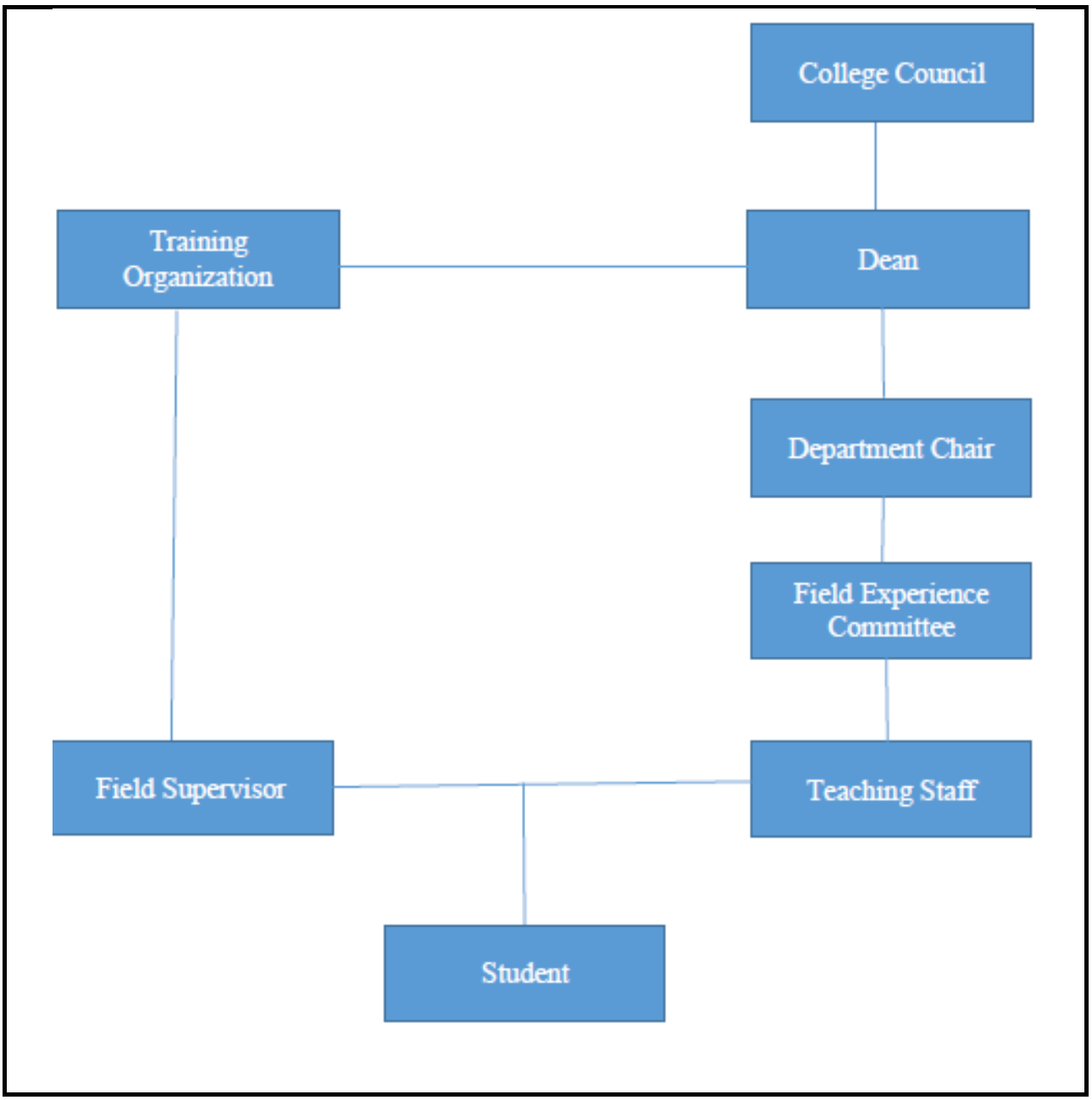
The field supervisor is able for supervising, training and evaluating the student throughout the training period., including the follow-up and monitoring. He should notify the corresponding teaching staff of any concerns or problems. In addition, s/he the following key skills and qualifications:

- Scientific academic path.
- Leadership and team management skills.
- Attention to detail and problem-solving skills.
- Written and verbal communication skills
- Advanced expertise in a specific training organization activities
- Deep knowledge of training organization policies.

3. Responsibilities

a. Field Experience Flowchart for Responsibility

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



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				☑	

Activity	Department or College	Teaching Staff	Student	Training Organization	Field Supervisor
Ensuring the safety of the site				☑	
Commuting to and from the field experience site		☑	☑		☑
Provision of support and guidance		☑			☑
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

The mechanism used for supervision and follow-up student is essentially based on:

follow-up forms
Interview follow-up
Student portfolio
Daily attendance record.
Evaluation rubric

b. Student Support and Guidance Activities

Session of orientation, necessary documentations (forms and rubrics, and guide manual).
The workplace is expected to provide documents for student training (including internal policy manuals, electronic sources).
The workspace is expected to provide also appropriate desk gadgets including printer/internet access with appropriate electronic devices and software.

5. Safety and Risk Management

Potential Risks	Safety Actions	Risk Management Procedures
-	-	-

G. Training Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Student performance, effectiveness and efficiency	Field Supervisor,	Direct and Indirect
Quality of learning resources Effectiveness of Training and assessment. Student performance	Teaching staff	Indirect
Evaluation of the field Experience (workspace, Quality of learning resources, supervisory, achievements, skills, behavior, time)	Student	Indirect

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	Head of Biology Department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

توصيف المقرر الدراسي

Course Title:	Research Project
Course Code:	BIO 1499
Program:	B. Sc. in Biology
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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F. Learning Resources and Facilities **7**

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2. Facilities Required 7

G. Course Quality Evaluation **7**

H. Specification Approval Data **8**

A. Course Identification

1. Credit hours: 4	**Contact hours: 5**
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐	
3. Level/year at which this course is offered: Level 12/Year 4	
4. Pre-requisites for this course (if any)**:** The student must have completed a minimum number of 160 credit hours. Upon research specific Project STA 1417 + BIO 1244	
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**		
2	**Blended**		
3	**E-learning**	√	20%
4	**Correspondence**		40%
5	**Other**	√	40%

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	0
2	**Laboratory/Studio**	60
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	60
Other Learning Hours*		
1	**Study**	-
2	**Assignments**	3 h
3	**Library**	2 h
4	**Projects/Research Essays/Theses**	-
5	**Others** (specify)	-
	Total	5 h

* 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 (research project) represents the culmination of study towards the Bachelor degree of Science in Biology. It offers the opportunity to apply and extend material learned throughout the program. The course undertaken spans a diverse range of topics, including theoretical, simulation and experimental studies.

2. Course Main Objective

Make literature review of current state of the art of specific scientific subjects; □ Understand and develop new scientific concept to solve and overcome a real life problem; □ Carry out and accomplish the work described and find solutions to a specific scientific problem; □ Gain

research experience and communication skills; Able to communicate technical information in written and oral to scientific community; Write-up of results and final report.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	Describe handling a scientific project.	1.1
1.2	Recognize good project management skills.	1.1
2	**Skills:**	
2.1	Summarize an excellent working knowledge of the project theories.	2.1
2.2	Reorganize and understand the basics properties related to the project.	2.1
2.3	Differentiate between different biological phenomena related to project.	1.1-2.1
3	**Values:**	
3.1	Demonstrate ability to deal with various sources of knowledge and the ability to exploit and to estimate the time.	2.3-3.1
3.2	Analyze the results with other colleagues and with supervisors.	2.2-2.3-3.2
3.3	Use of Electronic Mail in communicating with others, colleagues and supervisor.	2.2-3.1

C. Course Content

No	List of Topics	Contact Hours
1	Plan and execute a 16-week project in experimental or theoretical Biology in nature (or a mixture of both) and might involve substantial computing, construction and design, theory, measurements, and numerical modeling or analysis.	-
2	Planning report: Project topic selection and accompanying justification.	-
3	Planning report: Proposed project outline.	-
4	Planning report: Project schedule individual or as a team member tasks identified.	-
5	Involve constant review of the plan.	-
6	Setting and meeting deadlines and dealing with changes to the project plan as they arise.	-
7	Weekly reports.	-
8	Interim report.	-
9	Regular interaction and discussion with student's project supervisor and the outcome results and experimentations.	-
10	Undertake a literature review on a topic of relevance to the overall project.	-
11	Deliver a final report presentation, structure and supported appropriate drawings, figures, characteristics curves, experimental equipment's and tests, calculations and appendices) and oral presentation of student's project work summarizing the essential scientific and practical aspects and outcomes of the project at the end of semester.	-
Total		60

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	Describe handling a scientific project.	Diversify assessment. Promote skills and employability. Empower the student. Promote links between teaching and research	Submission weekly report by student to supervisor. Monthly assessment report written by the supervisor. Final oral presentation assessed by examiners committee.
1.2	Recognize good project management skills.	Weekly 2 hours devoted to project. Address concern. Promote skills and employability. Identify potential research students.	Meeting during office hours to discuss difficulties on the advancements of the project. Submission weekly report by student to supervisor. Monthly assessment report written by the supervisor. Final oral presentation assessed by
2.0	**Skills**		
2.1	Summarize an excellent working knowledge of the project theories.	Fairly complete discussion during the office hours with the supervisor. Self-working of student on modeling simulation analysis and interpretation.	Office discussion and questions. Evaluation on student's reports and via the website community.
2.2	Reorganize and understand the basics properties related to the project.	Fairly complete discussion during the office hours with the supervisor. Self-working of student on modeling simulation analysis and interpretation.	Office discussion and questions. Evaluation on student's reports and via the website community.
2.3	Differentiate between different biological phenomena related to project.	Fairly complete discussion during the office hours with the supervisor. Self-working of student on	Office discussion and questions. Evaluation on student's reports and via the website

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		modeling simulation analysis and interpretation.	community.
3.0	**Values**		
3.1	Demonstrate ability to deal with various sources of knowledge and the ability to exploit and to estimate the time.	Motivate the student to investigate related topics that are not covered in details with the supervisors	Evaluation of student's advancements and reports.
3.2	Analyze the results with other colleagues and with supervisors.	Motivate the student to investigate related topics that are not covered in details with the supervisors.	Evaluation of student's advancements and reports.
3.3	Use of Electronic Mail in communicating with others, colleagues and supervisor.	Upload questions and invite discussion. Encourage student to use Information and Communication Technologies regarding questions, information, submission reports.	Allocate marks continuously for the seriousness of the student in his advancements on the projects. Accept reports only if they are submitted using electronic mail and internet network.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	The final year project is compulsory and 100% based on continuous assessment, i.e. it must be passed at the end semester examinations. To ensure that all students have the opportunity to spend time on their project module, irrespective of their other final year module options.	weekly	The final year project is an assessment of performance away from a formal examination.
2	1st Report written by supervisor on the advancement of the student's project.	5th Week	30%
3	2nd Report written by supervisor on the advancement of the student's project.	8th Week	30%
4	Final Oral Exam directed by an oral examination committee.	13th Week	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:

Every student is supervised by an academic staff regarding his project he will receive all the necessaries academic and scientific advices which let the student able to design implement and finalize his project.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	This depends on the project topic.
Essential References Materials	-
Electronic Materials	www.imamm.org and Project communities.
Other Learning Materials	-

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	-
Technology Resources (AV, data show, Smart Board, software, etc.)	-
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
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees	Specialized committees	Indirect

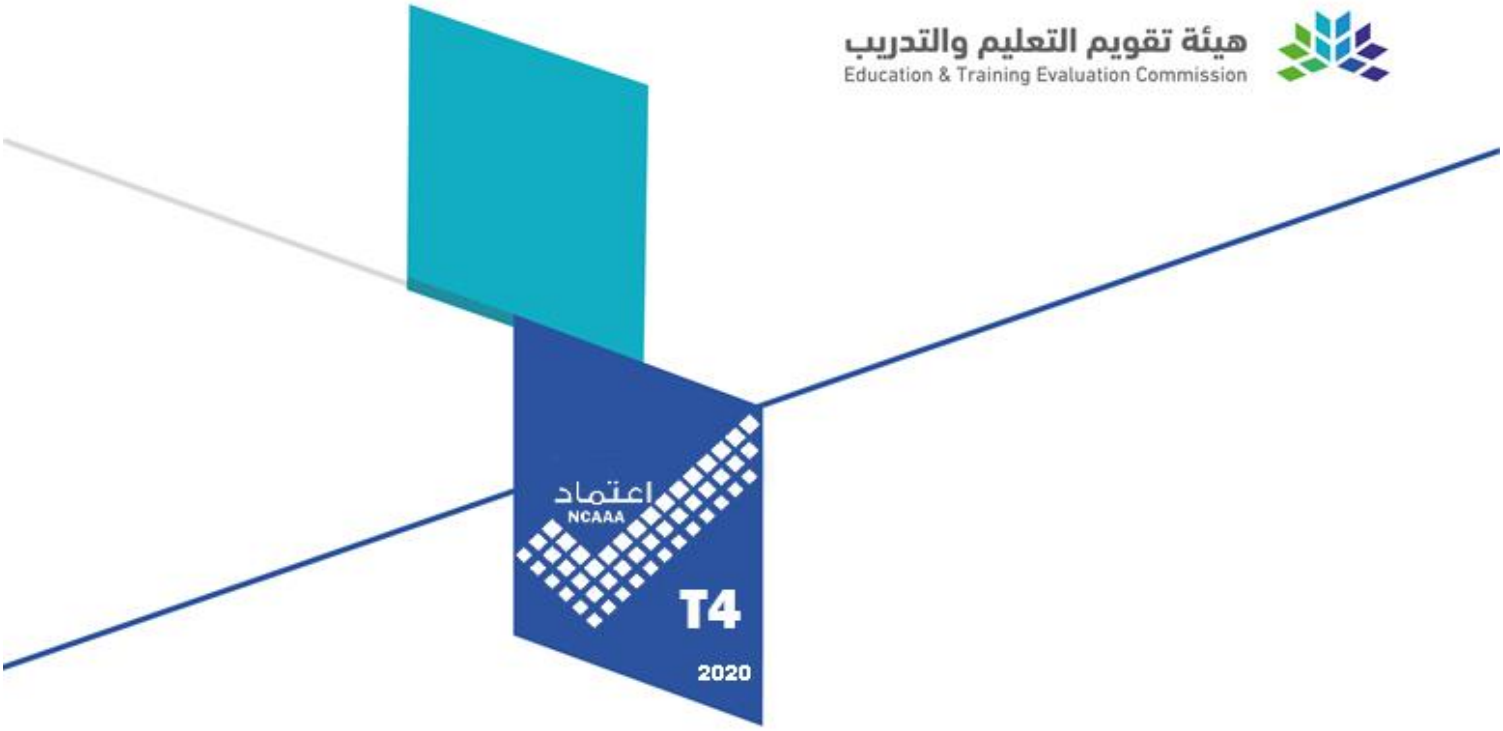
Evaluation Areas/Issues	Evaluators	Evaluation Methods
devoid of bias and criticism.		
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	Hematology
Course Code:	BIO 1417
Program:	Bachelor of Science in Biology.
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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2. Assessment Tasks for Students 6

E. Student Academic Counseling and Support **6**

F. Learning Resources and Facilities **6**

1.Learning Resources 6

2. Facilities Required 7

G. Course Quality Evaluation **7**

H. Specification Approval Data **8**

A. Course Identification

1. Credit hours:	4 (3 Lectures + 2 Laboratory + 0 Tutorials).
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☐ Elective ☑
3. Level/year at which this course is offered:	Level eight / Third Year
4. Pre-requisites for this course (if any)**:**	Animal Physiology – BIO 1314
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	36
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	60

B. Course Objectives and Learning Outcomes

1. Course Description

The Hematology course will cover the diagnosis and management of blood cell disorders, anatomy and physiology of hematopoiesis, routine specialized hematology tests, analysis, classification, and monitoring of blood cell abnormalities.

2. Course Main Objective

Upon successful completion of this module the student should be able to:

- Describe the characteristics of normal bone marrow and normal circulating blood.
- Describe the functions of hemoglobin, white blood cells, red blood cells and platelets.
- Discuss hemoglobin electrophoresis and abnormal hemoglobin.
- Describe the maturation of red blood cells, white blood cell and platelets.
- Recognize and identify abnormalities in red blood cell morphology and RBC precursors.

- Recognize and identify the causes of an abnormal result in any or all of the parameters of the CBC. (a) RBC b) WBC c) Hemoglobin d) Hematocrit e) Indices f) Differential WBC count).
- Discuss the etiology, morphological classification, and clinical laboratory findings of the different anemias:(a) Aplastic anemia b) Sideroblastic anemia c) Megaloblastic anemia d) Hemolytic anemias e) Deficiency anemias).
- Discuss the etiology, morphology of cells, and clinical laboratory findings of some the different leukemias.
- Discuss the etiology, morphology of cells, and clinical laboratory findings of the following hematological disorders: like a) Infectious mononucleosis b) Lupus erythematosus c) Lymphomas.

Demonstrate an understanding of the role and the main disciplines of Biomedical Science in the day to day operation of a Hematology laboratory.

3. Course Learning Outcomes

	CLOs	Aligned-PLOs
1	**Knowledge and Understanding**	
1.1	Define the scope and function of a Haematology.	1.1
1.2	Write about methods how controls and standards are used in Haematology.	1.2
1.3		
1...		
2	**Skills :**	
2.1	Estimate basics of the correct operation of laboratory equipment and explain the principles and quality assurance of the equipment.	2.1
2.2	Compare between manual and automated measurements.	2.1-2.3
2.3	Prepare and use of a Romanowsky stain.	2.1-2.3
2...		
3	**Values:**	
3.1	Evaluate Group leadership skill and to evaluate the responsibility.	2.2-3.1-3.2
3.2	Illustare linking between science and technology with society.	3.1-3.2
3.3	Demonstrate the operation and use of computers and means of modern technology.	3.3
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Introduction: Definition of Hematology, what is blood, Blood composition. The scope of Hematology.	5
2	The Erythrocytes, Red Blood Corpuscles (RBCs), Haemopoieses, RBCs cell lines in bone marrow. Normal Blood, RBCs indices.	5
3	Hemoglobin, Haemoglobinopathy. Aspect of Anaemia, Types of anaemia. Iron deficiency anemia & other hypochromic microcytic anemias. Megaloblastic anemia. Hemolytic Anemias I- Introductions & Classification:	10

	Hemolytic Anemias II- Structural hemoglobinopathies. Hemolytic Anemias III-Thalassemia.	
4	• Hemolytic Anemias IV- Membrane abnormalities. • Hemolytic Anemias V- Enzymopathies. • Hemolytic Anemias VI- Immune Hemolytic Anemias. • Aplastic Anemia. • Anemia of chronic disorders. • Malaria. Summary of red cell morphologic abnormalities.	10
5	White Blood Cells (WBCs), Types of WBCs, Formation of WBCs. Normal WBCs, Myeloproliferative disorders.	10
6	• White cells and their benign disorders. • Leukemias-introductions & classification: • Acute leukemia. • Chronic myeloid leukemias. • Chronic Lymphocytic leukemias. • Myelodysplastic syndromes & other preleukemic conditions.	10
7	• Physiology of coagulation & Hemostasis. • Bleeding disorders - Introduction & Classification. • Congenital bleeding disorders. • Acquired bleeding disorders. • Congenital platelet disorders. • Acquired platelet disorders. • Thrombophilic disorders & Their diagnosis. (Thrombocytopenia- thrombocytosis).	10
Total		60

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 scope and function of a Haematology.	Panel of discussions and dialogue, including discussion of small groups.	• Written tests. • Oral tests.
1.2	Write about methods how controls and standards are used in Haematology.	Laboratory method process (experiments) and view reports.	Work – papers and research papers.
…			
2.0	**Skills**		
2.1	Estimate basics of the correct operation of laboratory equipment and understand the principles and quality assurance of the equipment.	Mental focus.	Performance of written tests.

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.2	Compare between manual and automated measurements.	Find the collective research.	Performance mimicry tests.
2.3	Prepare and use of a Romanowsky stain.	Reciprocal teaching and the similes.	Work sample tests.
3.0	**Values**		
3.1	Evaluate Group leadership skill and to evaluate the responsibility.	Teaching colleagues.	Self-report methods.
3.2	Illustrate linking between science and technology with society.	Collective research project and writing reports and presenting its display.	Assigning students to conduct research using the Internet and modern technology.
3.3	Demonstrate the operation and use of computers and means of modern technology.	Default- laboratories Illustrated presentations.	Recording student performance.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around 7th-8thweek	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10%
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15%
6	Final Exam.	Around 13thweek	40%
7	Total		100%
8			

***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 :
Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• Dacie and Lewis Practical Haematology' SM Lewis, BJ Bain, I Bates10th Edition, 2012, Churchill Livingstone Elsevier. ISBN 9780702034077 Kandice Kottke-Marchant.Laboratory Hematology Practice 1st Ed (2012).ISBN-13: 978-1405162180.
Essential References Materials	• Essential Haematology' Hoffbrand A.V. Moss P.A.H. & Pettit J.E. 5th Edition, 2007, Blackwell. Publishing • Principles of Laboratory Instruments' Schoef L.E. & Williams R.H. 1993 Mosby - ISBN 08016749-1.

Electronic Materials	www, direct science.com.
Other Learning Materials	CD containing programs special for hematological methods.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• A (Stage), with an integrated audio system and microphones connected to the Internet and networks 2 Wired and wireless (optical fiber), and air conditioning system and modern suitable lighting. • Hall dedicated to educational films with moving chairs and a DVD player, and TV. • 60-inch (, conditioning system with a modern and appropriate lighting.). • Laboratories equipped with the latest electrical appliances, chemical and all chemicals and tools Safety and means to study the practical courses. • Hall dedicated to lectures e-learning.
Technology Resources (AV, data show, Smart Board, software, etc.)	• A computer for display and use of data with a slide show presentation. • High-device "projectors" Lighting. • It is assumed that each student has its own computer**.**
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals , dissection instruments, light microscopes, dissection microscopes, microtome instrument, slide preparations, mixer, fluorescent microscopes ,spectrophotometer ELISA unit for detecting Ag-Ab reactions ,instrument of gel electrophoresis ,hematocrit centrifuge , automated CBC analyzer , centrifuges , incubators , ovens , other glass wares special for hematology and automated micropipettes.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator	Course coordinator	Direct

Evaluation Areas/Issues	Evaluators	Evaluation Methods
completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.		
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	Animal Behavior
Course Code:	Bio 1455
Program:	Bachelor of Science in Biology.
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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A. Course Identification **3**

6. Mode of Instruction (mark all that apply) 3

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C. Course Content **4**

D. Teaching and Assessment **5**

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E. Student Academic Counseling and Support **6**

F. Learning Resources and Facilities **6**

1.Learning Resources 6

2. Facilities Required 7

G. Course Quality Evaluation **8**

H. Specification Approval Data **9**

A. Course Identification

1. Credit hours:	4 (3 Lectures + 2 Laboratory + 0 Tutorials).
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☐ Elective ☑
3. Level/year at which this course is offered:	Level eight / Third Year
4. Pre-requisites for this course (if any)**:**	Principles of Environmental Impact Assessment BIO 1252
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	36
2	**Laboratory/Studio**	24
3	**Tutorial**	
4	**Others** (specify)	
	Total	60

B. Course Objectives and Learning Outcomes

1. Course Description

The scientific study of the mechanistic and evolutionary causes of animal behavior, including communication, foraging and anti-predator behavior, spatial behavior, mating behavior, parental care, and social behaviors.

2. Course Main Objective

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

- Distinguish between the four types of questions that may be asked about animal behavior, and formulate hypotheses of each type to explain a given behavior.
- Explain how behavioral hypotheses are formulated, the procedures used to test them, and the types of data that can be collected.
- Understand some of the mechanisms involved in the production of a behavioral

sequence by an animal.

- Understand the role of natural and sexual selection in the evolution of behavior.
- Explain how these principles can be used to understand human behavior.
- Explain the relationship between hormones and behavior.

State the correlation between genetics and behavior.

3. Course Learning Outcomes

	CLOs	Aligned-PLOs
1	**Knowledge and Understanding**	
1.1	Define the scope and function of hormones and animal behavior. To	1.1
1.2	Write about methods how some of the mechanisms involved in the production of a behavioral sequence by an animal.	1.1-1.2
1.3		
1...		
2	**Skills :**	
2.1	Estimate how to recognize and identify the relationship between cause and effect in behavior.	2.1
2.2	Explain how to classify patterns of behavior of animals.	2.1
2.3	Compare between the patterns of different animals' behavior.	2.1
2...		
3	**Values:**	
3.1	Evaluate group leadership skill and to evaluate the responsibility. To	2.3
3.2	Demonstrate appropriate tools and use correct manner.	3.1-3.2
3.3	Demonstrate the operation and use of computers and means of modern technology.	3.3
3...		

C. Course Content

No	List of Topics	Contact Hours
1	• Background Information: • Introduction: Course Overview; Course Goals; History of Animal Behavior. • Background Information (1): Evolution & Natural Selection; Fitness &Adaptation; Levels & Units of Selection.	7
2	• Proximate Causes of Behavior: • Behavioral Genetics (1): Nature vs. Nurture; Reaction Norms; Relationship between Genes and Behavior. • Behavioral Genetics (2): Experimental Methods and Results; Evolution of Behavior. • Ontogeny of Behavior: Development of behavior in honey bees; Critical Periods; Learning; Bird Song; Evolution of Behavioral Plasticity.	7
3	• Hormones: The Endocrine System; Hormonal Influences; Methods of Studying Hormone-Behavior Systems; Organizational and Antinational Effects; Sex Differences and Sexual Behavior.	7
4	• Ultimate causes of behavior (focus on individual):	7

	• Habitat Selection: Natal Philopatry and Dispersal; Territoriality. • Orientation, Migration & Conservation: Definitions; Short and Long-Distance Migration; Cues; Applications for conservation *(KG)*. • Anti-Predator Behavior: Crypsis & Mimicry; Polymorphism; Deception Mechanisms; Fighting; Vigilance; Communal Defense	
5	• Foraging: Feeding Behavior; Optimality Models; Optimal Foraging • Sex: The Evolution of Sex. • Sexual Selection (1): Alternative Phenotypes. • Sexual Selection (2): Intersexual Competition. • Sexual Selection (3): Intersexual Competition; Mate Choice; Cryptic Mate Choice. Mating Systems: Classifications; Evolution of Mating Systems; Mating Systems and Their Ecological Correlates.	7
6	• Parental Care: Parental Care; Conflicts of Interest; Evolution of Favoritism. • Cooperation & Altruism: Kinship and Reciprocity; Kin Selection. • Kin Recognition: Mechanism; Example, The Recognition System of Paper Wasps.	7
7	• Communication (1): Definition; Channels; Functions; Signals vs. Cues. • Communication (2): Principals of Communication; Evolution of Honesty. • Eusociality: The Evolution of Eusociality; Reproductive Skew Models. Animal Cognition: Animal Minds.	7
8	• Ultimate causes on behavior (focus on human): • Darwinian Medicine (1): Definition; Applications. • Darwinian Medicine (2): Examples. • Human Sociobiology (1): Adaptations Approach; Mating Systems. Human Sociobiology (2): Examples	7
9	General revision	4
Total		60

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 scope and function of hormones and animal behavior.	Panel of discussions and dialogue, including discussion of small groups.	• Written tests. • Oral tests.
1.2	Write about methods how some of the mechanisms involved in the production of a behavioral sequence by an animal.	Laboratory method process (experiments) and view reports.	Work – papers and research papers.

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
…			
2.0	**Skills**		
2.1	Estimate how to recognize and identify the relationship between cause and effect in behavior.	Mental focus.	Performance of written tests.
2.2	Explain how to classify patterns of behavior of animals.	To explain how to classify patterns of behavior of animals.	Identification tests.
2.3	Compare between the patterns of different animals' behavior.	Find the collective research.	Performance mimicry tests.
3.0	**Values**		
3.1	Evaluate group leadership skill and to evaluate the responsibility.	Teaching colleagues.	Self-report methods.
3.2	Demonstrate appropriate tools and use correct manner.	Simulation and Process presentations.	Laboratory reports.
3.3	Demonstrate the operation and use of computers and means of modern technology.	Default- laboratories Illustrated presentations.	Recording student performance.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5h week	15%
2	Midterm 2	Around 7th -8th week	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15 %
6	Final Exam.	Around 13th week	40 %
7	Total		100%
8			

***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 :
Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• Shawn E.Nordell and Thomas J. Valone(2013) : Animal Behavior; Concepts, Methods, Applications,1e.Oxford University Press. • Drickamer, Lee C., Stephen H. Vessey, and Elizabeth Jakob.

	2002. *Animal Behavior: Mechanisms, Ecology, and Evolution.* Fifth edition. McGraw-Hill Publishers. ISBN 9780070121997.
Essential References Materials	• Brown R, Payne A, Graham KK and Starks PT. 2012. Prey capture and caste-specific payload capacities in the European paper wasp *Polistes dominulus*. *Insectes Sociaux.* 59: 519-525. • Chadwick V. Tillberg, Michael D.Breed,and Sarah J. Hinners (2007) : Field and Laboratory Exercises in Animal Behavior 1st edition ,ISBN-13:978-0123725820 Bonnie J.Ploger and Ken Yasukawa (2003):Exploring animal Behavior in laboratory and Field,An Hypothesis-testing Approach to the Development,Causation,Function,and Evolution of Animal behavior 1st edition,ISBN-13978-0125583305. • Chrastil ER, Getz WM, Euler HA and Starks PT. 2006. Paternity Uncertainty Overrides Sex Chromosome Selection for Preferential Grandparenting. *Evolution & Human Behavior*. 27: 206-223. • Dawkins R. (1982) Replicators and vehicles. pp. 45-64 in *Current problems in sociobiology*, (Kings College Sociobiology Group, ed.) Cambridge Univ. Press.
Electronic Materials	WWW Resources: *http://www.cbu.edu/~aross/animbeh/Animal_Behavior.htm.*
Other Learning Materials	CD containing programs special for Behavioral concepts.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms reserved for lectures and prepared the traditional education (face to face) and E-learning (E-learning) that allow interaction between teachers and students, ordinary paper blackboard smart plasma screens ... etc. A (Stage), with an integrated audio system and microphones connected to the Internet and networks 2 Wired and wireless (optical fiber), and air conditioning system and modern suitable lighting. Hall dedicated to educational films with moving chairs and a DVD player, and TV. 60-inch (conditioning system with a modern and appropriate lighting.). Laboratories equipped with the latest electrical appliances, chemical and all chemicals and tools Safety and means to study the practical courses.

Item	Resources
	Hall dedicated to lectures e-learning.
Technology Resources (AV, data show, Smart Board, software, etc.)	• A computer for display and uses of data with a slide show presentation. • High-device "projectors" Lighting. • It is assumed that each student has its own computer.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	A. Specific laboratory equipment for this course including posters, models of different experimental animals, dissection instruments, light microscopes, dissection microscopes, microtome instrument, slide preparations, mixer, fluorescent microscopes, spectrophotometer, instrument of gel electrophoresis, hematocrit centrifuge, automated CBC analyzer, centrifuges, incubators, ovens, other glass wares special for hematology and automated micropipettes. B. Animal house is equipped with especially-factors in terms of temperature control - brightness - the existence water basins - appropriate cages and specialists to deal with the animals.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	Ecological Physiology
Course Code:	BIO 1458
Program:	Bachelor of Science in Biology.
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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F. Learning Resources and Facilities **6**

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G. Course Quality Evaluation **7**

H. Specification Approval Data **7**

A. Course Identification

1. Credit hours:	4 (3 Lectures + 2 Lab + 0 Tutorials).
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☐ Elective ☑
3. Level/year at which this course is offered:	Level eight / Third Year
4. Pre-requisites for this course (if any)**:**	Entomology – BIO 1353
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	36
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	60

B. Course Objectives and Learning Outcomes

1. Course Description

This course is an exploration of environmental effects on fundamental physiological processes in plants and animals. Abiotic factors such as temperature and water availability interact with biotic forces such as predation, herbivory, and competition to constrain the ability of organisms to
survive, grow, and reproduce. Physiological solutions that allow success in one environment may preclude it in another. This course seeks to build up from physiological principles to understand characteristics of populations, communities, and ecosystems

2. Course Main Objective

Upon successful completion of this module the student should be able to :

- Demonstrate the major approaches to physiological ecology, including their differences and common threads.
- Demonstrate an understanding of the ecological principles.

- Demonstrate an understanding of basic physiological ecology issues.
- Explain the application of laboratory physiological methods to physiological ecology.
- Describe how individual-level physiology affects and is affected by ecological phenomena across the diversity of life (both plants and animals).
- *Explain* the physiological linkages across levels of biological organization.
- *Demonstrate* how, in the context of evolution, organisms exhibit similarities and differences in their basic physiology.
- Demonstrate how basic principles of physiology may inform students' individual research.
- Understand the physical aspects of the environment with which plants interact.
- Develop an awareness of what constitutes the field of plant physiological ecology and the issues to which knowledge in this area can be applied such as land use and habitat modifications, bioremediation, invasive species and global environmental change.
- Improve skills in critically evaluating primary literature.

Provide opportunities to discuss topics in plant physiological ecology based on the analysis of the literature, lecture information and other supplemental readings.

3. Course Learning Outcomes

	CLOs	Aligned-PLOs
1	**Knowledge and Understanding**	
1.1	Define the major approaches to physiological ecology.	1.1
1.2	Record the acquisition of practical experience in physiology relevant to physiological ecology.	1.1-1.2
1.3		
1...		
2	**Skills :**	
2.1	Estimate basics of the correct operation of laboratory equipment and summarize the principles and quality assurance of the equipment. To	1.2-2.1-3.1
2.2	Explain how individual-level physiology affects and is affected by ecological phenomena across the diversity of life (both plants and animals).	2.1
2.3	Compare how, in the context of evolution, organisms exhibit similarities and differences in their basic physiology.	2.1-2.3
2...		
3	**Values:**	
3.1	Evaluate Group leadership skill and to evaluate the responsibility. To	2.2-2.3
3.2	Demonstrate the operation and use of computers and means of modern technology.	3.3
3.3		
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to Physiological Ecology.	5
2	Energetics 1: The Basics of Metabolism.	5
3	Energetics 2: Survival, Growth and Reproduction.	5
4	Thermal Biology 1: Temperature Effects on Biological Rates/Times.	5

5	Thermal Biology II: Temperature adaptation and acclimatization.	5
6	Water and Osmotic Balance I: Plants and Animals.	5
7	Water and Osmotic Balance II.	5
8	Nutritional Ecology I: Feeding and digestion.	5
9	Nutritional Ecology I: Ecological Stoichiometry.	5
10	Stress and Organism Function.	5
11	Stress and Life History.	3
12	Sensory Physiology I.	3
13	Sensory Physiology II.	2
14	General revision.	2
Total		60

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 major approaches to physiological ecology.	Panel of discussions and dialogue, including discussion of small groups.	• Written tests. • Oral tests.
1.2	Record the acquisition of practical experience in physiology relevant to physiological ecology.	Teaching experts and guest speaker teaching	Bags achievement portfolio.
…			
2.0	**Skills**		
2.1	Estimate basics of the correct operation of laboratory equipment and summarize the principles and quality assurance of the equipment.	Mental focus.	Performance of written tests.
2.2	Explain how individual-level physiology affects and is affected by ecological phenomena across the diversity of life (both plants and animals).	Problem-solving and decision-making.	Identification tests.
2.3	Compare how, in the context of evolution, organisms exhibit similarities and differences in their basic physiology.	Find the collective research.	Performance mimicry tests.
3.0	**Values**		
3.1	Evaluate Group leadership skill and to evaluate the responsibility.	Teaching colleagues.	Self-report methods.
3.2	Demonstrate the operation and use of computers and means of modern technology.	Default- laboratories Illustrated presentations.	Recording student performance.
…			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around 7th-8thweek	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10%
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15%
6	Final Exam.	Around13thweek	40%
7	Total		100%
8			

***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 :
Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Lambers H, Chapin III FS, Pons TL.(2008). *Plant Physiological Ecology*. Springer-Verlag. ISBN-13: 978-0387783406. Hill, Wyse, and Anderson, (2012). *Animal Physiology*, 3rd edition (Sinauer).
Essential References Materials	William H. Karasov and Carlos Martinez del Rio.(2007)Physiological Ecology: How Animals Process Energy, Nutrients and Toxins.
Electronic Materials	www.dartmouth.edu/~bio31.
Other Learning Materials	CD containing programs special for physiological ecology methods for plants and animals.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms reserved for lectures and prepared the traditional education (face to face) and E-learning (E-learning) that allow interaction between teachers and students, ordinary paper blackboard smart plasma screens ... etc. A (Stage), with an integrated audio system and microphones connected to the Internet and networks 2 Wired and wireless (optical fiber), and air conditioning system and modern suitable lighting. Hall dedicated to educational films with moving chairs and a DVD player, and TV. 60-inch (, conditioning system with a modern and appropriate lighting.). Laboratories equipped with the latest electrical appliances,

Item	Resources
	chemical and all chemicals and tools Safety and means to study the practical courses. Hall dedicated to lectures e-learning.
Technology Resources (AV, data show, Smart Board, software, etc.)	A computer for display and use of data with a slide show presentation. High-device "projectors" Lighting. It is assumed that each student has its own computer**.**
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals, dissection instruments, light microscopes, dissection microscopes, microtome instrument, slide preparations, mixer, fluorescent microscopes, spectrophotometer, instrument of gel electrophoresis, hematocrit centrifuge, centrifuges, incubators, ovens, other glass wares special for physiological ecology.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	Endocrinology
Course Code:	BIO 1461
Program:	Bachelor of Science in Biology.
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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A. Course Identification **3**

6. Mode of Instruction (mark all that apply) 3

B. Course Objectives and Learning Outcomes **3**

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C. Course Content **4**

D. Teaching and Assessment **5**

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods 5

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E. Student Academic Counseling and Support **6**

F. Learning Resources and Facilities **6**

1.Learning Resources 6

2. Facilities Required 6

G. Course Quality Evaluation **7**

H. Specification Approval Data **7**

A. Course Identification

1. Credit hours:	4 (3 Lectures + 2 Lab + 0 Tutorials).
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☐ Elective ☑
3. Level/year at which this course is offered:	Level eight / Third Year
4. Pre-requisites for this course (if any)**:**	Animal Physiology BIO 1314
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	36
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	60

B. Course Objectives and Learning Outcomes

1. Course Description

This course will discuss endocrinology from both an anatomical and physiological view. We will discuss synthesis, distribution and regulation of the entire human endocrine system. In addition, contextual examples of these functions through human endocrine disorders will also be explored. The goal is to provide students with a basic knowledge of the complex endocrine system.

2. Course Main Objective

This course will discuss endocrinology from both an anatomical and physiological view. We will discuss synthesis, distribution and regulation of the entire human endocrine system. In addition, contextual examples of these functions through human endocrine disorders will also be explored. The goal is to provide students with a basic knowledge of the complex endocrine system.

Upon successful completion of this module the student should be able to:

- Acquire basic knowledge of properties and structures of hormones.

- Enable to understand the hormone synthesis.
- Measure hormones.
- Determine hormonal impact and syndromes.
- Understand patterns of gland tissues.

Acquire knowledge regarding receptors analysis.

3. Course Learning Outcomes

	CLOs	Aligned-PLOs
1	**Knowledge and Understanding**	
1.1	Define the scope and function of a endocrinology. Record the	1.1
1.2	acquisition of practical experience in hormonal lab.	1.1-1.2
1.3		
1...		
2	**Skills :**	
2.1	Estimate basics of the correct operation of laboratory equipment and summarize the principles and quality assurance of the equipment**.**	1.2-2.1-3.1
2.2	Explain how to and examine pituitary activity.	2.1
2.3	Compare between hypothyroidism and hyperthyroidism measurements.	2.1
2...		
3	**Values:**	
3.1	Evaluate Group leadership skill and to evaluate the responsibility.	2.2-2.3-3.1
3.2	Demonstrate the operation and use of computers and means of modern technology.	3.3
3.3		
3...		

C. Course Content

No	List of Topics	Contact Hours
1	• General Principles of Endocrinology. • What are hormones, types of release, homeostasis and feedback, causative vs. permissive, organizational vs. activational.	5
2	• Peptide Hormones Steroids, catechol amines and prostaglandins.	5
3	• The Hypothalamic-Pituitary System I: Anatomy, Tropic Hormones. • The Hypothalamic-Pituitary System II: Tropic hormone regulation. • The Hypothalamic-Pituitary System III : Tropic hormone regulation; Vasopressin and Oxytocin.	5
4	• Melatonin and Thyroid Hormones I : Biochemistry and Mechanisms of Action. Thyroid Hormones II: Biological functions.	5
5	• Endocrine disruptors and development. • Reproduction I – Males: Spermatogenesis, Testicular function, Sex Differentiation.	5
6	• Reproduction II – Females: Ovarian cycles, Pregnancy, Lactation.	5

7	• Reproduction III – Comparative Aspects: • Vitellogenesis, Sex determination, Clinical Diseases. Reproduction IV: Seasonal Breeding.	6
8	• Metabolism I – The Endocrine Pancreas: Pancreatic Anatomy, Insulin and Glucagon. • Metabolism II – Pancreatic Functions: Metabolism, Gluconeogenesis, Diabetes, Feeding.	6
9	• Gastrointestinal Hormones: Pepsin, Gastrin, Secretin, and Cholecystokinin.	6
10	• Calcium and Phosphate Homeostasis: Parathyroid hormone, Calcitonin. Adrenal Steroids: Adrenal anatomy, Aldosterone, Adrenal Medulla.	6
11	• Stress I: Glucocorticoids and Catechol amines. Stress II: how excessive eating alters hormone release.	6
Total		60

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 scope and function of an endocrinology.	Panel of discussions and dialogue, including discussion of small groups.	• Written tests. • Oral tests.
1.2	Record the acquisition of practical experience in hormonal lab.	Teaching experts and guest speaker teaching.	Bags achievement portfolio.
…			
2.0	**Skills**		
2.1	Estimate basics of the correct operation of laboratory equipment and summarize the principles and quality assurance of the equipment.	Mental focus.	Performance of written tests.
2.2	Explain how to and examine pituitary activity.	Problem-solving and decision-making.	Identification tests.
2.3	Compare between hypothyroidism and hyperthyroidism measurements.	Find the collective research.	Performance mimicry tests.
3.0	**Values**		
3.1	Evaluate Group leadership skill and to evaluate the responsibility.	Teaching colleagues.	Self-report methods.
3.2	Demonstrate the operation and use of computers and means of modern technology.	Default- laboratories Illustrated presentations.	Recording student performance.
…			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around 7th-8thweek	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10%
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15%
6	Final Exam.	Around 13thweek	40%
7	Total		100%
8			

***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 :
Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• Basic Medical Endocrinology; Fourth Edition, By H. Maurice Goodman, Elsevier/Academic Press © 2009; ISBN: 978-0-12-373975-9. • Endocrine Physiology, by Griffin, Oxford University Press (2004). "Hormones" by A.W. Norman and G. Litwack, Academic Press 2nd Edition
Essential References Materials	• Guyton and Hall. Textbook of Medical Physiology, 12th edition. Elsevier,Inc. ISBN-13: 978-0-7216-0240-0. ISBN-10: 0-7216-0240-1. • Endocrinology (6th edition) by Mac E.Hadley,Prentice-Hall,New Jersey(2007). Comparative Vertebrate Endocrinology,by Bentley,Cambrige Univ.Press.Cambridge,(2000).
Electronic Materials	www.directscience.com
Other Learning Materials	CD containing programs special for endocrinology methods and functions.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students. And the laboratory room is equipped with many laboratory instruments with a maximum of 20 students.

Item	Resources
Technology Resources (AV, data show, Smart Board, software, etc.)	• A computer for display and use of data with a slide show presentation. • High-device "projectors" Lighting. It is assumed that each student has its own computer**.**
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals, dissection instruments, light microscopes, dissection microscopes, microtome instrument, slide preparations, mixer, fluorescent microscopes, spectrophotometer ELISA unit for detecting Ag-Ab reactions, instrument of gel electrophoresis, centrifuges, incubators, ovens, other glass wares special and automated micropipettes.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	Experimental Embryology
Course Code:	BIO 1419
Program:	Bachelor of Science in Biology
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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C. Course Content **4**

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1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods 5

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E. Student Academic Counseling and Support **6**

F. Learning Resources and Facilities **6**

1.Learning Resources 6

2. Facilities Required 6

G. Course Quality Evaluation **7**

H. Specification Approval Data **7**

A. Course Identification

1. Credit hours:	4 (3 Lectures + 2 Lab + 0 Tutorials).
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☐ Elective ☑
3. Level/year at which this course is offered:	Level 11 / fourth Year
4. Pre-requisites for this course (if any)**:**	Embryology – BIO 1415
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	36
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	60

B. Course Objectives and Learning Outcomes

1. Course Description

Experimental Embryology is Comparative study in reproduction, gametogenesis, fertilization, cleavage and morphogenesis; development of organ systems in animals; practical exercises included.

2. Course Main Objective

After students have completed this course, they should be able to:

- Explain basic stages of animal development.
- Explain how to obtain primordial germ cells for experimentation.
- Describe the developmental anatomy of selected invertebrate and vertebrate embryos.
- Comprehend the basic molecular and cellular mechanisms of fertilization and embryo development.
- Explain the processes of fertilization both in lectures and laboratory.
- Develop and test a hypothesis using experimental embryology techniques learned in the laboratory.

- Understand and know how to do embryonic explanation.
- Know the ways and laboratory work for studying the effects of teratogens on embryonic development of animals.
- Explain the processes of regeneration and teratogenesis.
- Analyse and interpret experimental data in developmental biology.
- Communicate scientific results and evaluate their significance in the context of current knowledge in experimental biology.
- Discuss ethical implications and societal impacts of advances in experimental biology research.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Define the scope and function of an experimental embryology.	1.1
1.2	Recognize cell lineage descriptive embryology to experimental embryology.	1.2
1.3		
1...		
2	**Skills :**	
2.1	Analyze and interpret experimental data in developmental biology. To	2.1
2.2	Develop practice creative thinking skills in protocols including specimen requirements, reagents, methods and quality control.	1.2-2.1
2.3		
2...		
3	**Values:**	
3.1	Appraise working within the group to reach the desired result.	2.2-3.1
3.2	Write reports and preparation of presentations and the preparation of graphics and models by using technology.	3.2
3.3	Demonstrate the operation and use of computers and means of modern technology.	3.3
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Introduction: review basic stages of development.	6
2	Polarity and basic body plan.	6
3	Pattern formation, determination & differentiation.	6
4	Morphogenesis and regeneration.	6
5	Abnormal development and teratogenesis.	6
6	Apoptosis & aging.	6
7	Fertilization AI and IVF	6
8	Twining	6
9	Cryopreservation of Embryo	8
10	General revision.	4
Total		60

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 scope and function of an experimental embryology.	Panel of discussions and dialogue, including discussion.	Written tests. Oral tests.
1.2	Recognize cell lineage descriptive embryology to experimental embryology.	Interactive lectures.	Classroom assignments.
…			
2.0	**Skills**		
2.1	Analyze and interpret experimental data in developmental biology.	Survey/discovery.	Students' projects.
2.2	Develop practice creative thinking skills in protocols including specimen requirements, reagents, methods and quality control.	Problem-solving and decision-making.	Students' projects.
…			
3.0	**Values**		
3.1	Demonstrate the ability to work within the group to reach the desired result.	Collaborative learning.	Self-report methods.
3.2	Write reports and preparation of presentations and the preparation of graphics and models by using technology.	Attend seminars.	Class participation.
…	Demonstrate the operation and use of computers and means of modern technology.	Default- laboratories Oral presentations.	Recording student performance.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5h week	15%
2	Midterm 2	Around 7th-8thweek	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10%
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15%
6	Final Exam.	Around 13thweek	40%
7	Total		100%
8			

***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 : Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• Scott .f .Gilbert Developmental Biology, 10th eds. (2013). ISBN-13: 978-0878939787. • Bruce M. Carlson MD PhD .Human Embryology and Developmental Biology: With Student Consult Online Access, 5e 5th Edition,(2013). ISBN-13: 978-1455727940 • Pankaj Talwar Manual of Assisted Reproductive Technologies and Clinical Embryology (2012). ISBN-13: 978-9350255063. Laboratory Manual: Schoenwolf, G. C. 1995. Laboratory Studies of Vertebrate and Invertebrate Embryos. 7th ed. Prentice Hall. ISBN 0-02-407602-3.
Essential References Materials	• Essentials of Domestic Animal Embryology by Poul Hyttel et al. (Dec 6, 2009) Published: SEP-2009 ISBN 10: 0-7020-2899-1, ISBN 13: 978-0-7020-2899-1. • Atlas of Descriptive Embryology (Book Review), a Descriptive Embryology Atlas by Gary Schoenwolf and Willis Mathews.2008.
Electronic Materials	Publications and magazine of biological and life sciences.
Other Learning Materials	CD containing programs special for experimental and developmental biology methods.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students. The laboratory room is equipped with many laboratory instruments with a maximum of 20 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	The computers are equipped with different software's and connected to data show and to smart board.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals, dissection instruments, light microscopes, dissection microscopes, microtome instrument, slide preparations, mixer, fluorescent microscopes, specific instruments for embryological parameters, centrifuges, incubators, ovens and other glass wares.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	Plant Pathology
Course Code:	BIO 1424
Program:	Bachelor of Science in Biology
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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A. Course Identification

1. Credit hours: 4 (3 Lectures + 2 Lab + 0 Tutorials).
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☐ Elective ☑
3. Level/year at which this course is offered: Level 11 / Fourth Year
4. Pre-requisites for this course (if any)**:** Plant Physiology – BIO 1322
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	36
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	60

B. Course Objectives and Learning Outcomes

1. Course Description

Plant pathology focuses on the nature and causes of diseases in plants; the relationship between the environment and host-parasite interactions to the development of disease symptoms caused by plant pathogens, bacteria, viruses, mycoplasma and nematodes; abiotic causes of the disease; disease control methods; diseases affecting ornamental crops and plants.

2. Course Main Objective

Upon successful completion of this module the student should be able to:

- Understand of principles and concepts of plant pathology.
- Become familiar with what organisms cause disease in plants.
- Know how they cause diseases.
- Describe how disease cycles are used to understand the relationships between pathogens and plants.
- Explain how to guide management of diseases.
- Observe a broad range of plant diseases and will have hands-on experience in working with diseases and pathogens.

• Introduce to different sub disciplines in plant pathology such as epidemiology and genetics and physiology of plant-pathogen interactions.
• Demonstrate knowledge of the development and diagnosis of various diseases studied in this module.
• The principles of Quality Assurance and good laboratory practice.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Define Mechanisms of pathogenicity.	1.1
1.2	Recognize some plant diseases caused by infection with bacterial organisms.	1.2
1.3		
1...		
2	**Skills :**	
2.1	Differentiate between the fungal, viral and bacterial diseases which relevant to plant pathogenicity	2.1-2.3
2.2	Create the management of control of these diseases.	2.1
2.3	Justify the procedures for discovering diseases caused by nematodes and protozoa.	2.1-2.3
2...		
3	**Values:**	
3.1	Appraise working within the group to reach the desired result.	2.2-3.1
3.2	Write reports and preparation of presentations and the preparation of graphics and models by using technology.	3.2
3.3	Demonstrate the operation and use of computers and means of modern technology.	3.3
3...		

C. Course Content

No	List of Topics	Contact Hours
1	What is plant pathology, disease, symptoms? Diseases in history. The disease triangle and disease cycles. How do diseases affect plants?	5
2	Diseases caused by fungi &fungal- like organisms. Diseases caused by Myxomcetes. Diseases caused by Plasmodiphoromycetes, Oomycetes, Zygomycetes.	5
3	Diseases caused by fungi. Diseases caused by Ascomycetes. Diseases caused by Deuteromycetes	5
4	Diseases caused by Basidiomycetes: Rusts Diseases caused by Basidiomycetes: Smuts	5
5	Diseases caused by fungi. Diseases caused by Basidiomycetes: Rhizoctonia, Sclerotium.	5
6	A study of some plant diseases caused by infection with bacterial organisms.	5
7	A study of some plant diseases resulting from infection with viral objects.	5
8	A study of some plant diseases resulting from infection with worms and	5

	protozoa.	
9	Mechanisms of pathogenicity. Defense mechanisms of plants.	6
10	Genetics of pathogen-plant interactions. Epidemiology.	6
11	Physiological diseases and their causes.	6
12	General revision.	2
Total		60

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 Mechanisms of pathogenicity.	Interactive lectures.	Research papers.
1.2	Recognize some plant diseases caused by infection with bacterial organisms.	Interactive lectures.	Classroom assignments
…			
2.0	**Skills**		
2.1	Differentiate between the fungal, viral and bacterial diseases which relevant to plant pathogenicity	Mental focus	Work sample tests
2.2	Create the management of control of these diseases.	Teaching with analogies.	Research papers.
2.3	Justify the procedures for discovering diseases caused by nematodes and protozoa.	Style – wiki.	Bags achievement portfolio.
3.0	**Values**		
3.1	Demonstrate the ability to work within the group to reach the desired result.	Collaborative learning.	Self-report methods.
3.2	Write reports and preparation of presentations and the preparation of graphics and models by using technology.	Attend seminars.	Class participation.
3.3	Demonstrate the operation and use of computers and means of modern technology.	Default- laboratories Oral presentations.	Recording student performance.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around 7th- 8th week	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10%

#	Assessment task*	Week Due	Percentage of Total Assessment Score
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15%
6	Final Exam.	Around 13thweek	40%
7	Total		100%
8			

***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 :
Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• Agrios G.N. (2005). Plant Pathology (5th ed.). Elsevier Academic Press. ISBN: 0-12-044565- 4. • Alexopoulos C.J., Mims C.W., Blackwell M. (1996). Introductory Mycology (4th ed.). John Wiley & Sons, Inc. ISBN0-471-52229-5. Schumann G.L., D'Arcy C.J. (2006). Essential Plant Pathology. APS Press. ISBN: 0-89054- 342-9.
Essential References Materials	• Trigiano R.N., Windham M.T., Windham A.S. (2004). Plant Pathology, Concepts and Laboratory Exercises. CRC Press. ISBN: 0-8493-1037-7. • Webster J., Weber R.W.S. (2007). Introduction to Fungi (3rd ed.). Cambridge University Press. ISBN: 0-521-01483-2.
Electronic Materials	• www.ucmpberkeley.edu/fungi. • www.ictv.org. • www.bibo.libraray.cornell.edu. • www.plantdisease.com.
Other Learning Materials	CD containing special programs for plant pathology methods.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students. And the laboratory room is equipped with many laboratory instruments with a maximum of 20 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	The computers are equipped with different software's and connected to data show and to smart board.

Item	Resources
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental plants, dissection instruments, light microscopes, dissection microscopes, microtome instrument, slide preparations, mixer, fluorescent microscopes, spectrophotometer, instrument of gel electrophoresis, analyzer, centrifuges, incubators, ovens, other glass wares special for plant pathology and automated micropipettes.

G. Course Quality Evaluation

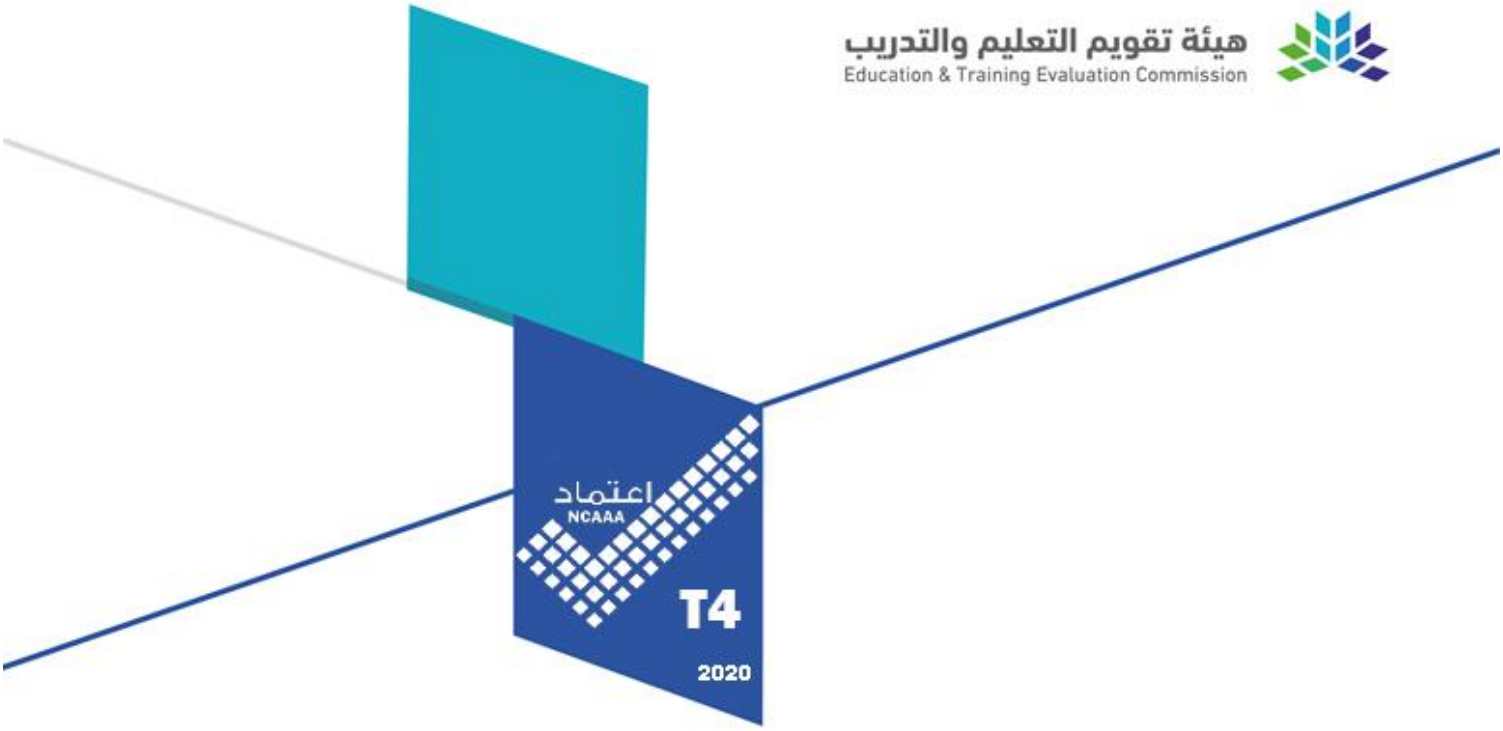
Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	Biological control
Course Code:	BIO 1457
Program:	Bachelor of Science in Biology
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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G. Course Quality Evaluation **8**

H. Specification Approval Data **9**

A. Course Identification

1. Credit hours:	4 (3 Lectures + 2 Lab + 0 Tutorials).
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☐ Elective ☑
3. Level/year at which this course is offered:	Level 11 / Fourth Year
4. Pre-requisites for this course (if any)**:**	Entomology – BIO 1353
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	36
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	60

B. Course Objectives and Learning Outcomes

1. Course Description

The ecological principles and applied practices of modern biological control of insects, weeds and plant pathogens; including the history, scope, strengths and weaknesses, scientific basis of biological control, the biology of entomophagous insects, insect pathogens, microbial control, biological control methods, population ecology as it relates to biological control, biological control in integrated pest management, techniques and protocols in implementation of control programs and related topics.

2. Course Main Objective

Upon successful completion of this module the student should be able to:

- Have a broad knowledge about the importance and definition of pests.
- Have abroad knowledge about the identification and classification of the most important medically and economically insect's pest in KSA and worldwide.
- Appreciate the basis and implications of the theory of natural enemies.
- Appreciate and describe the techniques implemented in biological control.

- Understand the different types of biological control.
- Appreciate the use of the different biocontrol agents (including parasites, parasiticides, and microorganisms) in controlling pests.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Outline procedures for biological control of fungal and bacterial pathogens on aerial surfaces.	1.1-1.2
1.2	Tell biological control of soil - borne pathogens and concepts of biotechnology.	1.1-1.2
1.3		
1...		
2	**Skills :**	
2.1	Compare between biological control by microorganisms and by insects.	2.1-2.3
2.2	Analyze how tests with organic extracts are used in practical biological control.	2.1-2.3
2.3	Differentiate parasites, parasitoids, and predators of insects relevant to biological control.	2.1-2.3
2...		
3	**Values:**	
3.1	Appraise working within the group to reach the desired result.	2.2-3.1
3.2	Write reports and preparation of presentations and the preparation of graphics and models by using technology.	3.2
3.3	Demonstrate the operation and use of computers and means of modern technology.	3.3
3...		

C. Course Content

No	List of Topics	Contact Hours
1	• Biological control of plant pathogens: • Definitions, history, and importance of biological control. • Biological control of bacterial pathogens on aerial surfaces: • Bacterial pathogens of blossoms. eg. *Erwinia amylovora;* russet-inducing bacteria. • Bacterial pathogens of leaves. eg. *Pseudomonas syringae* and the INA concept; *Xanthomonas campestris*.	6
2	• Biological control of fungal pathogens on aerial surfaces: • Ecology in the leave surface Necrotrophic fungal pathogens. eg. *Botrytis cinerea* - bacterial biocontrol agents and *Trichoderma Sclerotinia sclerotiorum.* • Biotrophic fungal pathogens. eg. Rusts - bacterial biocontrol agents. • Powdery mildews - bacterial biocontrol agents and *Ampelomyces* Virus and induced systemic resistance.	6

3	• Biological control of soil - borne pathogens and concepts of biotechnology: • Bacterial pathogens. eg. *Agrobacterium tumefaciens* - *A. radiobacter* K84 and K1026 and *Ralstonia* (=*Pseudomonas*) *solanacearum* - an example of plectropism and the transference of resistant gene. • Fungal pathogens. eg. *Fusarium* spp. - bacterial biocontrol agents and nonpathogenic fusaria. *Rhizoctonia solani* - bacterial agents and nonpathogenic *Rhizoctonia* *Pythium* spp. - bacterial biocontrol agents and hyperparasitic *Pythium* spp.	6
4	• Biological control of post-harvest pathogens: • Bacterial pathogens eg. *Erwinia carotovora* soft-rots. • Fungal pathogens Monilinia on peaches, *Mucor* and *Rhizopus* on apple and pear. • Mechanisms of biological control of plant pathogens: • Competition for nutrients. E.g. competition between pathogenic and nonpathogenic fungi. • Competition for iron and the role of siderophores. • Competition for fungal germination stimulants. • Antibiosis. - Lytic enzymes. - Induced systemic resistance. Cross protection. - Hyperparasitism. - Hypovirulence.	6
5	• Biological control of nematodes using microorganisms: • Bacterial parasites and Rhizobacteria (PGPR or YIB). E.g. *Pasteuria penetrans, Ralstonia (=Burkholderia) cepacia.* • Fungal parasites *eg. Paecilomyces lilacinus.* and *Verticillium clamydosporum*, etc. • Nematode trapping fungi. E.g., *Arthrobotrys oligospora.* • Mycorrhiza and endophytic bacteria. Trap and antagonistic crops, organic amendments and rotations.	6
6	• Biological control of insects: • Definitions and importance. • Parasitoids definitions and examples: eg. *Trichogramma; Apanteles*. • Predators: eg. *Chrysopa, Hippodamia*, etc. • Biology, ecology, and population dynamics. • Microbial Control. • Bacteria: eg. *Bacillus thuringiensis; B. popilliae.* • Viruses: eg. Nucleopolyhedrosis and granulosis viruses. Fungi: eg. *Entomophthora, Beauveria*.	6
7	• Biological control using entomopathogenic nematodes 1Introduction: *Steinenema, Heterorhabditis.* • Mode of action. • Production and formulation. Application and commercialization.	6
8	• Biological control of weed using insects:	8

	• Use of insects to control weeds in agronomic lands. eg. *Cactoblastis cactorum* on prickly pear cactus. • *Chrysolina quadrigemina* on Klamath weed. • Use of insects/fish to control aquatic weeds. eg. *Agasicles hygrophila* on alligatorweed. *Ctenopharyngodon idella* on many aquatics weed species.	
9	• Industry and commercialization: • Technology transfer. • Market size and marketability. • Timely availability and shelf-life. Consumer acceptance of produce protected by non-engineered and engineered biocontrol agents: Cost/benefit ratio.	10
Total		60

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	Outline procedures for biological control of fungal and bacterial pathogens on aerial surfaces.	Mental focus and problem solving strategies.	Classroom discussions and contributions.
1.2	Tell biological control of soil - borne pathogens and concepts of biotechnology.	Collaborative learning.	Home assignments
…			
2.0	**Skills**		
2.1	Compare between biological control by microorganisms and by insects.	Find the collective research.	Performance mimicry tests.
2.2	Analyze how tests with organic extracts are used in practical biological control.	Survey / discovery.	Students' projects.
2.3	Differentiate parasites, parasitoids, and predators of insects relevant to biological control.	Mental focus.	Work sample tests.
3.0	**Values**		
3.1	Demonstrate the ability to work within the group to reach the desired result.	Collaborative learning	Self-report methods.
3.2	Write reports and preparation of presentations and the preparation of graphics and models by using technology.	Attend seminars.	Class participation.
3.3	Demonstrate the operation and use of computers and means of modern technology.	Default- laboratories Oral presentations.	Recording student performance.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th -5th week	15%
2	Midterm 2	Around7th-8thweek	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10%
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around week 9th	15%
6	Final Exam.	Around 13th week	40%
7	Total		100%
8			

***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 :
Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• Hajek A.E. (2004). Natural Enemies. Cambridge University Press. • Flint M.L. and Driestadt S.H. (1998). Natural Enemies Handbook: The illustrated guide to biological pest control. University of California Division of Agriculture and Natural Resources. • Van Driesche R.G. and Bellows T.S Jr. (1996). Biological Control. Chapman and Hall, New York, New York. • Van den Bosch R., Messenger P. S. and Gutierrez A. P. (1982). An Introduction to Biological Control. Plenum, N.Y. • Bellows T.S. and T.W. Fisher. (1999). Handbook of Biological Control. Academic Press. San Diego. • Debach P. and Rosen Y.D. (1991). Biological control by natural enemies. 2nd. Ed. Cambridge. Univ. Press, Cambridge, N.Y.
Essential References Materials	• Roy Van Driescheand Thomas S. Bellows Jr.1996.Biological control. • Vincent et al. (2007). Biological Control: A Global Perspective.CAB International. • G. Gurr, S.S..Wratten (eds.) (2000). Biological Control:

	Measures of Success. Kluwer Academic Publishers.
Electronic Materials	• www.biocontrol.entmology.cornell. • http//:edis.ifas.ufl.edu. • http//:nematode.unl.edu./wormeps.htm.
Other Learning Materials	CD containing programs special for biological control methods, distribution and its importance.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students. The laboratory room is equipped with many laboratory instruments with a maximum of 20 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	The computers are equipped with different software's and connected to data show and to smart board.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different organelles, light microscopes, centrifuges, incubators, ovens and other glass wares.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد NCAAA T4 2020

Course Specifications

Course Title:	Flora & Fauna of Saudi Arabia
Course Code:	BIO 1459
Program:	Bachelor of Science in Biology
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University

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E. Student Academic Counseling and Support **6**

F. Learning Resources and Facilities **6**

1.Learning Resources 6

2. Facilities Required 6

G. Course Quality Evaluation **6**

H. Specification Approval Data **7**

A. Course Identification

1. Credit hours: 4 (3 Lectures + 2 Lab + 0 Tutorials).
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☐ Elective ☑
3. Level/year at which this course is offered: Level 11 / fourth Year
4. Pre-requisites for this course (if any)**:** Entomology – BIO 1353
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**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	36
2	**Laboratory/Studio**	24
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	60

B. Course Objectives and Learning Outcomes

1. Course Description

Introductory to general kinds of animals' species (marine and terrestrial), their distribution within the Saudi Kingdom. The course will address the climate, geomorphology and their effect on animal life. It will expose students to the multi-disciplinary nature of wild animals, endemic and endangered species. Consideration of biological taxonomic systems and consideration of both vegetative features and reproductive features associated with local flora and fauna.

2. Course Main Objective

Upon successful completion of this module the student should be able to:

- Define the concept of biodiversity.
- Remember the topography and the climate of the Kingdom of properties.
- Comparing the animal and plant species in the Kingdom in terms of characteristics and their geographical distribution.
- Describe the evolution of the study of wildlife in the Kingdom.
- Remember the rare species of plants and animals.

- Describes flora and fauna structures and their different systems.
- The multiplicity of threats to flora and fauna Kingdom and how to maintain them.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Tell the rare species of plants and animals	1.1
1.2	Recognize the importance the types of rare plants and animals that resident, migratory, exotic and endangered extinction.	1.2
1.3		
1...		
2	**Skills :**	
2.1	Explain how to bring marine fauna, collection of selected species, invertebrate of Saudi Arabia.	2.1
2.2	Create the application of conservation of all types of flora and fauna.	2.1-2.3
2.3	Differentiate between resident and immigrant birds.	2.1
2...		
3	**Values:**	
3.1	Appraise team work and participation in scientific skill groups.	2.1-2.2-3.1
3.2	Write reports and preparation of presentations and the preparation of graphics and models by using technology.	3.2
3.3	Demonstrate the operation and use of computers and means of modern technology.	3.3
3...		

C. Course Content

No	List of Topics	Contact Hours
1	The concept of biodiversity.	9
2	The study of the topography, the climate and site of geographical. Kingdom.	9
3	Plant and animal species in the Kingdom in terms of their characteristics, geographic distribution and density.	9
4	A brief history of the evolution of life studies (Wildlife) in the plant and animal of the kingdom.	9
5	Illustrate the types of rare plants and animals that resident and migratory, exotic and endangered Extinction.	8
6	Flora and fauna structures and their various systems. The environmental protectorates.	8
7	Threats facing the flora and fauna Kingdom and maintaining flora and fauna Kingdom.	8
Total		60

D. Teaching and Assessment

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

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	Tell the rare species of plants and animals	Collaborative learning.	Home assignments.
1.2	Recognize the importance the types of rare plants and animals that resident, migratory, exotic and endangered extinction.	Interactive lectures.	Classroom assignments.
…			
2.0	**Skills**		
2.1	Explain how to bring marine fauna, collection of selected species, invertebrate of Saudi Arabia.	Problem-solving and decision-making.	Identification tests.
2.2	Create the application of conservation of all types of flora and fauna.	Teaching with analogies.	Research papers.
2.3	Differentiate between resident and immigrant birds.	Mental focus.	Work sample tests.
3.0	**Values**		
3.1	Appraise team work and participation in scientific skill groups.	Seminars and collaborative learning	Organized observation.
3.2	Write reports and preparation of presentations and the preparation of graphics and models by using technology.	Attend seminars.	Class participation.
3.3	Demonstrate the operation and use of computers and means of modern technology.	Default- laboratories Oral presentations.	Recording student performance.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 4th - 5th week	15%
2	Midterm 2	Around 7th - 8th week	15%
3	Quizzes, Attendance, Participation, Home works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 9th week	15 %
6	Final Exam.	Around 13th week	40 %
7	Total		100%
8			

***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 : Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	A.M. Megahid, (1989). Flora of Saudi Arabia, King Saud University, Riyadh. J.P. Mandaville, (1990). Flora of Eastern of S.A., John Wiley & Sons Ltd. England.
Essential References Materials	Krupp, F. and Mahnert, V. (eds.) 1987-2004, Fauna of Saudi Arabia, Vols. (9-22), NCWCD, Riyadh, Saudi Arabia. Buttiker, W. and Krupp, F. (eds.) 1979-1987, Fauna of Saudi Arabia, Vols. (1-8), NCWCD, Jeddah, Saudi Arabia.
Electronic Materials	http://www.splendidarabia.com/kingdom/flowers-of-saudi-arabia/ http://www.saudinf.com/main/a6.htm.
Other Learning Materials	CD containing programs special for flora& fauna morphologies, distributions.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students. The laboratory room is equipped with many laboratory instruments with a maximum of 20 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	The computers are equipped with different software's and connected to data show and to smart board.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals, dissection instruments, light microscopes, dissection microscopes, microtome instrument, slide preparations, mixer, fluorescent microscopes, centrifuges, incubators, ovens, other glass wares and tools, instruments required for collecting specimens of flora and fauna.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to	Students	Direct

Evaluation Areas/Issues	Evaluators	Evaluation Methods
evaluate the course feedback and the instructor.		
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

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	Head of biology department
Reference No.	10
Date	November 16, 2022