هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission
اعتماد
NCAAA
2024
TP-153

Course Specification
(Bachelor)

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
Version:	1
Last Revision Date:	29 September 2024

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A. General information about the course:

1. Course Identification

1. Credit hours: 4 (3 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☒ College	☐ Program	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Level 1 / Year 1)					
4. Course General Description:					
The course will cover the principles of eukaryotic/prokaryotic cell structure and function. This course will provide a conceptual and experimental background in biology sufficient to enable students to take courses that are more advanced in related fields.					
5. Pre-requirements for this course (if any)**:**					
None					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
This course aims to prepares the student for understanding the principles and concepts of the living cells, differentiate between animal and plant cells, cell contents and its structure and function, the different types of animal and plants tissues (structure and function), the biological activities of living cells.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	75	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom	-	-

No	Mode of Instruction	Contact Hours	Percentage
	• E-learning		
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

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

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	List basic concepts and principles of general biology	1.1	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Tell an understanding and appreciation of the vast diversity of living things, their special adaptations to their environment, and	1.1-1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning	Written tests Class discussion questions Class assignments Homework Short

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	their evolutionary and ecological relationships		Cooperative Learning Field Visits	research/reports Summaries Presentations
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	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
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	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Analyze the results obtained from examination and investigations	2.1-2.2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Show ability to communicate effectively with class mates and teaching staff	3.1-3.2	Modeling Dialogue and discussion Self-learning Collaborative	Observation Self-assessment Peer assessment Achievement

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			learning	file
3.2	Use laboratory instruments and computers	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Analyze biological experiments and use various slides during laboratory classes	3.2-3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No	List of Topics	Contact Hours
1.	Themes of Biology	5
2.	Atoms	5
3.	Molecules	5
4.	Macromolecules	5
5.	Lipids	5
6.	Cell Structure	5
7.	Cell Function	5
8.	Mitosis	5
9.	Meiosis	5
10.	Mendelian Genetics	5
11.	Mendelian Genetics	5
12.	Gene Expression, Transcription	5
13.	Gene Expression, Translation	5
14.	Plant Growth	5
15.	Introduction to Animal Body	5
Total		**75**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Campbell Biology (Campbell Biology Series) 11th Edition
Supportive References	None
Electronic Materials	None
Other Learning Materials	None

2. Required Facilities and equipment

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

F. Assessment of Course Quality

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

Assessment Areas/Issues	Assessor	Assessment Methods
been achieved		
Other	-	-

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

2024

TP-153

Course Specification

(Bachelor)

Course Title: **General Chemistry (1)**	
Course Code: **CHM 1101**	
Program: **Bachelor of Science in Biology**	
Department: **Chemistry**	
College: **Science**	
Institution: **Imam Mohammad Ibn Saud Islamic University**	
Version: **1**	
Last Revision Date: **2 October 2024**	

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A. General information about the course:

1. Course Identification

1. Credit hours:					
4 (2 Lectures, 2 Lab, 2 Tutorial)					
2. Course type					
A.	☐University	☒ College	☐ Department	☐Track	☐Others
B.	☒ Required			☐Elective	
3. Level/year at which this course is offered: (Level 1/ Year 1)					
4. Course General 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.					
5. Pre-requirements for this course (if any)**:**					
None					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
By the end of this course the student able to: • 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.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	90	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	0
4.	**Tutorial**	30
5.	**Others (specify)**	0
Total		90

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	To recognize the atomic theory and structure of the atom.	K1, K2	Lecturing	Short quizzes
1.2	To describe different phenomena related to chemical reactions and its stoichiometry.	K1	Solving problems, Homework and assignment	Homework and assignment marks and written exams
1.3	To list gases laws and their physical properties.	K1, K2	Discussions, Laboratory classes	Quizzes and MCQs, laboratory report
1.4	To define the principles of safety, list of emergency responses and outline the routes of exposures to hazards, the minimization, and	K2	Discussions, Laboratory classes	Quizzes and MCQs, laboratory report

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	controlling and laboratory management.			
2.0	**Skills**			
2.1	To differentiate between protons, neutrons and electrons.	S1	Lecturing and oral discussion	Short quizzes and Multiples Choice Questions
2.2	To calculate and balance chemical equations.	S1	Lectures supported by laboratory experiments	Homework assignment, Examination and laboratory sheet
2.3	To interpret the ideal gas laws and illustrate chemical calculations.	S1,S3	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.	S1, S2, S3	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, autonomy, and responsibility**			
3.1	To illustrate contribution in teamwork and raise Knowledge during various evaluations, initiatives, and Lab-reports to uphold scientific integrity.	V1, V2	Group discussion, assignments and homework Lab-reports Virtual labs and demonstrations	Oral tests, lab performance, Lab-reports and sheets Marks Assignments and homework marks
3.2	To appraise teamwork, and adapt to the work environment culture as well as link theoretical study with practical reality.	V2	Group discussion, assignments and homework Lab-reports Virtual labs and demonstrations	Oral tests, lab performance, Lab-reports and sheets Marks Assignments and homework marks

C. Course Content

No	List of Topics	Contact Hours
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	8
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.	10
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-reduction reactions, Oxidation number, Types of oxidation-reduction reactions, Solution Stoichiometry, Concentration, dilution, indicators, Equivalence point, Gravimetric analysis, Acid base titrations, Redox titrations.	8
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.	8
7.	The Periodic Table: Development of the periodic table, ground state electron configurations of the elements, classification of the	8

	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.	
	List of Topics (Laboratory)	
1.	Safety and precautioins in the chemistry laboratory.	2
2.	Density of liquids ,water , alcohol, oil	2
3.	Density of regular and irregular solids	2
4.	Preparation of primary standard solutions.	2
5.	Standardization of a secondary standard solution.	2
6.	The chemical composition by mass percentage	2
7.	Stoichiometry: Mass-mass relationship	2
8.	Determination of the empirical formula	2
9.	Strong acid-strong base titration	2
10.	Vinegar Analysis, Mass %	2
11.	Reactions in Aqueous Solutions & Precipitation reaction & Limiting reactant	2
12.	Redox titration of Fe2+	2
13.	Determination of the specific heat of metal	2
14.	Revision	4
Total		**90**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	**Quizzes, Attendance, Participation, Homework**	**During the semester**	**10 %**
2.	**Laboratory**	**During the semester**	**30 %**
3.	**Midterm Exam 1**	**5th week**	**10 %**
4.	**Midterm Exam 2**	**10th week**	**10 %**
5.	**Final Exam**	**16th week**	**40 %**

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	**Chemistry, Raymond CHANG, Mc Graw Hill, 10thEducation, 2010, ISBN 9780073511092.**
Supportive References	**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. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	· Each classroom is equipped with PC and retro projector with a maximum of 25 students. · Each Laboratory should be equipped with maximum 25 seats · In each laboratory, a list of safety and precautions are provided. · In each lab has proper ventilation, and well equipped with instruments. · In each lab, containers for solid waste, liquid waste, and crushed glasses. · Each lab has a small pharmacy for first aid in case of an accident · In each lab, the rules, conditions, and safety mechanism as well list of Risk, Safety precautions according to Merck Catalogue are hanging in the labs.
Technology equipment (projector, smart board, software)	The rooms are equipped with data show, Smart Board, WI-FI access.
Other equipment (depending on the nature of the specialty)	• Appropriate Glasswares for carrying the requested experiments (burrete, pipets, conical flasks, beakers, measuring cyliders, curecibles, dishes, funnels, buchner, buchner flasks) • Appropriate chemicals and solvents (Sodium hydroxide, Barium Chloride, Hydrochloric acid, Sulphuric acid, phenolphthalein, methyl orange, ferric sulphate, ferrous sulphate, potassium permanganate, lead acetate) • Furnace Oven, Analytical balance (3

Items	Resources
	digits), Drying oven • Filter papers , clamps, stands

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment 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 Students assessment	Program Leaders	Direct: Course e-Portfolio. Indirect: Course report.
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.
The extent to which CLOs have been achieved	Course Responsible	Direct: Exams - Course e-Portfolio. Indirect: Second examiner checklist-Course report.
	Program Leaders	Indirect: Exams.
Other	Students Course Responsible	Direct: Lab reports, Final Lab exam, Course e-Portfolio.

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)
Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Department of Chemistry Council
REFERENCE NO.	7 (NO. 2/3)
DATE	29/3/1446 - 2/10/2024

Course Specification
(Bachelor)

Course Title: **Calculus (1)**	
Course Code: **MAT 1101**	
Program: **Bachelor of Science in Biology**	
Department: **Mathematics and Statistics**	
College: **Science**	
Institution: **Imam Mohammad Ibn Saud Islamic University**	
Version: **1**	
Last Revision Date: 8 October 2024	

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A. General information about the course:

1. Course Identification

1. Credit hours:					
4 (3 Lectures, 0 Lab, 2 Tutorial)					
2. Course type					
A.	☐University	☒ College	☐ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: Level 1 / Year 1					
4. Course general Description:					
This course provides a solid foundation for advanced studies and practical applications in mathematics. Indeed, it introduces essential mathematical concepts, starting with solving linear and quadratic equations, polynomials, and inequalities, along with functions and their domains, ranges, and operations. It covers trigonometric functions and sequences, followed by an exploration of limits and continuity, including limit theorems and asymptotes. The course focuses on differentiation, teaching how to compute derivatives and apply them to concepts like tangent lines and velocity. Finally, students learn to optimize functions, analyze monotonicity, and determine concavity.					
5. Pre-requirements for this course (if any)**:**					
None.					
6. Co-requisites for this course (if any)**:**					
None.					
7. Course Main Objective(s):					
The course aims to establish a solid foundation in algebra and functions, covering topics such as solving equations and inequalities, analyzing polynomials, and understanding trigonometric concepts. It also focuses on limits and continuity, differentiation techniques, and their applications, including optimization and graph analysis.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	75	100%
2	E-learning	0	0%
3	Hybrid • Traditional classroom • E-learning	0	0%
4	Distance learning	0	0%

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	0
3.	Field	0
4.	Tutorial	30
5.	Others (specify)	0
Total		75

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

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Define key concepts related to linear equations, absolute value inequalities, and polynomial factoring.	K1	Lectures and tutorials	Quizzes and written definitions
1.2	Describe the fundamental characteristics of functions, including domain, range, and composition.	K1, K2	Interactive discussions and group work	Concept maps and homework assignments
1.3	Recall the definitions of limits and continuity, and the processes for computing derivatives.	K1	Tutorials and guided problem-solving sessions	Multiple-choice exams and problem sets
2.0	Skills			
2.1	Utilize appropriate integration techniques, including substitution and integration by	S1	Problem-based learning, workshops, tutorials, and hands-on practice.	Problem sets in assignments

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	parts, to effectively solve complex problems involving definite and improper integrals.			
2.2	Construct graphical representations of functions and curves described by parametric equations, accurately determining arc lengths and surface areas using calculus methods.	S2	Hands-on workshops with graphing software, tutorials, and guided practice.	Assignments; and Class participation and feedback.
2.3	Evaluate the convergence of infinite series by applying various convergence tests and effectively communicate the results through written explanations and presentations.	S3	Lectures on convergence tests, group discussions, tutorials, and presentations.	Exams and class participation
3.0	**Values, autonomy, and responsibility**			
3.1	Demonstrate ethical responsibility by collaborating effectively with peers, fostering a respectful and inclusive learning environment during group activities and projects.	V1	Group activities, peer review sessions, tutorials, and collaborative projects.	Direct: Group evaluations; Indirect: Reflection on group dynamics and peer feedback.
3.2	Cultivate self-	V2	Independent	Direct:

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	directed learning by engaging in independent study and reflection, recognizing the importance of personal responsibility in mastering calculus concepts.		**study assignments, self-directed projects, tutorials, and reflective journaling.**	**Individual assignments; Indirect: Reflective journals and self-assessment.**

C. Course Content

No	List of Topics	Contact Hours
1.	**Equations and Inequalities:** Solving Linear Equations and Inequalities, Absolute value, Solving Inequalities Containing an Absolute Value, Equations of lines, Quadratic Equations and Inequalities, Special Product Formulas.	10
2.	**Functions:** Domain, Range, and graphs of functions, Common Functions, Composition of functions, Inverse function; Exponential and Logarithmic Functions, Laws of Exponents and Logarithms.	10
3.	**Trigonometry:** Unit Circle, Angles and their Measurements, Important Trigonometric Identities, Trigonometric Functions, Inverses Trigonometric Functions, Complex Numbers, Complex Numbers in Polar Form and De Moivre's Theorem.	10
4.	**Limits and Continuity:** The Concept of Limit, Computation of limits, Continuity of functions, Intermediate value theorem, Limits Involving Infinity, Asymptotes, Formal definition of the limit.	15
5.	**Differentiation:** Tangent Lines and Velocity, The Derivative, Computation of Derivatives: The Power Rule, The Product and Quotient Rules, The Chain rule, Derivatives of Trigonometric Functions, Derivatives of Exponential and Logarithmic Functions, Implicit Differentiation, The Mean Value Theorem.	15
6.	**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.	15
Total		**75**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	HomeWorks, Quizzes, Mini projects	During the semester	10%
2.	First Midterm	5th week	25%
3.	Second Midterm	10th week	25%
4.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	***Calculus***, 4th Edition, R. T. Smith, R. B. Minton, McGraw-Hill, 2012. **(Main Reference)**
Supportive References	**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. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	**Classrooms:** Equipped with whiteboards, projectors, and Smart Boards for interactive lessons and group discussions. **Laboratories:** Feature computers with internet access, enabling hands-on activities and exploration of algebraic and trigonometric concepts. **Exhibition Rooms:** Spaces for showcasing projects and presentations to encourage collaborative learning.
Technology equipment (projector, smart board, software)	**Data Show Projectors:** For clear presentations in classrooms and labs. **Smart Boards:** To enhance interactivity during lessons. **Mathematical Software:** Essential for

Items	Resources
	graphing and analysis.
Other equipment (depending on the nature of the specialty)	**Computers:** For mini-project and homework and practical applications in laboratories. **Advanced Calculators:** For computations and problem-solving and supporting the study of limits, continuity, and differentiation. **Whiteboards and Markers:** To facilitate brainstorming and collaboration.

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	**Student and teaching staff**	**Surveys and Questionnaires**
Effectiveness of Students assessment	**Course Coordinator**	**Peer Reviews**
Quality of learning resources	**Students and teaching staff**	**Classroom Observations**
The extent to which CLOs have been achieved	**Student Representatives**	**Student Performance Evaluations (exams, projects)** **CLOs Excel sheet.**
Other	**None**	

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**MATHEMATICS AND STATISTICS DEPARTMENT COUNCIL**
REFERENCE NO.	**8/1446**
DATE	**05/04/1446 (08/10/2024)**

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد
NCAAA

2024
TP-153

Course Specification
(Bachelor)

Course Title:	English (1)
Course Code:	ENG 1140
Program:	Bachelor of Science in Biology
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University
Version:	1
Last Revision Date:	29 September 2024

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A. General information about the course:

1. Course Identification

1. Credit hours: (2)					
2. Course type					
A.	☐ University	☒ College	☐ Department	☐ Track	☐ Others
B.	☒ Required		☐ Elective		
3. Level/year at which this course is offered: (Leve 1/ Year 1)					
4. Course General Description:					
This course, "English for Science", enhances English language proficiency while integrating fundamental scientific concepts. Through lectures and interactive tutorials, students will explore topics such as the composition of matter, energy, motion, and the universe. Activities include group discussions, hands-on experiments, and presentations, fostering critical thinking and effective communication of scientific ideas..					
5. Pre-requirements for this course (if any)**:**					
None					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
1. Enhance Language Proficiency: Improve English skills in scientific contexts, including vocabulary and communication. 2. Integrate Scientific Concepts: Understand and apply fundamental scientific principles and theories. 3. Develop Critical Thinking: Foster skills in data analysis, hypothesis formulation, and interpretation. 4. Promote Collaboration: Encourage teamwork through group projects and discussions. 5. Encourage Ethical Awareness: Instill understanding of ethical considerations in scientific research. 6. Prepare for Advanced Study: Equip students for success in further academic and professional pursuits in science.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100
2	E-learning		
3	Hybrid	45	45

No	Mode of Instruction	Contact Hours	Percentage
	• Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	15
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	30
5.	**Others (specify)**	
Total		45

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Develop a repertoire of essential words and phrases to describe several topics	K1, K2	1 hour lecture and 2 hours tutorial	Written quiz on conventions; review of a sample paper.
1.2	Demonstrate knowledge of simple grammatical structures	K1, K2	1 hour lecture and 2 hours tutorial	Peer feedback on written drafts; reflective essay.
1.3	Demonstrate understanding of phrases and expressions	K1, K2	1 hour lecture and 2 hours tutorial	Vocabulary quiz; application in written assignments.

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
2.0	**Skills**			
2.1	Extract essential information from several resources	S1-S3	1 hour lecture and 2 hours tutorial	Submission of a draft manuscript/ report; rubric-based evaluation.
2.2	Identify main ideas, details, and reasons in listening passages on multiple topics	S1-S3	1 hour lecture and 2 hours tutorial	Written critique of a research article; group presentation.
2.3	Locate specific information in simple written material on various topics.	S1-S3		Research project; annotated bibliography submission.
3.0	**Values, autonomy, and responsibility**			
3.1	Participate in short conversations on topics	V1-V3	1 hour lecture and 2 hours tutorial	Ethical analysis assignment; class discussion participation.
3.2	Justify briefly reasons and explanations for opinions	V1-V3	1 hour lecture and 2 hours tutorial	Self-reflection essay; checklist for manuscript/ report quality.
3.3	Contribute discussions or concerns in a respectful and in collaborative way	V1-V3	1 hour lecture and 2 hours tutorial	Group project evaluation; individual contribution report.

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to Classification: - Discussion Points	**3**

	- Writing Skills: Topic Sentences - Writing a Paragraph of Classification	
2.	Comparing - The Elements: - Introduction - Short Reading: The Wonder Metals - Using English to Compare - Writing a Paragraph of Comparison - Introduction	4
3.	Cause and Effect - Color, Light, and Sound: - Sentence Patterns - Identifying Cause and Effect - Short Reading: The Effects of Temperature	4
4.	Hypothesizing - Motion and Gravity: - Discussion Points - Writing Hypotheses	3
5.	Defining – Energy: - Introduction - Short Reading: The Many Forms of Energy - Using English to Define - Creating Definitions	4
6.	Exemplifying – Heat: - Introduction - Using English to Exemplify - Analyzing Exemplification	3
7.	Giving Evidence - Smoking, Drugs, and Alcohol: - Discussion Points - Writing with Evidence	4
8.	Experimenting - Electricity and Magnetism: - Introduction - Short Reading: Lightning Strikes - Using English to Give Directions	4
9.	Calculating - Liquids and Gases: - Introduction - Short Reading: When Molecules Collide - Using English to Calculate	4
10.	Reporting - The Origin of Life: - Discussion Points - Writing a Report	4
11.	Describing - The Universe: - Introduction - Short Reading: The Sun and Other Stars - Using English to Describe	4

12.	Predicting - The Weather: - Introduction - Short Reading: The Water Cycle - Discussion Points	4
Total		**45**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	**Class Work (Participation+ Quizzes)**	**During the Semester**	**30%**
2.	**Mid-Term Exam**	**8th week**	**30%**
3.	**Final Exam**	**16th week**	**40%**

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	**Zimmerman, F. (2005). *English for science*. Pearson Malaysia Sdn. Bhd.**
Supportive References	
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms
Technology equipment (projector, smart board, software)	Projector, smart board and electronic copy of textbook
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	**Students** • **Peer Reviewers**	**Student Surveys (Indirect)**

Assessment Areas/Issues	Assessor	Assessment Methods
	• Faculty • External Reviewers • Quality Assurance Unit	• Formal Observations (Indirect) • Course Report and Course File (Direct) • Student Samples (Direct) • Self-Reflection reports (Indirect)
Effectiveness of Students assessment	Students • Faculty • Curriculum Committee • Assessment Committee • External Reviewers • Quality Assurance Unit	Item Analysis Data ((Indirect)) • Teacher Feedback (Direct) • Student Feedback (Direct) • Course Report & Course File (Direct)
Quality of learning resources	Students • Faculty	Student surveys (Indirect) • Faculty surveys (Indirect)
The extent to which CLOs have been achieved	Students • Faculty • Quality Assurance Unit	Item Analysis Data (Indirect) • Course Report & Course File (Direct) • Annual Program Review (Direct)
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**COUNCIL OF THE DEPARTMENT OF ENGLISH LANGUAGE AND LITERATURE**
REFERENCE NO.	**2446-17-7**
DATE	**2025/1/23**

Course Specification
(Bachelor)

Course Title: Animal Taxonomy	
Course Code: BIO 1111	
Program: Bachelor of Science in Biology	
Department: Biology	
College: Science	
Institution: Imam Mohammad Ibn Saud Islamic University	
Version: 1	
Last Revision Date: 29 September 2024	

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A. General information about the course:

1. Course Identification

1. Credit hours: 3 (2 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☒ Required			☐Elective	
3. Level/year at which this course is offered: (Level 2 / Year 1)					
4. Course General 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.					
5. Pre-requirements for this course (if any)**:**					
BIO 1101					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
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.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Define where each animal group fits evolutionarily in the animal kingdom	1.1	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Outline how changes in animal structure	1.2	Interactive Lecture Discussion and	Written tests Class

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	(morphology) to perform his function		Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	discussion questions Class assignments Homework Short research/reports Summaries Presentations
2.0	**Skills**			
2.1	Evaluate the general magnitude of animal evolution over time	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Develop a historical perspective of animals	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Explain how different animal structures and functions are complimentary relationships	2.1-2.2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
3.1	Show ability to communicate effectively with class mates and teaching staff	2.2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.2	Use laboratory instruments and computers	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Analyze biological experiments and use various slides during laboratory classes	3.1-3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

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 Trinomial nomenclature.	4
4.	Classification of Animal Kingdom-Major and Minor Phyla • PROTOZOA: general characters and classification up to orders with	4

	examples. Nutrition, locomotion and reproduction in Protozoa. PORIFERA: general characters and classification up to orders with examples canal system of in porifera.	
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.	4
9.	General characters, outline of classification and plan of body organization in chordates • Protochrdata: general characters, classification of protochrdata up to suborders with examples. • HEMICHORDATA: morphology and affinities of Balanoglossus. • UROCHORDATA: structure and retrogressive metamorphosis in Urochordata.	4
10.	CEPHALOCHORDATA: structure and affinities of Amphioxus. • AGNATHOSTOMATA: distinctive characters and classification, Ammocoete larva - its importance in evolution, differences between Lamprey and Hagfish.	4
11.	Circulatory system, nervous system and sense organ of Scoliodon. accessory respiratory organ and swim bladder in fish, migration of fishes.	4
12.	AMPHIBIA: general characters, classification up to orders with examples, respiration in amphibia, parental care in amphibian.	4
13.	REPTILIA: general characters classification up to order with examples. anatomical peculiarities and affinities of Sphenodon, biting mechanism	4

	of poisonous snake.	
14.	AVES: Distinctive characters and classification up to orders with examples. Air sacs-significance and importance, Flight and perching mechanism in birds Migration of bird.	4
15.	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.	4
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5^{th} week	15%
3.	Midterm 2	10^{th} week	15%
4.	Lab reports and Lab Exam	15^{th} week	20%
5.	Final Exam	16^{th} week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	• 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.
Supportive References	• 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	None

2. Required Facilities and equipment

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

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Department of Biology Council
REFERENCE NO.	Meeting No. 6
DATE	29/9/2024

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد
NCAAA

2024
TP-153

Course Specification
(Bachelor)

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	
Version: 1	
Last Revision Date: 29 September 2024	

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A. General information about the course:

1. Course Identification

1. Credit hours: 3 (2 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Level 2 / Year 1)					
4. Course General Description:					
Cell Biology is an essential foundational course that explores the structural and functional organization of cells, which are the basic building blocks of life. This course is designed to introduce students to the fundamental principles of cellular biology, including the composition, behavior, and interactions of cells, as well as their significance in maintaining life processes.					
5. Pre-requirements for this course (if any)**:**					
BIO 1101					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
Biology of cells of higher organisms: Structure, function, and biosynthesis of cellular membranes and organelles; cell growth and oncogenic transformation; transport, receptors, and cell signaling; the cytoskeleton, the extracellular matrix, and cell movements; chromatin structure and RNA synthesis. 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.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Name the components of the cell and understanding the cell functions	1.2-2.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
				Presentations
1.2	Describe the structure of cell membranes	1.2-2.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
2.0	**Skills**			
2.1	Explain the intracellular mechanism of signaling pathways and describe how a cell communicate with other cells	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Summarize the fundamentals of gene expression and describe how gene expression is regulated at the protein level	2.1-2.2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Explain all the major organelles in eukaryotic cells and their respective major functions	2.1-2.2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			Collaborative Learning	
3.0	**Values, autonomy, and responsibility**			
3.1	Show ability to communicate effectively with class mates and teaching staff	3.1-3.2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.2	Use laboratory instruments and computers	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Analyze biological experiments and use various slides during laboratory classes	3.2-3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No	List of Topics	Contact Hours
1.	Road map of course, what is cell biology?	4
2.	Properties of cells	4
3.	Cell Characteristics and Organization	4
4.	Nucleus structure and detailed components	4
5.	Membrane Structures	4
6.	Membrane Functions	4
7.	Non-Membranous Organelles	4
8.	Cell Cycle	4
9.	Mitosis	4
10.	Meiosis	4
11.	DNA Replication	4

12.	Gene expression, Transcription	4
13.	Gene expression, Translation	4
14.	Cellular Metabolism	4
15.	Bioenergetics	4
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	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.
Supportive References	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
Electronic Materials	CD for cell biology and life science
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories

Items	Resources
Technology equipment (projector, smart board, software)	Projector and Smart board
Other equipment (depending on the nature of the specialty)	Specific laboratory equipment for this course including posters, models of different organelles, light microscopes, centrifuges, incubators, ovens and other glass wares

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

Course Specification
(Bachelor)

Course Title: Plant Taxonomy	
Course Code: BIO 1121	
Program: Bachelor of Science in Biology	
Department: Biology	
College: Science	
Institution: Imam Mohammad Ibn Saud Islamic University	
Version: 1	
Last Revision Date: 29 September 2024	

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A. General information about the course:

1. Course Identification

1. Credit hours: 4 (3 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐ College	☒ Program	☐Track	☐Others
B.	☒ Required			☐Elective	
3. Level/year at which this course is offered: (Level 2 / Year 1)					
4. Course General 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.					
5. Pre-requirements for this course (if any)**:**					
BIO 1101					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					

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.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	75	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

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

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Recognize introduction addresses in taxonomy, its importance, its applications, the basic rules of classification	1.1	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning	Written tests Class discussion questions Class assignments Homework Short

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			Cooperative Learning Field Visits	research/reports Summaries Presentations
1.2	List scientific and taxonomic keys naming, recent trends in the science of taxonomy	1.1-1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
2.0	**Skills**			
2.1	Explain and identify the relationship between cause and consequence in the different mechanisms of taxonomy	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Analyze data and information and view discussion of sound scientific debate	2.1-2.2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Predict incidental problems which they face and provide appropriate solutions	2.1-2.2	Practical Application Microteaching Modeling and Simulation	Observation / Rating Scales Practical Tests Self-Assessment

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			Project-Based Learning Discovery Learning Collaborative Learning	Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Appraise collaborative work skill	3.1	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.2	Illustrate linking between science and technology with society	3.1-3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Demonstrate the operation and use of computers and means of modern technology	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

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).	5
2.	Wild and Cultivated plants.	5
3.	Species concepts in wild plants: A. Morphological species concepts. B. Interbreeding species concepts. C. Ecological species concepts. D. Cladistic species concepts. E. Nominolistic species concepts.	5

4.	Classification philosophies in wild and cultivated plants.	5
5.	Brief history of nomenclature and codes.	5
6.	The study of Keys of scientific and taxonomic and nomenclature directions in modern taxonomy.	5
7.	Nomenclature (How are plants named?) Fundamental differences in the classification and nomenclature of cultivated and wild plants: A. Ambiguity of the term variety. B. Culton versus taxon. C. Open versus closed classifications.	5
8.	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	5
9.	Nomenclature through changes and use of the ICNCP references.	5
10.	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.	5
11.	Dichotomous & polyclave keys (How are plants identified?) Flowers (How do taxonomists describe the features of flowers?)	5
12.	Floral modifications & inflorescences (How do taxonomists describe various modifications from the 'basic' floral pattern and the features of inflorescences?	5
13.	Fruits & seeds (How do we describe the features of fruits and seeds?).	5
14.	Embryology & palynology (How do taxonomists describe the basic features of angiosperm embryology and pollen?). Systematics & Diversity (What are the characteristics of common plant families?).	5
15.	Families of the Dicotyledonous plants: *Cactaceae, Fabaceae, Asteraceae.* Families of the Monocotyledonous plants: *Poaceae, Arecaceae, Liliaceae.*	5
Total		**75**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	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.
Supportive References	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	None
Other Learning Materials	None

2. Required Facilities and equipment

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

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد
NCAAA

2024

TP-153

Course Specification

(Bachelor)

Course Title:	**General Physics (1)**
Course Code:	**PHY 1101**
Program:	**Bachelor of Science in Biology**
Department:	**Physics**
College:	**Science**
Institution:	**Imam Mohammad Ibn Saud Islamic University**
Version:	**1**
Last Revision Date:	26 September 2024

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A. General information about the course:

1. Course Identification

1. Credit hours:					
4 (2 Lectures, 2 Lab, 2 Tutorial)					
2. Course type					
A.	☐University	☒ College	☐ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Level 2/ Year 1)					
4. Course General Description:					
This course covers topics like kinematics and the study of work and energy and. Students will gain with a deep understanding of these concepts and topics. A laboratory portion of this course will provide hands-on experience with these topics.					
5. Pre-requirements for this course (if any)**:**					
6. Co-requisites for this course (if any)**:**					
7. Course Main Objective(s):					

- **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.**

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	**90**	**100%**
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	0
4.	**Tutorial**	30
5.	**Others (specify)**	0
Total		**90**

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Describe the concepts and principles in introductory dynamics in one and two dimensions.	K1, K2	• Lectures. • Tutorials. • Class discussions.	▪ Exams. ▪ Participation. ▪ Discussions.
1.2	Outline physical phenomena using Newton's laws of motion.	K1, K2	• Lectures. • Tutorials. • Class discussions.	▪ Exams. ▪ Homework. ▪ Quizzes.
1.3	Describe physical phenomena using energy and work concepts.	K1, K2	• Lectures. • Class discussions. • Tutorials.	▪ Participation. ▪ Exams. ▪ Discussions. ▪ Homework.
2.0	**Skills**			
2.1	Explain and summarize the basic knowledge gained from studying mechanics.	S1, S2	• Lectures. • Class discussions. • Tutorials.	▪ Exams. ▪ Discussions. ▪ Participation.
2.2	Explain and summarize the basic knowledge gained from studying mechanics.	S1, S2	• Lectures. • Class discussions. • Tutorials.	▪ Exams. ▪ Discussions. ▪ Participation.
2.3	Develop the students ability to solve and analyze problems in physics related the topics covered by the course.	S2, S3	• Problem classes and group tutorial. • Homework assignments as well as problems solutions.	▪ Exams. ▪ Discussions. ▪ Homework.

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
2.4	Explain and use information from the output of experiment to draw conclusions.	S2, S3	• Experiments setting up, data recording and calculations based on lab manual and lectures (co-requisites).	▪ Compare with standard results. ▪ Feedback and explanations.
2.5	Summarize conclusions and write reports.	S2, S3	• Experiments setting up, data recording and calculations based on lab manual and lectures (co-requisites).	▪ Compare with standard results. ▪ Feedback and explanations.
3.0	**Values, autonomy, and responsibility**			
3.1	Show the collaboration and inter-professionalism in class discussions or team works, as well as solve problems independently.	V1, V2, V3	• Small team tasks • Open discussion at classroom. • Office hours.	▪ Participation. ▪ Homework. ▪ Mini-project(s).

C. Course Content

No	List of Topics	Contact Hours
1.	**Physics and Measurements:** Standards of length, mass, and time, dimensional analysis, conversion of units, estimates and order-of-magnitude calculations, significant figures.	**4**
2.	**Motion in One Dimension:** Displacement, velocity and acceleration, one dimensional motion with constant acceleration, freely falling objects.	**10**
3.	**Vectors:** Vector and scalar quantities, some properties of vectors, components of a vector and unit vectors.	**10**
4.	**Motion in Two Dimensions:** position vector, velocity vector, acceleration vector, two-dimensional motion with constant acceleration, projectile motion.	**12**
5.	**Newton's Laws of Motion:** The concept of force, Newton's first law, Newton's second law, the force of gravity and weight, Newton's third law, frictional force, some applications of Newton's laws.	**12**
6.	**Work and Energy:** Scalar product of two vectors, work done by a	**12**

	constant/variable force, kinetic energy and the work-kinetic energy theorem, potential energy, conservative and non-conservative forces, conservative forces and potential energy, conservation of mechanical energy, work done by non-conservative forces, power.	
	List of Topics (Laboratory)	
1.	**Experiment 1:** Measurements and uncertainties. Virtual experience.	3
2.	**Experiment 2:** Free fall.	3
3.	**Experiment 3:** Forces in equilibrium.	3
4.	**Experiment 4:** Simple pendulum.	3
5.	**Experiment 5:** Constant Spring.	3
6.	**Experiment 6:** Simple harmonic motion.	3
7.	**Experiment 7:** Free fall: Conservation of mechanical energy of a uniformly accelerated mass.	3
8.	**Experiment 8:** Describe the movement of an object moving at a constant speed and constant acceleration.	3
9.	**Experiment 9:** Friction and Newton's second law.	3
10.	**Experiment 10:** Ohm's Law.	3
Total		**90**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	**Class Activities (class quizzes, homework, solving problems, etc.....)**	**During the semester**	**10 %**
2.	**Laboratory**	**During the semester**	**30 %**
3.	**Midterm Exam 1**	**5th week**	**10 %**
4.	**Midterm Exam 2**	**10th week**	**10 %**
5.	**Final Exam**	**16th week**	**40 %**

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	- Serway R.A. and Jewett J.W., **Physics for Scientists and Engineers with Modern Physics,** 9th Edition, Brooks/Cole, Belmont, CA, USA (2014).
Supportive References	- Halliday D. and Resnick R., **Physics**, 9th Edition, 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. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	- **Classrooms.** - **Labs.**
Technology equipment (projector, smart board, software)	- **Classroom equipped with a whiteboard and a projector.**
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	- **Students** - **Second examiner**	- **Indirect (The students complete the evaluation forms at the end of term. Final exam is evaluated by the second examiner)**
Effectiveness of Students assessment	- **Instructors**	**Direct (exams, HW, project, …)**
Quality of learning resources	- **Faculty** - **Students**	- **Indirect (surveys)**
The extent to which CLOs have been achieved	- **Instructors** - **Program Leaders**	- **Direct (excel sheet)**
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)
Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Physics Department Council**
REFERENCE NO.	**6**
DATE	**26/09/2024**

Course Specification
(Bachelor)

Course Title:	English (2)
Course Code:	ENG 1195
Program:	Bachelor of Science in Biology
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University
Version:	1
Last Revision Date:	29 September 2024

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A. General information about the course:

1. Course Identification

1. Credit hours: (2 Hours)					
(2 Lectures, 0 Lab, 2 Tutorials)					
2. Course type					
A.	☐ University	☒ College	☐ Department	☐ Track	☐ Others
B.	☒ Required		☐ Elective		
3. Level/year at which this course is offered: (Level 2/ Year 1					
4. Course General Description:					
This course, "Scientific English: Writing and Communication," aims to enhance students' skills in writing effectively within scientific contexts. It covers the conventions of formal scientific English, emphasizing clarity, structure, and precision. Students will learn to summarize texts, write abstracts, and construct well-organized reports. Practical exercises will foster critical thinking and improve their ability to communicate complex ideas clearly. Additionally, the module provides resources for independent study and expands students' scientific vocabulary, preparing them for academic success and professional communication in the scientific field.					
5. Pre-requirements for this course (if any)**:**					
None					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
• Enhance Scientific Communication: Help students improve their ability to write and express scientific ideas clearly and effectively, which is crucial for their academic and professional journeys in science. • Develop Critical Thinking Skills: Encourage students to summarize and analyze scientific literature critically, enabling them to engage with complex topics thoughtfully. • Introduce Scientific Writing Standards: Familiarize students with the structure and conventions of scientific writing, including how to format manuscripts/reports and cite sources correctly. • Prepare for Professional Expectations: Equip students with the skills needed to create high-quality scientific documents, preparing them for both academic research and careers in industry.					

• Promote Lifelong Learning: Encourage students to become independent learners by providing them with tools and resources for ongoing improvement in their scientific writing and vocabulary development.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100
2	E-learning	0	0
3	Hybrid • Traditional classroom • E-learning	0	0
4	Distance learning	0	0

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	15
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	30
5.	**Others (specify)**	
Total		45

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Demonstrate a comprehensive understanding of the conventions and structures of scientific writing.	K1, K2	1 hour lecture on scientific writing conventions; 2 hours tutorial for practice exercises.	Written quiz on conventions; review of a sample paper.

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.2	Articulate the importance of clarity, precision, and accuracy in scientific communication.	K1, K2	1 hour lecture on clarity in writing; 2 hours tutorial for peer review sessions.	Peer feedback on written drafts; reflective essay.
1.3	Identify and explain key scientific vocabulary and terminology.	K1, K2	1 hour lecture on scientific vocabulary; 2 hours tutorial for vocabulary exercises.	Vocabulary quiz; application in written assignments.
2.0	**Skills**			
2.1	Apply effective writing techniques to produce clear and enhanced scientific documents.	S1-S3	1 hour lecture on writing techniques; 2 hours tutorial for document drafting.	Submission of a draft manuscript/report; rubric-based evaluation.
2.2	Analyze and critique scientific literature.	S1-S3	1 hour lecture on literature review techniques; 2 hours tutorial for literature analysis.	Written critique of a research article; group presentation.
2.3	Utilize research tools to gather and synthesize information.	S1-S3	1 hour lecture on research tools; 2 hours tutorial for practical exercises.	Research project; annotated bibliography submission.
3.0	**Values, autonomy, and responsibility**			
3.1	Recognize ethical considerations in scientific writing.	V1-V3	1 hour lecture on ethics in research; 2 hours tutorial for case studies.	Ethical analysis assignment; class discussion participation.
3.2	Develop accountability for writing and research standards.	V1-V3	1 hour lecture on professional standards; 2 hours tutorial for self-assessment exercises.	Self-reflection essay; checklist for manuscript/report quality.
3.3	Work collaboratively in diverse teams.	V1-V3	1 hour lecture on teamwork; 2 hours tutorial for team-building exercises.	Group project evaluation; individual

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
				contribution report.

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to Scientific English: 1.1 Advantages and Disadvantages of English 1.1.1 British or American? 1.2 Formal English, the Language of Science 1.3 Words for Writing Scientific English 1.4 Take-home Messages from Chapter 1	3
2	Writing Clear Scientific English: 2.1 Eight Guidelines for Improving Your Writing 2.2 Just to Make You Feel Better 2.3 Take-home Messages from Chapter 2	4
3	Applying the Fundamentals: 3.1 Summarizing the Text “Fighting for Breath” 3.2 Improving Summaries 3.3 Writing Abstracts for Scientific Presentations 3.4 Improving Abstracts 3.5 What is Science? 3.6 Improving Texts on “What is Science?”	5
4	Constructing a Scientific report: 4.1 The Process of Publishing Original Data 4.2 Planning a Scientific Manuscript/report 4.3 Writing a Scientific Manuscript/report 4.4 Assembling and Improving the Model Manuscript/report	5

5	Practicing Writing and Improving report: 5.1 Improving the Quality of Bread 5.2 Views on Human Activity and Global Warming 5.3 Measuring Biodiversity 5.4 Stereotypic Man 5.5 Searching for the Best Firewood	5
6	On Your Own: 6.1 Resources 6.2 Reading List to Improve Vocabulary	3
7	Scientific Vocabulary: 7.1 Linking Words 7.2 Basic Scientific Lexicon 7.3 Extended Scientific Lexicon	3
8	Punctuation and Sentence Structure: 1.2.1 Complete Sentences 1.2.2 Punctuation Marks	3
9	Writing Techniques: 2.1.1 Make a Plan 2.1.2 Clean and Legible Layout	4
10	Research and Summarization: 3.1 Summarizing Scientific Texts 3.2 Improving Summaries	3
11	Manuscript Components: 4.3.1 Prepare Figures and Tables 4.3.2 Describe Figures and Tables	4
12	Finalizing Scientific Documents: 4.5 Editing and Refining Manuscripts/reports 4.6 Assembling and Finalizing Manuscript/reports	3

Total	45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Class Work (Participation+ Quizzes)	During the Semester	30
2.	Mid-Term Exam	8th Week	30
3.	Final Exam	16th Week	40

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Skern, T. (2011). *Writing scientific english: A workbook*. Facultas.wuv, UTB.
Supportive References	
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms
Technology equipment (projector, smart board, software)	Projector, smart board and electronic copy of textbook
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students • Peer Reviewers • Faculty • External Reviewers	• Student Surveys (Indirect) • Formal Observations (Indirect)

Assessment Areas/Issues	Assessor	Assessment Methods
	• Quality Assurance Unit	• Course Report and Course File (Direct) • Student Samples (Direct) • Self-Reflection reports (Indirect)
Effectiveness of Students assessment	Students • Faculty • Curriculum Committee • Assessment Committee • External Reviewers • Quality Assurance Unit	• Item Analysis Data ((Indirect)) • Teacher Feedback (Direct) • Student Feedback (Direct) • Course Report & Course File (Direct)
Quality of learning resources	• Students • Faculty	• Student surveys (Indirect) • Faculty surveys (Indirect)
The extent to which CLOs have been achieved	• Students • Faculty • Quality Assurance Unit	• Item Analysis Data (Indirect) • Course Report & Course File (Direct) • Annual Program Review (Direct)
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	COUNCIL OF THE DEPARTMENT OF ENGLISH LANGUAGE AND LITERATURE
REFERENCE NO.	2446-17-7
DATE	2025/1/23

Course Specification

(Bachelor)

Course Title: Genetics	
Course Code: BIO 1231	
Program: Bachelor of Science in Biology	
Department: Biology	
College: Science	
Institution: Imam Mohammad Ibn Saud Islamic University	
Version: 1	
Last Revision Date: 29 September 2024	

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G. Specification Approval 8

A. General information about the course:

1. Course Identification

1. Credit hours: 3 (2 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐ College	☒ Program	☐Track	☐Others
B.	☒ Required			☐Elective	
3. Level/year at which this course is offered: (Level 3 / Year 2)					
4. Course General 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.					
5. Pre-requirements for this course (if any)**:**					
BIO 1113					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
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.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
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	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Describe the molecular	1.2	Interactive Lecture Discussion and	Written tests Class

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	mechanisms by which genetic information is transmitted		Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	discussion questions Class assignments Homework Short research/reports Summaries Presentations
2.0	**Skills**			
2.1	Explain the major extensions and modifications of Mendel's principles of heredity	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Differentiate particularities of bacterial and viral genetics	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Justify how gene pool of a population shapes it and changes with time	2.1-2.2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
3.1	Use computer programs for analyzing and processing the experimental data	3.1	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.2	Use laboratory instruments and computers	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Analyze biological experiments and use various slides during laboratory classes	3.2-3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to genetics Genetics: the science of heredity	4
2.	Mendel's laws of inheritance	4
3.	Dominance, dominance relations and recessiveness	4
4.	The basics of population genetics	4
5.	Sex determination in different organisms and sex-linked characters	4
6.	The chromosome theory of inheritance	4
7.	The structure of DNA and DNA Replication	4
8.	Transcription, translation and the genetic code	4
9.	Transmission Genetics	4
10.	Basic and advanced principles of heredity The chromosomal basis of heredity	4
11.	Gene linkage and genetic mapping	4
12.	Human karyotypes and chromosome behavior	4
13.	Prokaryotic Genetics	4

14.	The genetics of bacteria and viruses Molecular mechanisms of prokaryotic gene regulation	4
15.	Genetic engineering and genomics Mechanisms of mutation	4
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	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.
Supportive References	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	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories
Technology equipment (projector, smart board, software)	Projector and Smart board
Other equipment (depending on the nature of the specialty)	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 amplification centrifuges, incubators, ovens and other glass wares

F. Assessment of Course Quality

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

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)
Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد
NCAAA

2024
TP-153

Course Specification
(Bachelor)

Course Title: Biochemistry	
Course Code: BIO 1237	
Program: Bachelor of Science in Biology	
Department: Biology	
College: Science	
Institution: Imam Mohammad Ibn Saud Islamic University	
Version: 1	
Last Revision Date: 29 September 2024	

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A. General information about the course:

1. Course Identification

1. Credit hours: 3 (2 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Level 3 / Year 2)					
4. Course General Description:					
This course offers an overview of the chemical processes that drive biological systems. It also explores the basic principles of biochemistry and develops the student's appreciation and understanding of biological networks. In addition, it focuses on the understanding of biochemical processes in the context of chemical principles; and the importance of research design and application in the investigation of questions in biochemistry.					
5. Pre-requirements for this course (if any)**:**					
BIO 1101 and CHM 1101					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
The objective of the course is to provide the students with the basic knowledge about the structure, properties, function, and metabolism of the major cellular macromolecules, including carbohydrates, proteins, lipids, enzymes, vitamins, and nucleic acids. It also aims to provide the students with an overview of the key biochemical steps for the major metabolic pathways of these macromolecules. In addition, it provides the students with a detailed understanding of the fundamental principles of how the anabolism and catabolism of these macromolecules are regulated.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Describe the structure, biochemical properties, biological role, anabolism and catabolism of the cellular macromolecules, including carbohydrates, proteins, lipids, enzymes, vitamins, and nucleic acids	1.1	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.2	Outline the biochemical reactions and bioenergetics of the major macromolecules' metabolic pathways, their interrelationships, and how they are controlled	1.1-1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
2.0	**Skills**			
2.1	Analyze the different macromolecules in natural/synthetic samples using macromolecule-specific qualitative tests	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Estimate the concentration of a macromolecule candidate in biological samples using quantitative assays	2.1-2.3	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Assemble and summarize information from a variety of sources (textbooks, research papers and review articles), and use	3.2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	information technology to prepare, process and present information			
3.2	Compose and show ideas effectively both orally and in writing	3.1-3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Perform independently and as a member of a team	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No	List of Lecture Topics	Contact Hours
1.	Carbohydrates chemistry	2
2.	Carbohydrates metabolism	2
3.	Proteins chemistry	2
4.	Proteins metabolism	2
5.	Lipids chemistry	2
6.	Lipids metabolism	2
7.	Enzymes	2
8.	Vitamins	2
9.	Nucleic acids	2
10.	Anabolism and Catabolism	2
11.	Glycolysis (glycolytic pathway)	2
12.	Tricarboxylic acid cycle (citric acid cycle/Krebs cycle)	2
13.	Electron transport chain and oxidative phosphorylation	2
14.	Gluconeogenesis	2
15.	Pentose phosphate pathway (hexose monophosphate shunt)	2
Total		**30**

No	List of Laboratory Topics	Contact Hours
3.	Carbohydrates identification tests	2
4.	Proteins identification tests	2
3.	Lipids identification tests	2
4.	Quantitative estimation of glucose	2
5.	Quantitative estimation of cholesterol	2
6.	Quantitative estimation of triglycerides	2
7.	Quantitative estimation of ALT	2
8.	Quantitative estimation of AST	2
9.	Quantitative estimation of ALP	2
10.	Quantitative estimation of GGT	2
11.	Quantitative estimation of total protein	2
12.	Quantitative estimation of albumin	2
13.	Quantitative estimation of bilirubin	2
14.	Quantitative estimation of urea	2
15.	Quantitative estimation of creatinine	2
	Total	**30**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Kyle Kirkland, Anne Wanjie (2014). The Basics of Biochemistry (Core Concepts), Rosen Pub Group.
Supportive References	Michael A. Lieberman, Rick Ricer (2009). Lippincott's Illustrated Q&A Review of Biochemistry, 1st Edition, Lippincott Williams &

	Wilkins.
Electronic Materials	None
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories
Technology equipment (projector, smart board, software)	Projector and Smart board
Other equipment (depending on the nature of the specialty)	Biochemistry-related instruments, including safety cabinet, centrifuges, incubators, light microscopes, spectrophotometers, microplate reader

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد
NCAAA

2024
TP-153

Course Specification
(Bachelor)

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	
Version: 1	
Last Revision Date: 29 September 2024	

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A. General information about the course:

1. Course Identification

1. Credit hours: 3 (2 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐ College	☒ Program	☐Track	☐Others
B.	☒ Required			☐Elective	
3. Level/year at which this course is offered: (Level 3 / Year 2)					
4. Course General 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.					
5. Pre-requirements for this course (if any)**:**					
BIO 1101					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
Upon completion of this course, the 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.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Name microorganisms and classify them	1.1-1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Recall chemical principals and list microbial	1.1-1.2	Interactive Lecture Discussion and Dialogue	Written tests Class discussion

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	metabolism and growth		Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	questions Class assignments Homework Short research/reports Summaries Presentations
2.0	**Skills**			
2.1	Analyze the properties of microorganisms in terms of cellular anatomy and physiology	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Evaluate how physical and chemical methods can be used to control microbial growth	2.1-2.2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Explain how the human body interacts with various microorganisms through symbiotic relationships and host defenses	2.1-2.2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Illustrate the	3.1	Modeling	Observation

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	application of microbiology concepts to current issues in human health and infectious diseases		Dialogue and discussion Self-learning Collaborative learning	Self-assessment Peer assessment Achievement file
3.2	Use safety measures and operate laboratory instruments during laboratory sessions	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Analyze microbiological experiments and use various slides and technics during laboratory classes	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

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 of the Germ Theory of Diseases Vaccination, Modern Developments in Microbiology.	4
2.	Microbes in our Lives • 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	4

	Buffers, Oxidation and Reduction, Functional Groups. • The Macromolecules: Carbohydrates, Lipids, Proteins, Nucleic acid.	
3.	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.	4
4.	The Anatomy of the Prokaryotic cell (Comparison of Prokaryotic and Eukaryotic Cells – Overview The Prokaryotic Cell). • 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.	4
5.	Microbial Metabolism (Catabolic and Anabolic Reactions Enzymes Energy Production Metabolic Pathways Carbohydrate Catabolism) • Glycolysis • Aerobic Respiration, The Kreb's Cycle, the electron transport system, and summary of ATP production. • Anaerobic Respiration and Fermentation Lipid and Protein Catabolism. Microbial Growth. • The Requirements for Growth: Physical Requirements, Chemical Requirements.	4
6.	Microbial Metabolism (Catabolic and Anabolic Reactions Enzymes Energy Production Metabolic Pathways Carbohydrate Catabolism) • 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.	4
7.	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.	4
8.	The Fungus • Characteristics of Fungi • Nutrition and Cultivation • Yeast, Molds and Dimorphics	4

	• Sexual and Asexual Spores • Medically Important Phyla of Fungi • 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.	
9.	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	4
10.	The Bacteriophage: Structure, Multiplication, The Growth Curve of the Bacteriophage. Viruses and Cancer.	4
11.	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	4
12.	Immune Response • Disorders Associated with the Immune System • Allergies (Hypersensitivities) Autoimmune Diseases • The Relationship between the Immune System and Cancer • Immunodeficiency, AIDS	4
13.	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	4

	• 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	
14.	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 • Bacterial Diseases of the Lower Respiratory Tract: Pertussis, Tuberculosis, Bacterial Pneumonia • Viral Diseases of the Lower Respiratory Tract: Viral Pneumonia, Influenza	4
15.	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.	4
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5^{th} week	15%
3.	Midterm 2	10^{th} week	15%
4.	Lab reports and Lab Exam	15^{th} week	20%
5.	Final Exam	16^{th} week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	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.
Supportive References	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	None

2. Required Facilities and equipment

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

F. Assessment of Course Quality

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

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)
Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Department of Biology Council
REFERENCE NO.	Meeting No. 6
DATE	29/9/2024

Course Specification

(Bachelor)

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	
Version: 1	
Last Revision Date: 29 September 2024	

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A. General information about the course:

1. Course Identification

1. Credit hours: 2 (1 lecture, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☒ Required			☐Elective	
3. Level/year at which this course is offered: (Level 3 / Year 2)					
4. Course General Description:					
This course describes the nature and diversity of life, from microorganisms and fungi to plants and animals.					
5. Pre-requirements for this course (if any)**:**					
BIO 1121					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
On successfully completing this course, the students will be able: • 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. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100%
2	E-learning	-	-
3	Hybrid	-	-

No	Mode of Instruction	Contact Hours	Percentage
	• Traditional classroom • E-learning		
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	15
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		45

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	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	1.1	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Describe the molecular and structural unity of life	1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method	Written tests Class discussion questions Class assignments Homework

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			Self-Learning Cooperative Learning Field Visits	Short research/reports Summaries Presentations
2.0	**Skills**			
2.1	Predict whether populations of interacting organisms persist over time or become extinct	2.1-2.3	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Explain how the diversity of living things is generated and perpetuated	2.1-2.2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
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	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Use quantitative models and data to solve problems in evolution and	2.2-1.3	Modeling Dialogue and discussion Self-learning	Observation Self-assessment Peer

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	ecology		Collaborative learning	assessment Achievement file
3.2	Use laboratory instruments and computers	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Analyze biological experiments and use various slides during laboratory classes	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No	List of Topics	Contact Hours
1.	Definitions and levels of Ecosystem Organization	3
2.	Classification of Ecology and Ecosystem components	3
3.	Feeding chains and web	3
4.	Pyramids of Biomass and Energy	3
5.	Biogeochemical cycles and Eutrophication	3
6.	Biotic interactions	3
7.	Processes and levels of Biodiversity	3
8.	Diversity metrics: indices and graphical methods	3
9.	Diversity patterns Univariate/Multivariate metrics of taxonomic similarity	3
10.	Flora and Fauna of Saudi Arabia	3
11.	Population dynamics: dispersion pattern and survivorship curves	3
12.	Functional Ecology and Demographic Strategies	3
13.	Ecosystem services	3
14.	Biodiversity threats: Pollution, Climate change, and Bio-invasion/Bio-extinction	3
15.	Sustainability and Conservation Biology	3
Total		45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	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.
Supportive References	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	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories
Technology equipment (projector, smart board, software)	Projector and Smart board

Items	Resources
Other equipment (depending on the nature of the specialty)	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

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

Course Specification
(Bachelor)

Course Title: **Biostatistics**	
Course Code: **STA 1217**	
Program: **Bachelor of Science in Biology**	
Department: **Mathematics and Statistics**	
College: **Science**	
Institution: **Imam Mohammad Ibn Saud Islamic University**	
Version: **1**	
Last Revision Date: 8 October 2024	

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A. General information about the course:

1. Course Identification

1. Credit hours:					
3 (2 Lectures, 0 Lab, 2 Tutorial)					
2. Course type					
A.	☐University	☐ College	☒ Program	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: Level 3 / Year 2					
4. Course general 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.					
5. Pre-requirements for this course (if any)**:**					
None.					
6. Co-requisites for this course (if any)**:**					
None.					
7. Course Main Objective(s):					
• 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.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	0	0%
3	Hybrid • Traditional classroom • E-learning	0	0%

No	Mode of Instruction	Contact Hours	Percentage
4	Distance learning	0	0%

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	0
3.	**Field**	0
4.	**Tutorial**	30
5.	**Others (specify)**	0
	Total	60

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

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Identify several techniques of counting and calculus (series, integrals…) to calculate probabilities, mean, and variance.	K1, K2	2 lecture hours\week	Direct: Regular Exams
1.2	Describe different sampling experiments, sampling distribution, confidence interval, and hypothesis testing.	K1, K2	• 2 tutorial hours\week • Self-study	Direct: Short Quizzes
2.0	Skills			
2.1	Use techniques of problem solving.	S3	• Self-study • Real-life problems	Direct: • Participations • Short Quizzes

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.2	**Draw graphs of data using descriptive statistics.**	**S3**	**Real-life problems**	**Direct: Short Quizzes**
2.3	**State, clearly and precisely, both orally and in writing, correlation and regression technique.**	**S3**	**Self-study**	**Direct: Participations**
3.0	**Values, autonomy, and responsibility**			
3.1	**Generate initiatives independently.**	**V1, V2**	**Personal questions**	**Direct: Participation**
3.2	**Develop personal values and attributes such as honesty, empathy and respect for others.**	**V1, V2**	**Teamwork and class discussions.**	**Direct: Homework and Mini projects**

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,	8

	Testing Claim about Proportion, Testing Claim about Mean (Sigma Known and unknown), Testing Claim about Standard Deviation and Variance.	
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. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	**HomeWorks, Quizzes, Mini projects**	**During the semester**	**10%**
2.	**First Midterm**	**5th week**	**25%**
3.	**Second Midterm**	**10th week**	**25%**
4.	**Final Exam**	**16th week**	**40%**

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	***Biostatistics for Biological and Health Sciences*, M.M. Triola & M.F. Triola, Pearson, 2006.** ISBN-10: 0321194365 ISBN-13: 9780321194367 **(Main Reference)**
Supportive References	• ***Biostatistical Analysis*, 5th Edition, Jerrold H. Zar, PearsonEducation. 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 UniversityPress, Harvey J. Motulsky, 2013.** ISBN13: 978-0199946648, ISBN10: 0199946647. • ***Basic Biostatistics: Statistics for Public Health Practice*, 2ndEdition, B. Burt Gerstman, Jones & Barlett Learning, 2015.** ISBN-13: 9781284036015.
Electronic Materials	**None**
Other Learning Materials	**None**

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	▪ Each class room should be equipped with a whiteboard and a projector. ▪ Laboratories should be equipped with computers and an internet connection.
Technology equipment (projector, smart board, software)	The rooms should be equipped with data show and Smart Board.
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	During the semester and at the end of the course each student will complete two evaluation forms.
Effectiveness of Students assessment	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.
Quality of learning resources	Students	During the semester and at the end of the course each student will complete two evaluation forms.
The extent to which CLOs have been achieved	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

Assessment Areas/Issues	Assessor	Assessment Methods
		identifying changes that need to be made if necessary.
Other	None	

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	MATHEMATICS AND STATISTICS DEPARTMENT COUNCIL
REFERENCE NO.	8/1446
DATE	05/04/1446 (08/10/2024)

Course Specification

(Bachelor)

Course Title:	Immunology
Course Code:	BIO 1212
Program:	Bachelor of Science in Biology
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University
Version:	1
Last Revision Date:	29 September 2024

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F. Assessment of Course Quality 9
G. Specification Approval 9

A. General information about the course:

1. Course Identification

1. Credit hours: 3 (2 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☒ Required			☐Elective	
3. Level/year at which this course is offered: (Level 4 / Year 2)					
4. Course General Description:					
This course introduces the principles knowledge of the immune system at both the molecular and cellular levels. Specifically, it aims to familiarize students with the components of the human immune system and the mechanisms involved in recognizing and eliminating pathogens. The course also focuses on innate and adaptive immunity, signaling molecules and the complement system. Additionally, immunological disorders including the immune system's role in allergic reactions, autoimmune, as well as immunodeficiency also emphasized to enable the students to get acquainted. The lectures are complemented by laboratory that integrates widely used immunology tools.					
5. Pre-requirements for this course (if any)**:**					
BIO 1113					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
The course aims to provide students with the fundamental concepts of the immune system emphasizing on the components of immune system and their functions. The course also covers the difference between the innate and adaptive immunity and the detail structure of antibodies, their different classes and how they recognize and bind to antigens. The course will also delve into immune system failures, including hypersensitivity reactions, autoimmune diseases, transplantation rejection, and cancer immunology. The laboratory course will cover the fundamental immunological techniques and the underlying concepts behind them.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Name the components of the immune system and their role in immunity	1.1	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	List the difference between innate and	1.1-1.2	Interactive Lecture Discussion and	Written tests Class

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	adaptive immunity. Cell vs humoral mediated immune response		Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.3	Recognize the types and structure of both antigens and antibodies	1.1-1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.4	Describe the immunological issue in the context of allergy, autoimmune, immunodeficiency diseases	1.1-1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
2.0	**Skills**			
2.1	Explain how T-cells aid in eliminating pathogens from the body	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			Discovery Learning Collaborative Learning	
2.2	Summarize the role of B-cells and T-cells in the specific immune system	2.1-2.2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Analyze the mechanisms that lead to the removal of pathogens, such as opsonization, complement activation, and other relevant processes	2.1-2.3	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Demonstrate proper immunological laboratory involving microscopy and biochemical techniques	3.1	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.2	Illustrate the ability to communicate their ideas with the instructor at all times during and after the class	3.1-3.2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Use safety measures and operate laboratory	3.3	Modeling Dialogue and discussion	Observation Self-assessment

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	instruments during laboratory sessions		Self-learning Collaborative learning	Peer assessment Achievement file

C. Course Content

No	List of Lecture Topics	Contact Hours
1.	Introduction: Basic concepts and Definitions	2
2.	The Immune system: Organs, cells-I	2
3.	The Immune system: Organs, cells- II	2
4.	Antigen Recognition and Presentation	2
5.	The Immune system: Molecules	2
6.	Antigens	2
7.	Antibodies	2
8.	Immune response	2
9.	Microbial Immune Response	2
10.	Hypersensitivity I	2
11.	Hypersensitivity II	2
12.	Autoimmunity	2
13.	Transplantation Immunology	2
14.	Immunodeficiency	2
15.	Cancer immunology	2
Total		30

No	List of Laboratory Topics	Contact Hours
3.	Introduction: Safety in immunology lab	2
4.	Basic skills: Pipetting and dilutions	2
3.	Histological study for lymph system (thymus gland, lymph nodes, spleen, tonsils)	2
4.	Cell count with hemocytometer	2
5.	Preparation of the blood smear	2
6.	Serology	2
7.	Agglutination tests	2
8.	Precipitation tests	2
9.	Immunodiffusion tests	2

10.	Principles of ELISA	2
11.	Types of ELISA	2
12.	Fluorescent antibody staining and fluorescent microscopy	2
13.	Types of Allergy and allergy tests	2
14.	Western Blot	2
15.	Flow cytometer	2
Total		**30**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Judith A Owen; Janis Kuby; Jenni Punt; Sharon A Stranford Pat Jones, Kuby Immunology 8th ed, (2018), ISBN-13: 978-1429219198. The Immune System (TIS), 3rd edition, Peter Parham (2005), ISBN 978-0-8153-4146-8.
Supportive References	Murphy, K. M., and Weaver, C. (2016) Janeway's Immunobiology, 9th Edition, W. W. Norton & Company, ISBN 978-0815345053.
Electronic Materials	None
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories

Items	Resources
Technology equipment (projector, smart board, software)	Projector and Smart board
Other equipment (depending on the nature of the specialty)	Immunology-related instruments, including safety cabinet, ELISA plate reader, Hemocytometer, Fluorescence microscopes, Flow cytometry

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد
NCAAA

2024
TP-153

Course Specification
(Bachelor)

Course Title: Microtechniques	
Course Code: BIO 1218	
Program: Bachelor of Science in Biology	
Department: Biology	
College: Science	
Institution: Imam Mohammad Ibn Saud Islamic University	
Version: 1	
Last Revision Date: 29 September 2024	

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E. Learning Resources and Facilities 7

F. Assessment of Course Quality 8

G. Specification Approval 8

A. General information about the course:

1. Course Identification

1. Credit hours: 3 (1 lectures, 4 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Level 4 / Year 2)					
4. Course General Description:					
This course deals with 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 are also studied. Theoretical principle and investigative experimental activities are incorporated into this course.					
5. Pre-requirements for this course (if any)**:**					
BIO 1101					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
By the end of the course, the student should be able to: • Prepare microscopic sections and smears from different body tissues and fluids. • Prepare all solutions and stains used for processing. • Preserve and store histological specimens.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	75	100%
2	E-learning	-	-
3	Hybrid	-	-

No	Mode of Instruction	Contact Hours	Percentage
	• Traditional classroom • E-learning		
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	15
2.	**Laboratory/Studio**	60
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		75

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Describe the structure of normal animal cell and its inclusions	1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Define the functions of all cellular components	1.1	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method	Written tests Class discussion questions Class assignments Homework

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			Self-Learning Cooperative Learning Field Visits	Short research/reports Summaries Presentations
2.0	**Skills**			
2.1	Summarize methods of preparation of whole mounts, smears, permanent section, and paraffin embedding and sectioning using microtomes	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Differentiate between the different cellular organelles	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Predict the abnormal ultrastructure of the organelles under different treatments	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Demonstrate ability to communicate with people based on different biological techniques used in	2.2-3.1	Modeling Dialogue and discussion Self-learning Collaborative	Observation Self-assessment Peer assessment

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	biology		learning	Achievement file
3.2	Use laboratory instruments and computers	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Use biological experiments and use various slides during laboratory classes	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No	List of Topics	Contact Hours
1.	Lab safety rules and instructions	5
2.	Lab equipment	5
3.	Introduction to microtechnique	5
4.	Classification of microtechnique methods	5
5.	Measurement tools	5
6.	Preparation of standard, normal and molar solutions	5
7.	Dissecting tools	5
8.	Preparation of histological specimens	5
9.	Microtomes, types and uses	5
10.	Preparation of biological slides	5
11.	Microscopes, types and uses	5
12.	Hemocytometers	5
13.	Preparation and examination of blood smears	5
14.	Centrifuges, types and uses	5
15.	Spectrophotometers, types and uses	5
Total		**75**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Lab reports	During the semester	10%
3.	Lab Exam 1	5^{th} week	20%
4.	Lab Exam 2	10^{th} week	20%
5.	Final Exam	16^{th} week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	https://sites.google.com/a/koyauniversity.org/mit6115/description
Supportive References	http://ac.els-cdn.com/0026265X71900816/1-s2.0-0026265X71900816-main.pdf
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	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories
Technology equipment (projector, smart board, software)	Projector and Smart board
Other equipment (depending on the nature of the specialty)	Specific laboratory equipment for this course including posters, models of different experimental animals, dissection instruments, light microscopes, dissection microscopes, microtome instrument, slide preparations, mixer, microscopes, and centrifuges, incubators, ovens and other glassware

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد
NCAAA

2024
TP-153

Course Specification
(Bachelor)

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	
Version: 1	
Last Revision Date: 29 September 2024	

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A. General information about the course:

1. Course Identification

1. Credit hours: 3 (2 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Level 4 / Year 2)					
4. Course General Description:					
This course deals with nucleic acids and proteins and how these molecules interact within the cell to promote proper growth, division, and development. It offers a detailed analysis of the biological systems at the molecular level in prokaryotic and eukaryotic organisms. It focuses on the structure, function and metabolism of nucleic acids. Topics include nucleic acids structure and function, DNA structure and replication, RNA transcription and processing, as well as translation. It provides students with an appreciation of the experimental approaches used in molecular biology.					
5. Pre-requirements for this course (if any)**:**					
BIO 1231					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
The objective of the course is to provide the students with the basic knowledge about the structure and function of nucleic acids. It also aims to provide the students with an overview of DNA replication, repair, transcription, RNA processing, and translation of RNA transcripts into proteins in both prokaryotes and eukaryotes. In addition, it provides the students with a detailed understanding of the fundamental principles of how gene expression is regulated in both prokaryotes and eukaryotes.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Describe the basic molecular structure and function of nucleic acids and proteins	1.2-2.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Outline the	1.2	Interactive Lecture Discussion and	Written tests Class

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	mechanisms of DNA replication, repair, transcription, gene regulation, RNA processing and translation in prokaryotes & eukaryotes		Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	discussion questions Class assignments Homework Short research/reports Summaries Presentations
2.0	**Skills**			
2.1	Analyze and contrast flow of genetic information and regulation of gene expression in both prokaryotes and eukaryotes	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Plan and use standard molecular biology techniques to isolate, purify and analyze nucleic acids and proteins	2.1-2.3	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Analyze and interpret molecular biology data using standard molecular tools	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
3.1	Assemble and summarize information from a variety of sources (textbooks, research papers and review articles), and use information technology to prepare, process and present information	2.2-3.1	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.2	Compose and show ideas effectively both orally and in writing	3.2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Perform independently and as a member of a team	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No	List of Lecture Topics	Contact Hours
1.	The molecular nature of the genome	2
2.	Gene structure, organization, and function	2
3.	Structures, properties and functions of nucleic acids	2
4.	DNA replication in prokaryotes and eukaryotes	2
5.	DNA damage and repair mechanisms	2
6.	Transcription (RNA synthesis) in prokaryotes and eukaryotes	2
7.	Post-transcriptional events (capping, polyadenylation, and splicing)	2
8.	Translation (protein synthesis) in prokaryotes and eukaryotes	2
9.	Regulation of gene expression in prokaryotes and eukaryotes	2
10.	Nucleic acids extraction	2

11.	Polymerase chain reaction	2
12.	Gel electrophoresis	2
13.	Restriction enzymes	2
14.	Blot (Southern blot, Northern blot, and Western Blot)	2
15.	DNA sequencing	2
Total		**30**

No	List of Laboratory Topics	Contact Hours
3.	Isolation of DNA	2
4.	Isolation of RNA	2
3.	Polymerase chain reaction	2
4.	Gel electrophoresis	2
5.	Restriction enzymes	2
6.	Southern blot	2
7.	Northern blot	2
8.	Western Blot	2
9.	DNA sequencing	2
10.	Web-based Molecular Biology Tools Gene https://www.ncbi.nlm.nih.gov/gene	2
11.	Web-based Molecular Biology Tools Protein https://www.ncbi.nlm.nih.gov/protein	2
12.	Web-based Molecular Biology Tools Basic Local Alignment Search Tool (BLAST) https://blast.ncbi.nlm.nih.gov/Blast.cgi Standard Nucleotide BLAST	2
13.	Web-based Molecular Biology Tools Basic Local Alignment Search Tool (BLAST) https://blast.ncbi.nlm.nih.gov/Blast.cgi Standard Protein BLAST	2
14.	Web-based Molecular Biology Tools Basic Local Alignment Search Tool (BLAST) https://blast.ncbi.nlm.nih.gov/Blast.cgi Primer-BLAST (a tool for finding specific primers)	2
15.	Web-based Molecular Biology Tools Single nucleotide variations https://www.ncbi.nlm.nih.gov/snp/	2
Total		**30**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Victor A. Bloomfield, Donald M. Crothers, Ignacio Tinoco, John E. Hearst, David E. Wemmer, Peter A. Killman, Douglas H. Turner (2000). Nucleic Acids: Structures, Properties, and Functions, 1st Edition, University Science Books. James D. Watson, Tania A. Baker, Stephen P. Bell, Alexander Gann, Michael Levine, Richard Losick (2013). Molecular Biology of the Gene, 7th Edition, Pearson.
Supportive References	Robert F. Weaver. (2011) Molecular Biology, 5th Edition, McGraw-Hill Education. Michael M. Cox, Jennifer Doudna, Michael O'Donnell. (2015) Molecular Biology: Principles and Practice, 2nd Edition, W. H. Freeman.
Electronic Materials	Web-based Molecular Biology Tools
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories
Technology equipment (projector, smart board, software)	Projector and Smart board
Other equipment (depending on the nature of the specialty)	Molecular Biology-related instruments, including safety cabinet, centrifuges, incubators, thermal

Items	Resources
	cyclers, trans-illuminators, gel electrophoresis apparatus

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

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NCAAA

2024
TP-153

Course Specification
(Bachelor)

Course Title: Bacteriology	
Course Code: BIO 1242	
Program: Bachelor of Science in Biology	
Department: Biology	
College: Science	
Institution: Imam Mohammad Ibn Saud Islamic University	
Version: 1	
Last Revision Date: 29 September 2024	

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A. General information about the course:

1. Course Identification

1. Credit hours: 3 (2 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☒ Required			☐Elective	
3. Level/year at which this course is offered: (Level 4 / Year 2)					
4. Course General Description:					
This 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.					
5. Pre-requirements for this course (if any)**:**					
BIO 1241					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
By the end of the course, 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.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-

No	Mode of Instruction	Contact Hours	Percentage
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
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	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	State how specific bacterial pathogens, interact with their host to cause disease	1.1-1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method	Written tests Class discussion questions Class assignments

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			Inductive Method Self-Learning Cooperative Learning Field Visits	Homework Short research/reports Summaries Presentations
2.0	**Skills**			
2.1	Develop a knowledge base of principles of microbial taxonomy, structure, physiology and function	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Prepare the laboratory to diagnose infections, including appropriate specimen collection and test ordering	2.2-2.3	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Illustrate the ability to communicate their ideas with the instructor at all times during and after the class	2.2-3.1	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.2	Use laboratory instruments and computers.	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
				file
3.3	Demonstrate the different types of microorganisms	2.2-3.1	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

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.	4
2.	Cell Membrane: Structure, function and chemical composition of bacterial and archaeal cell membranes	4
3.	Cytoplasm: Ribosomes, mesosomes, inclusion bodies, nucleoid, chromosome and plasmids	4
4.	Endospore: Structure, formation, stages of sporulation	4
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.	4
6.	Growth and nutrition. Nutritional requirements in bacteria and nutritional categories.	4
7.	Culture media: components of media, natural and synthetic media, chemically defined media, complex media, selective, differential, indicator, enriched and enrichment media.	4
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.	4
9.	Reproduction in Bacteria. Asexual methods of reproduction, logarithmic representation of bacterial populations, phases of growth, calculation of generation time and specific growth rate.	4

10.	Bacterial Systematics. Aim and principles of classification, systematics 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.	4
11.	Differences between eubacteria and archaebacteria.	4
12.	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).	4
13.	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
14.	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.	4
15.	Cyanobacteria	4
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	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.
Supportive References	https://legacy.saylor.org/bio407/Intro/
Electronic Materials	https://archive.org/details/fundamentalprinc029784mbp
Other Learning Materials	None

2. Required Facilities and equipment

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

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

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NCAAA

2024
TP-153

Course Specification
(Bachelor)

Course Title: Environmental Impact Assessment	
Course Code: BIO 1252	
Program: Bachelor of Science in Biology	
Department: Biology	
College: Science	
Institution: Imam Mohammad Ibn Saud Islamic University	
Version: 1	
Last Revision Date: 29 September 2024	

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A. General information about the course:

1. Course Identification

1. Credit hours: 2 (1 lecture, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☒ Required			☐Elective	
3. Level/year at which this course is offered: (Level 4 / Year 2)					
4. Course General Description:					
This course describes the principles, processes, and necessary techniques for environmental impact assessment.					
5. Pre-requirements for this course (if any)**:**					
BIO 1251					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
On successfully completing this course, the students will be able: • Understand fundamentals and tools of environmental impact assessment, mitigation and monitoring. • To evaluate the impacts on natural resources, ecological system and community.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-

No	Mode of Instruction	Contact Hours	Percentage
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	15
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		45

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Define principle of environmental impact assessment	1.1-1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Recognize processes of environmental impact assessment	1.1-1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning	Written tests Class discussion questions Class assignments Homework Short research/reports

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			Field Visits	Summaries Presentations
2.0	**Skills**			
2.1	Contrast theoretical of each resource dimension to the environmental impact assessment	2.3	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Develop analytical thinking	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Interpret integrated knowledge to enhance skills on environmental impact assessment	2.2- 2.3	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Show ability to work in a team and solve the problem regarding the environmental issues	2.1-2.2-3.1	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
3.2	Illustrate the principle and result of assessment on environmental impact from assignment	3.1-3.2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Use laboratory instruments and computers	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to EIA	3
2.	Introduction to SEA	3
3.	Introduction to HIA	3
4.	The steps and EIA processes	3
5.	Acts, laws, and regulations	3
6.	Assessment of impact on ecosystem dimension (Terrestrial ecosystem)	3
7.	Assessment of impact on ecosystem dimension (Aquatic ecosystem)	3
8.	Assessment of impact on physical environmental dimension (soil and land)	3
9.	Assessment of impact on physical environmental dimension (water resources)	3
10.	Assessment of impact on physical environmental dimension (air)	3
11.	Assessment of Quality-of-life dimension (socioeconomic)	3
12.	Assessment of Quality-of-life dimension (health)	3
13.	Public participation and public hearing in EIA process	3
14.	Monitoring environmental impacts	3
15.	Mitigation environmental impacts	3
Total		**45**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	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.
Supportive References	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	None
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories
Technology equipment (projector, smart board, software)	Projector and Smart board
Other equipment (depending on the nature of the specialty)	Specific laboratory equipment for this course including posters, models of different

Items	Resources
	experimental animals, dissection instruments, light microscopes , dissection microscopes, microtome instrument, slide preparations, mixer, fluorescent microscopes, instruments for measurements of environmental parameters, centrifuges, incubators, ovens and other glassware

F. Assessment of Course Quality

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

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)
Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

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2024
TP-153

Course Specification
(Bachelor)

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	
Version: 1	
Last Revision Date: 29 September 2024	

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G. Specification Approval 9

A. General information about the course:

1. Course Identification

1. Credit hours: 3 (2 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐ College	☒ Program	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Level 5 / Year 3)					
4. Course General Description:					
This course provides the students with the fundamentals of the body systems functions. The course focuses on the physiological concept of body organization starting from the level of atoms and molecules reaching to the full organization of an organism. The various physiological processes of the body are presented along with the coordination between the different organ systems. The processes of homeostasis and the relevant control mechanisms are also introduced.					
5. Pre-requirements for this course (if any)**:**					
BIO 1237					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
Upon completion of this course, the students should be able: • To recognize the parts of the body that are linked into a whole functioning unit. • To know gastrointestinal physiology and regulation of metabolism and energy balance. • To define 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 related to reproductive physiology.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Identify the organization levels of the organism (from atoms to full organism), and the structure/ function relationships of the various cells and tissues	1.1	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Outline the functions	1.2	Interactive Lecture Discussion and	Written tests Class

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	and regulatory mechanisms of the major physiological systems including metabolism, circulatory, respiratory, digestive, urinary, reproductive, muscular, nervous, and endocrine systems		Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.3	Explain how two or more organ systems are integrated to accomplish certain physiological functions	1.1-1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.4	Discuss the significance of homeostasis in maintaining the equilibrium of the internal environment of the body	1.3	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
2.0	**Skills**			
2.1	Relate the principles of chemistry and physics with	2.1	Practical Application Microteaching Modeling and	Observation / Rating Scales Practical Tests Self-

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	physiology concepts to understand the underlying physiological mechanisms		Simulation Project-Based Learning Discovery Learning Collaborative Learning	Assessment Peer Assessment
2.2	Design a minor experiment and consequently conduct laboratory experimental work by employing the acquired practical skills and convenient tools	2.1-2.2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Analyze and interpret the experimental results by using critical thinking skills, quantitative reasoning, and analytical statistical methods	2.3	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Perform the assigned work independently, and cooperate effectively with a work team	3.1	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.2	Communicate scientific data clearly through writing formats and oral presentations	3.2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
				file
3.3	Adhere to the ethical rules related to the activities in the field of physiology	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No	List of Lecture Topics	Contact Hours
1.	Introduction to the course, Basic Body Organization	2
2.	Homeostasis and Feedback Control	2
3.	Cellular Reactions and Metabolism	2
4.	Cellular Metabolism	2
5.	Regulation of Metabolism and Energy Balance	2
6.	Gastrointestinal Physiology	2
7.	Cardiovascular Physiology	2
8.	Respiratory System	2
9.	Control of Respiration	2
10.	Urinary System Kidneys and Fluid/Electrolyte Balance	2
11.	Muscles	2
12.	Muscular Control	2
13.	Cells of the Nervous System, NS organization	2
14.	Endocrine Glands and Hormones	2
15.	Reproductive Physiology	2
Total		**30**

No	List of Laboratory Topics	Contact Hours
1.	Introduction	2
2.	Administrative issues and Lab safety	2
3.	Hypothesis testing and data presentation	2
4.	Detection of digestive enzymes	2
5.	Osmoregulation (RBCs fragility)	2
6.	Determination of blood components	2
7.	Determination of hemoglobin and hematocrit	2

8.	Blood pressure, heart rate, and rat guts	2
9.	Urine analysis	2
10.	Frog skeletal muscles	2
11.	Cardiac dynamics	2
12.	Special senses and reflexes	2
13.	Vertebrate thermoregulation	2
14.	Some physiological estimations	2
15.	Metabolic rate and body size	2
Total		**30**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

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

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms,	Classrooms and Laboratories

Items	Resources
simulation rooms, etc.)	
Technology equipment (projector, smart board, software)	Projector and Smart board
Other equipment (depending on the nature of the specialty)	Specific laboratory equipment for this course including posters, models of different experimental animals, dissection instruments, light microscopes, dissection microscopes, microtome instruments, slide preparations, mixer, fluorescent microscopes, counter and coulter for hematological parameters, spectrophotometer physiological chemistry, centrifuges, incubators, ovens, and other glassware

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

Course Specification
(Bachelor)

Course Title:	Plant Anatomy and Physiology
Course Code:	BIO 1322
Program:	Bachelor of Science in Biology
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University
Version:	1
Last Revision Date:	29 September 2024

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A. General information about the course:

1. Course Identification

1. Credit hours: 3 (2 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Level 5, Year 3)					
4. Course General Description:					
The course introduces the students to the principles of plant anatomy and physiology. The topics include the structure of the various types of plant cells, tissues and organs. This course emphasizes the major vital physiological processes and their mechanistic pathways that take place in the diverse plant species. These vital processes encompass photosynthesis and responses to light and stresses, water relations and internal transport, primary and secondary growth, adaptations to different environmental factors, mineral nutrition, regulation of growth and development. In addition, the developmental stages of flowers, fruit, and seeds in relation to their structure and function, senescence and dormancy are emphasized. The life cycle of flowering plants is employed as a model for investigating the principal physiological processes incorporated in the survival, growth, and reproduction of plants. The designed Lab sessions provide the students with in-hand experience and practical skills on the main physiological processes such as photosynthesis, seed germination, and water potential using living plant specimens. The group and lab work and reports emphasize analysis, presentation, and interpretation of physiological data.					
5. Pre-requirements for this course (if any)**:**					
BIO 1251					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					

The main aim of the course is to present the basic knowledge of Plant Anatomy and Physiology to the students of Biology Program. One of the course ojectives is to provide the fundamental knowledge of the structure and functions of plants which constitutes the essential prerequisite to get aquanted with the knowledge submitted in other curriculm courses. These include the courses dealing with other scientific disciplines, such as Genetics, Cell Biology, and Biotechnology. To achieve the targeted objectives, the course is divided into major sections that describe the organizational structure in relation to the functions starting from the plant cell to the level of the whole plant organs. The designed lab sessions support and greatly enforce the acquired knowledge and give the students the opportunity to have in-hand experience to recognize the principal anatomical characteristics of plants and the main relevant physiological processes.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Outline the major anatomical structures and their functions in the higher plants at the level of cells, tissues, and organs	K1	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Recognize the macroscopic characters and the microscopic morphological features of plant tissues	K2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.3	Describe the various central physiological processes that are vital for growth and reproduction of plants	K3	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.4	Explain the diverse structure-function	K2, K3	Interactive Lecture Discussion and	Written tests Class

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	inter-relationships that enable plants to perform the vital processes and adapt to different environments		Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	discussion questions Class assignments Homework Short research/reports Summaries Presentations
2.0	**Skills**			
2.1	Relate and utilize the acquired knowledge of plant anatomy and physiology in the various relevant fields	S1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Design and conduct research work in the field of plant physiology using the proper tools and techniques	S2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Analyze and interpret the experimental and field data using the appropriate statistical methods	S3	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	Values, autonomy, and responsibility			

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
3.1	Demonstrate the ability to work independently and cooperate with a team	V1	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.2	Share in the specialized meetings and present the scientific data either orally or in written formats	V2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Adhere to the ethics and regulations while performing a research work in the field of plant physiology	V3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No	List of Topics (Lectures)	Contact Hours
1.	Introduction to Plant Anatomy: -Overview of plant structure and function -Importance of plant anatomy in botany and agriculture -Basic tools and techniques for studying plant anatomy (microscopy, staining, etc.)	**2**
2.	Plant Cell Structure: -Structure and function of plant cell organelles -Differences between plant and animal cells -Cell wall composition and function	**2**
3.	Plant Tissues – Meristematic and Permanent Tissues: -Types of meristematic tissues (apical, lateral, intercalary) -Classification of permanent tissues (simple and complex) -Functions of parenchyma, collenchyma, and sclerenchyma	**2**
4.	Plant Tissues – Vascular Tissues: -Structure and function of xylem and phloem -Primary and secondary growth in plants	**2**

	-Differences between monocot and dicot vascular bundles	
5.	Root Anatomy: -Internal structure of roots (monocot vs. dicot) -Root modifications and their functions -Role of roots in water and nutrient absorption	**2**
6.	Stem Anatomy: -Internal structure of stems (monocot vs. dicot) -Stem modifications and their functions -Role of stems in support and transport	**2**
7.	Leaf Anatomy: -Internal structure of leaves (monocot vs. dicot) -Adaptations of leaves for photosynthesis and transpiration -Leaf modifications and their functions	**2**
8.	Transition to Pant Physiology: -Introduction to plant physiology: scope and importance Water Relations in Plants: -Overview of physiological processes in plants -Properties of water and its role in plants -Water potential, osmosis, and plasmolysis -Absorption and transport of water	**2**
9.	Mineral Metabolism: -Essential mineral elements and their functions -Mechanisms of nutrient uptake and transport -Role of mycorrhizae and nitrogen-fixing bacteria	**2**
10.	Photosynthesis: -Light and dark reactions of photosynthesis -Factors affecting photosynthesis -Adaptations for photosynthesis in different environments	**2**
11.	Respiration: -Glycolysis, Krebs cycle, and electron transport chain -Aerobic vs. anaerobic respiration in plants -Factors affecting respiration	**2**
12.	Plant Hormones and Growth Regulation: -Types of plant hormones (auxins, gibberellins, cytokinins, ethylene, abscisic acid) -Roles of hormones in growth, development, and stress responses	**2**
13.	Plant Movements and Tropisms: -Types of plant movements (tropic and nastic) -Mechanisms of phototropism, gravitropism, and thigmotropism	**2**
14.	Stress Physiology: -Plant responses to abiotic stresses (drought, salinity, temperature) -Mechanisms of stress tolerance and adaptation	**2**
15.	Reproduction and Senescence:	**2**

	-Physiological aspects of flowering, pollination, and seed development -Senescence and programmed cell death in plants	
Total		**30**

No	List of Topics (Labs)	Contact Hours
1	-Introduction to the microscope and slide preparation -Observation of plant cells and tissues	**2**
2	-Microscopic examination of plant cells (e.g., onion epidermis, Elodea) -Staining techniques for cell wall visualization	**2**
3	-Identification of meristematic and permanent tissues in plant sections -Comparative study of tissue types in stems, roots, and leaves	**2**
4	-Microscopic examination of xylem and phloem in stem and root cross-sections -Demonstration of secondary growth in woody plants	**2**
5	-Study of root cross-sections and root hairs -Observation of root modifications (e.g., storage roots, prop roots)	**2**
6	-Microscopic examination of stem cross-sections -Observation of stem modifications (e.g., rhizomes, tubers, tendrils)	**2**
7	-Microscopic examination of leaf cross-sections -Observation of leaf modifications (e.g., spines, tendrils, succulent leaves)	**2**
8	-Demonstration of physiological processes (e.g., osmosis, diffusion)	**2**
9	-Experiments on osmosis and water potential -Demonstration of root pressure and guttation	**2**
10	-Hydroponics experiment to study nutrient deficiency symptoms -Analysis of soil and plant nutrient content	**2**
11	-Experiments on the rate of photosynthesis (e.g., light intensity, CO2 concentration) -Chromatography of photosynthetic pigments	**2**
12	-Measurement of respiration rate in germinating seeds -Demonstration of fermentation in plant tissues	**2**
13	-Experiments on hormone effects (e.g., auxin on root growth, ethylene on fruit ripening) -Experiments on tropic responses (e.g., phototropism in seedlings)	**2**
14	-Experiments on stress responses (e.g., effect of salinity on seed germination)	**2**
15	-Observation of flower structure and seed development -Experiments on seed dormancy and germination	**2**
	Total	**30**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	**Mid-term Exam 1**	5th week	15%
2.	**Mid-term Exam 2**	10th week	15%
3.	**Assignments, presentations, data search, attendance, participations**	During the course period	10%
4.	**Final Lab Exam**	15th week	20%
4.	**Final Exam**	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Taiz L, Zeiger E. Plant Physiology. 5th ed. Sunderland, MA: Sinauer Associates, Inc. Publishers; 2010. ISBN: 978-0-87893-866-7. Raven PH, Evert RF, Eichhorn SE. Biology of Plants. 8th ed. New York: W.H. Freeman and Company; 2013. ISBN: 978-1-4292-1961-7. Moore R, Clark WD, Vodopich DS. Botany. 3rd ed. New York: McGraw-Hill Education; 2010. ISBN: 978-0-07-122212-9.
Supportive References	Beck CB. An Introduction to Plant Structure and Development: Plant Anatomy for the Twenty-First Century. 2nd ed. Cambridge: Cambridge University Press; 2010. ISBN: 978-0-521-51805-5. Raven PH, Evert RF, Eichhorn SE. Biology of Plants. 8th ed. New York: W.H. Freeman and Company; 2013. ISBN: 978-1-4292-1961-7. Mauseth JD. Plant Anatomy: An Applied Approach. Oxford: Blackwell Publishing; 2008. ISBN: 978-1-4051-2679-3.
Electronic Materials	-
Other Learning Materials	-

2. Required Facilities and equipment

Items	Resources

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms, Laboratories
Technology equipment (projector, smart board, software)	Projector, smart board
Other equipment (depending on the nature of the specialty)	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, gel electrophoresis, centrifuges, incubators, ovens, other glassware specific for plant anatomy and physiology, and automated micropipettes

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

Course Specification
(Bachelor)

Course Title: Parasitology	
Course Code: BIO 1343	
Program: Bachelor of Science in Biology	
Department: Biology	
College: Science	
Institution: Imam Mohammad Ibn Saud Islamic University	
Version: 1	
Last Revision Date: 29 September 2024	

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G. Specification Approval 10

A. General information about the course:

1. Course Identification

1. Credit hours: 3 (2 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☒ Required			☐Elective	
3. Level/year at which this course is offered: (Level 5 / Year 3)					
4. Course General Description:					
This course provides the students with an understanding of the parasitic infections, their significance, and the susceptible hosts. It also covers the host-parasite relationships and emphasizes the biology of parasites, including their classification and morphological features. The coursework covers unicellular protozoal parasites and helminths, with a focus on medically important parasites. By studying the life cycle of parasites, students learn to identify the different developmental stages and modes of transmission. The course also provides an overview of the epidemiology of parasitic infections, including endemic and epidemic diseases, and preventive and control measures. Students will gain specialized knowledge in identifying appropriate clinical specimens and laboratory methods required for diagnosing parasitic infections.					
5. Pre-requirements for this course (if any)**:**					
BIO 1111					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
By the successful completion of the course, the student will be able to: • Develop an understanding of the nature of parasitic associations and appreciate their significance. • Understand the terminology commonly used in parasitology. • Understand the ecology and life cycles of various host-parasite associations. • Develop an understanding of the physiological, morphological, and behavioral modifications needed to adopt a parasitic lifestyle.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Outline the major taxonomic groups of the medically important parasites and their characteristic morphologic features	1.1	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Explain the various host-parasite relationships, and	1.1-1.2	Interactive Lecture Discussion and Dialogue	Written tests Class discussion

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	the parasitic infections responsible for clinical diseases in humans and animals		Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	questions Class assignments Homework Short research/reports Summaries Presentations
1.3	Describe the life cycles of the main parasitic groups including protozoal and helminth parasites, and the related appropriate preventative and control measures	1.1-1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.4	Identify the common transmission modes of parasitic infections, and the proper clinical specimens necessary to establish a laboratory diagnosis	1.1-1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
2.0	**Skills**			
2.1	Employ the proper laboratory methods and techniques to diagnose and differentiate parasitic infections	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			Collaborative Learning	
2.2	Write a short proposal and conduct minor laboratory work to investigate the focused parasites using microscopy and other technical methods	2.2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Interpret the laboratory results using the acquired technical skills, and relate the findings to the corresponding clinical parasitic infections	2.1-2.2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Perform the assigned work independently in a safe environment and cooperate effectively with a team	3.1	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.2	Communicate issues of parasitology clearly, and present the scientific data through oral presentations and written formats	3.2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Adhere to the relevant ethics while working in the field of parasitology	3.2-3.3	Modeling Dialogue and discussion Self-learning	Observation Self-assessment Peer

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			Collaborative learning	assessment Achievement file

C. Course Content

No	List of Lecture Topics	Contact Hours
1.	Introduction to parasitology	2
2.	The significance of parasitism in world affairs; general principles and concepts; transmission; factors influencing parasitism; outcomes and implications of parasitism	2
3.	Outline of “areas of responsibility” for selected groups of parasites	2
4.	Introduction to the protozoa Terminology, structures, major life cycle events, and systematics	2
5.	Amoebae General: structure, life history Amebiasis: course of infection, pathology, treatment, and prognosis Epidemiology: of intestinal amoebae Diagnosis: various techniques	2
6.	Flagellates (intestinal and urogenital) General: structure, life history	2
7.	Hemoflagellates of humans General: structure and life history Leishmania: Kala-azar, cutaneous and mucocutaneous Trypanosomes: trypanosomiasis & world affairs, African and American trypanosomiasis	2
8.	Apicomplexa General: anatomy, structure, life history General Coccidiosis: economic impact in animals, role as human pathogens Toxoplasma, Eimeria & Cryptosporidium: epidemiology and course of infection	2
9.	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	2
10.	Introduction to Trematoda General: Adult anatomy/ reproductive biology; life cycles/development	2
11.	Schistosomes General: course of infection, histopathology, treatment and prognosis Schistosomiasis and human affairs: antigenic mimicry Ecological models: approaches to parasite control Cercarial dermatitis	2
12.	Other Trematodes Liver flukes life histories, epidemiology, and pathology Lung flukes: life histories, epidemiology, and pathology	2

13.	Cestodes General: life history patterns among cestodes Pseudophyllidea of humans: dibothriocephaliasis and sparganosis Cyclophyllidiea of humans: Taenia and Echinococcus Larval tapeworms: human disease	2
14.	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
15.	Parasitism and World Affairs Molecular techniques in control and prevention of parasitic disease Why are there no vaccines?	2
Total		**30**

No	List of Laboratory Topics	Contact Hours
1.	Sarcodina (Entamoeba)	2
2.	Sarcodina (Balantidium)	2
3.	Mastigophora (Guardia)	2
4.	Mastigophora (Trichomonas)	2
5.	Mastigophora (Trypanosome and Leishmania)	2
6.	Mastigophora (Trypanosome and Leishmania)	2
7.	Mastigophora (Trypanosome and Leishmania)	2
8.	Apicomplexa (Plasmodium)	2
9.	Apicomplexa (Plasmodium)	2
10.	Trematodes (Fasciola)	2
11.	Trematodes (Schistosome)	2
12.	Cestodes (Taenia)	2
13.	Cestodes (Taenia)	2
14.	Nematodes (Ascaris)	2
15.	Nematodes (Ascaris)	2
Total		**30**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5^{th} week	15%

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	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.
Supportive References	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	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories
Technology equipment (projector, smart board, software)	Projector and Smart board
Other equipment (depending on the nature of the specialty)	Specific laboratory equipment for this course including posters, models of different experimental animals, dissection instruments, light microscopes, dissection microscopes, microtome instruments, slide preparations, mixer, fluorescent microscopes, specific stains, centrifuges, incubators, ovens, and other glassware

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

Course Specification

(Bachelor)

Course Title: Entomology	
Course Code: BIO 1353	
Program: Bachelor of Science in Biology	
Department: Biology	
College: Science	
Institution: Imam Mohammad Ibn Saud Islamic University	
Version: 1	
Last Revision Date: 29 September 2024	

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A. General information about the course:

1. Course Identification

1. Credit hours: 3 (2 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☒ Required			☐Elective	
3. Level/year at which this course is offered: (Level 5 / Year 3)					
4. Course General Description:					
This course is 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.					
5. Pre-requirements for this course (if any):					
BIO 1111					
6. Co-requisites for this course (if any):					
None					
7. Course Main Objective(s):					
On successfully completing this course, the students will be able: • To appreciate the value and importance of insects. • To learn about the classification, biology, ecology, behavior, 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.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Define the insect world and their position in the animal kingdom	1.1	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Outline the reasons	1.1-1.2	Interactive Lecture	Written tests

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	for the spread of insects, general characteristics and morphology of insects		Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
2.0	**Skills**			
2.1	Reconstruct information about the functions of the organs and arrange them logically and sequentially	2.2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Compare organs of the body and the interpretation of its mechanisms	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Explain and identify the relationship between cause and consequence in the different mechanisms	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
3.0	Values, autonomy, and responsibility			
3.1	Appraise the collaborative work and to accept criticism from others	3.1	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.2	Illustrate non-verbal understanding and effective cooperation and discussion	3.1-3.2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Use of computers and means of modern technology	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

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

10.	Nervous system: its divisions, nerve conduction, the members of the Sense, mechanical and chemical receptors, members of hearing and vision	2
11.	Muscular system: muscle types, their structure	2
12.	Excretory system: excretory organs and excretory process	2
13.	Reproductive system: its structure, methods of reproduction	2
14.	A brief study of the growth after embryonic including types of Transformation	2
15.	Types of larvae and pupae in insects	2
Total		**30**

No	List of Laboratory Topics	Contact Hours
1.	Exterior shape of insects	2
2.	Cockroach	2
3.	Various appendages of body and its modifications	2
4.	Mouth parts, Antennae, legs, wings, and growths	2
5.	Anatomy of typical insects	2
6.	Chest	2
7.	Abdomen	2
8.	Digestive system	2
9.	Circulatory system	2
10.	Respiratory system	2
11.	Nervous system	2
12.	Muscular system	2
13.	Excretory system	2
14.	Reproductive system	2
15.	larvae and pupae	2
Total		**30**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	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.
Supportive References	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.
Electronic Materials	http://www.ent.iastate.edu/LIST http://www.chenowith.k12.or.us/TECH/subject/science/bugs.html
Other Learning Materials	None

2. Required Facilities and equipment

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

F. Assessment of Course Quality

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

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)
Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد
NCAAA

2024
TP-153

Course Specification
(Bachelor)

Course Title: Analytical Analysis	
Course Code: CHM 1307	
Program: Bachelor of Science in Biology	
Department: Chemistry	
College: Science	
Institution: Imam Mohammad Ibn Saud Islamic University	
Version: 1	
Last Revision Date: 2 October 2024	

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A. General information about the course:

1. Course Identification

1. Credit hours:					
4 (3 Lectures, 3 Lab, 0 Tutorial)					
2. Course type					
A.	☐University	☐ College	☒ Program	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Level 5/ Year 3)					
4. Course General Description:					
This course introduces 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.					
5. Pre-requirements for this course (if any)**:**					
CHM 1101					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
By the end of this course, the student should be able: • 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.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	90	100%
2	E-learning	0	0
3	Hybrid • Traditional classroom • E-learning	0	0
4	Distance learning	0	0

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	**45**
2.	**Laboratory/Studio**	**45**
3.	**Field**	**0**
4.	**Tutorial**	**0**
5.	**Others (specify)**	**0**
Total		**90**

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Rcognize the main principles of analytical chemistry.	K1	Lecturing	Short quizzes
1.2	State formula related to statistics and the effect of different errors on the analytical results	K2	Solving problems, Homework, and assignment	Homework and assignment marks and written exams
1.3	List some of the analytical chemistry methods and types of concentration expressions.	K1, K2	Discussions, Laboratory classes	Quizzes and MCQs, laboratory report
2.0	**Skills**			
2.1	Differentiate between the types of statistical errors and predict results obtained from chemical analysis statistically	S1, S3	Lecturing and oral discussion	Short quizzes and Multiples Choice Questions
2.2	Design accurate chemical analysis through accurate preparation of standards and reagents	S1, S3	Lectures supported by laboratory experiments	Homework assignment, Examination and laboratory sheet
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	K2, S2, S3	Lecturing and oral discussion supported by laboratory experiments	Examination and laboratory report

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	use mail and Network to communicating with others			
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	Seminars lab experiment Encourage students to use electronic mail and blackboard to submit works and assessments.	Presentation marks Oral tests and lab sheets Assignments and homework Laboratory performance Laboratory reports and sheet
3.0	**Values, autonomy, and responsibility**			
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	Group discussion, assignments and homework Lab-reports Virtual labs and demonstrations	Oral tests, lab performance, Lab-reports and sheets Marks Assignments and homework marks

C. Course Content

No	List of Topics	Contact Hours
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.	5
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.	5
3.	Statistics and data analysis in analytical chemistry: Experimental Errors, Significant Figures, Significant Figures in arithmetic,	5

	Addition and Subtraction, Multiplication and Division. Graphs, logarithms and antilogarithms, Types of Errors, Systematic and Random Errors, Precision and Accuracy.	
4.	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.	5
5.	Introduction to titration: Some terms used in volumetric Titrimetry, Standard solutions, Primary standard substances, Indicators, titration error, The requirements of a titration, Types of titrations, Back-titration, Direct titration, Indirect titration, Percent Purity Calculations.	5
6.	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.	5
7.	Oxidation/Reduction Titrations: Redox titration, Visual Detection of the End Point, Self-Indication, Redox indicators, Starch indicator, Titrations Involving Iodine: Iodimetry and Iodometry.	5
8.	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.	5
9.	Precipitation Titrations: Introduction to Precipitation Titrations, Argentometric titrations, Precipitation Titration Curves, Methods of Precipitation Titrations, Mohr method, Volhard method.	5
	List of Topics (Laboratory)	
1.	Preparing Chemical Solutions by Physical Methods (w/v%, g/L, ppm) Making a standard solution using solid reagents.	4
2.	Part 1: Preparation and standardization of solutions by Chemical method [Molarity, Normality and molality]. Part 2: Dilution of Solutions by different methods.	5
3.	Quality Control and Assurance of Weight Measurements. (A) Statistical Evaluation of Measurements (Panadol Tablets). (B) Quality Control Chart.	4
4.	Preparation of Buffers: [Preparation of buffer pH= 9.5, Preparation of buffer pH= 5], buffer capacity and range.	5
5.	Determination of the citric acidic content in lemon juice (Direct titration).	5
6.	Determination of calcium carbonate (back titration).	4
7.	Preparation of triodide solution (I^{3-}). Iodimetric titration of Vitamin	4

	C tablets.	
8.	Iodometric titration: Determination of Copper (II) using sodium thiosulfate.	5
9.	Complexometric Titrations: Determination of calcium by EDTA using EBT (back titration).	4
10.	Precipitation Titration: Standardization of Silver Nitrate Solution, and determination of Chloride by the Mohr Method.	5
Total		**90**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	**Quizzes, Attendance, Participation, Homework**	**During the semester**	**10 %**
2.	**Laboratory**	**During the semester**	**30 %**
3.	**Midterm Exam 1**	**5th week**	**10 %**
4.	**Midterm Exam 2**	**10th week**	**10 %**
5.	**Final Exam**	**16th week**	**40 %**

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	**Gary D. Christian, Purnendu K. (Sandy) Dasgupta, Kevin A.Schug. Analytical Chemistry, 7th Edition. ISBN: 978-0-470-88757-8.**
Supportive References	**Douglas A. Skoog, Donald M. West, F. James Holler, StanleyR. Crouch. Fundamentals of analytical chemistry, 9thEdition. ISBN-13: 978-0-495-55828-6.** **Daniel C. Harris. Quantitative Chemical Analysis, 8thedition,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. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	**Each classroom should be equipped with a whiteboard and a projector, with a maximum of 20 students. In each laboratory, a list of safety and precautions are provided. In each lab has proper ventilation, and well equipped with instruments. In each lab, containers for solid waste, liquid waste, and crushed glasses. Each lab has a small pharmacy for first aid in case of an accident In each lab, the rules, conditions, and safety mechanism as well list of Risk, Safety precautions according to Merck Catalogue are hanging in the labs**
Technology equipment (projector, smart board, software)	**The rooms are equipped with data show, Smart Board, WI-FI access.**
Other equipment (depending on the nature of the specialty)	**Appropriate Glasswares for carrying the requested experiments (conical flasks, beakers, measuring cylinders) . Appropriate fine chemicals and solvents (distilled Water ammonium nitrate). Analytical balance (3 digits), Set gas laws with the glass jacket Data acquisition set for gas laws with glass jacket, PC, Windows 95 or higher, calorimeter, thermometer, Filter papers , clamps, stands**

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment 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 Students assessment	**Program Leaders**	**Direct: Course e-Portfolio. Indirect: Course**

Assessment Areas/Issues	Assessor	Assessment Methods
		report.
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.
The extent to which CLOs have been achieved	Course Responsible	Direct: Exams - Course e-Portfolio. Indirect: Second examiner checklist- Course report.
	Program Leaders	Indirect: Exams.
Other	Students	Direct: Lab reports, Final Lab exam, Course e-Portfolio.

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)
Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Department of Chemistry Council
REFERENCE NO.	7 (NO. 2/3)
DATE	29/3/1446 - 2/10/2024

Course Specification
(Bachelor)

Course Title: Plant Pathology	
Course Code: BIO 1324	
Program: Bachelor of Science in Biology	
Department: Biology	
College: Science	
Institution: Imam Mohammad Ibn Saud Islamic University	
Version: 1	
Last Revision Date: 29 September 2024	

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A. General information about the course:

1. Course Identification

1. Credit hours: 3 (2 lectures, 2 laboratories, 0 tutorials)					

2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☒ Required			☐ Elective	

3. Level/year at which this course is offered: (Level 6 / Year 3)

4. Course General Description:
This course provides an introduction to the basic principles of plant pathogens, their interactions with the host plants, and the impact of plant diseases on agricultural activities and ecosystems. The course topics enable the students to explore the causative agents of plant diseases, including the biotic pathogens (fungi, bacteria, viruses, nematodes, and other microorganisms) and abiotic factors (drought, salinity, temperature extremes, and nutrient deficiencies). The course emphasizes identification, diagnosis, and management of the significant plant diseases through diverse integrated approaches, including cultural, chemical, and biological control methods.

5. Pre-requirements for this course (if any):
BIO 1322

6. Co-requisites for this course (if any):
None

7. Course Main Objective(s):
The main course objectives can be listed as follow: • Equip the students with the necessary knowledge to identify, diagnose, and manage plant diseases caused by either abiotic stresses (e.g., drought, salinity, temperature extremes) or biotic stresses (e.g., fungi, bacteria, viruses, nematodes). • Develop the practical skills of the students through practicing the laboratory techniques required for pathogen identification as well as disease diagnosis and management. • Foster an understanding of plant-pathogen interactions, plant defense

mechanisms, and the role of integrated pest management (IPM) in sustainable agriculture.

- Highlight the impact of climate change in the development of emerging plant diseases and the global efforts that are focused disease surveillance and management.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	28
3.	**Field**	2
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Define the discipline of plant pathology and elucidate its importance to work in the field of agriculture and in ecosystems-related professions	K1	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning	Written tests Class discussion questions Class assignments Homework Short

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			Cooperative Learning Field Visits	research/reports Summaries Presentations
1.2	Classify plant pathogens (fungi, bacteria, viruses, nematodes) and describe their life cycles	K2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.3	Explain the physiological and biochemical mechanisms integrated in the plant-pathogen interactions	K3	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
2.0	Skills			
2.1	Diagnose plant diseases caused by biotic and abiotic factors using the proper laboratory techniques	S1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Apply the integrated pest management (IPM) strategies to control plant	S2	Practical Application Microteaching Modeling and	Observation / Rating Scales Practical Tests Self-

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	diseases		Simulation Project-Based Learning Discovery Learning Collaborative Learning	Assessment Peer Assessment
2.3	Analyze and interpret experimental and field data and draw conclusions related to disease management	S3	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Demonstrate responsibility and the ability to be integrated in a teamwork and collaborate in laboratory and field activities	V1	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.2	Participate in specialized meetings and communicate the scientific findings effectively through oral presentation and written formats	V2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Adhere to ethical rules and regulations while performing research work relevant to the field of plant pathology	V3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No	List of Topics (Lectures)	Contact Hours
1.	Introduction to Plant pathology, Overview of Abiotic Stresses	4
2.	Drought and Waterlogging in Plants	2
3.	Temperature Extremes and Plant Stress	2
4.	Soil Salinity and pH Effects on Plant Health	2
5.	Introduction to Biotic Stresses and Plant Pathogens	2
6.	Fungal Pathogens and Their Impact on Plants	2
7.	Abiotic Stresses and Introduction to Biotic Stresses	2
8.	Bacterial Pathogens and Plant Diseases	2
9.	Viral Pathogens and Their Role in Plant Infections	2
10.	Nematode Pathogens and Their Effects on Plants	2
11.	Plant-Pathogen Interactions and Defense Mechanisms	2
12.	Bacterial, Viral, Nematode Pathogens, and Plant-Pathogen Interactions	2
13.	Disease Management Strategies and Integrated Pest Management (IPM)	2
14.	Emerging Plant Diseases and the Impact of Climate Change	2
Total		**30**

No	List of Topics (Labs)	Contact Hours
1	-Introduction to laboratory tools and techniques in plant pathology -Measuring plant growth and development (leaf morphology, leaf area, wilting index, plant height, …)	4
2	-Observation of symptoms caused by abiotic stresses (e.g., leaf scorch, chlorosis, wilting, …etc.) -Soil analysis for nutrient deficiencies	4
3	-Experiments on drought stress (e.g., wilting point, stomatal closure) -Observation of waterlogging effects on root systems	2
4	-Experiments on temperature stress (e.g., heat shock proteins, frost damage) -Observation of temperature-induced symptoms	2
5	-Soil salinity and pH testing -Observation of salt stress symptoms (e.g., leaf burn, stunted growth)	2
6	-Identification of common plant pathogens under the microscope -Collection and preservation of diseased plant samples	2
7	-Microscopic examination of fungal structures (e.g., spores, hyphae) -Isolation and culturing of fungi from infected plants	2
8	-Microscopic examination of bacterial cells (Gram staining) -Isolation and culturing of bacteria from infected plants	2
9	-Observation of viral symptoms (e.g., mosaic patterns, leaf curling) -Serological tests for virus detection (e.g., ELISA)	2

10	-Microscopic examination of nematodes -Extraction of nematodes from soil samples	2
11	-Demonstration of hypersensitive response (HR) in plants -Analysis of defense-related enzymes (e.g., peroxidase, polyphenol oxidase)	2
12	-Demonstration of disease control methods (e.g., fungicides, biocontrol agents) -Case studies on successful disease management	2
13	-Group presentations on emerging plant diseases -Review of course material and practical skills	2
Total		**30**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	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. Introduction to plant physiology. 4 ed., university of weseren.(2008). ISBN 978-0470-24766-2. Agrios GN. Plant Pathology. 5th ed. Burlington, MA: Academic Press; 2005. ISBN: 978-0-12-044565-3.
Supportive References	Schumann GL, D'Arcy CJ. Essential Plant Pathology. 2nd ed. St. Paul, MN: American Phytopathological Society (APS Press); 2010. ISBN: 978-0-89054-381-8. Lucas JA. Plant Pathology and Plant Pathogens. 4th ed. Hoboken, NJ: Wiley-Blackwell; 2020. ISBN: 978-1-119-51199-9.
Electronic Materials	1. **American Phytopathological Society (APS) Education Center** ○ **Website:** https://www.apsnet.org/edcenter/ ○ **Description:** Offers online courses, teaching resources, and webinars on plant pathology topics.

	2. **Coursera: Plant Pathology Courses** ○ **Website:** https://www.coursera.org/ ○ **Courses:** ▪ "Plant Biology" by University of Illinois. ▪ "Sustainable Agricultural Land Management" by University of Florida. ○ **Description:** Online courses covering plant pathology and related topics. 3. **edX: Plant Science Courses** ○ **Website:** https://www.edx.org/ ○ **Courses:** ▪ "Fundamentals of Plant Biology" by Tel Aviv University. ▪ "Introduction to Biology: Ecology, Evolution, and Biodiversity" by Rice University. ○ **Description:** Online courses with modules on plant pathology and disease management.
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories
Technology equipment (projector, smart board, software)	Projector and Smart board
Other equipment (depending on the nature of the specialty)	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, gel electrophoresis, centrifuges, incubators, ovens, other glassware specific for plant pathology, and automated micropipettes

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Direct

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد
NCAAA

2024

TP-153

Course Specification

(Bachelor)

Course Title: Genetic Engineering & Biotechnology	
Course Code: BIO 1333	
Program: Bachelor of Science in Biology	
Department: Biology	
College: Science	
Institution: Imam Mohammad Ibn Saud Islamic University	
Version: 1	
Last Revision Date: 29 September 2024	

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A. General information about the course:

1. Course Identification

1. Credit hours: 4 (3 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Level 6 / Year 3)					
4. Course General Description:					
This course provides the basic necessary knowledge of genetic engineering and biotechnology principles, techniques, and applications. The course topics covers recombinant DNA technology, cloning strategies, gene expression systems, genome editing. The course content also emphasizes the biotechnological applications in the fields of medicine, agriculture, and industry. The offered practical sessions reinforce the theoretical concepts by the mean of hands-on experience in the aforementioned techniques.					
5. Pre-requirements for this course (if any)**:**					
BIO 1231 BIO 1232					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
This course aims to provide students with the fundamental concepts, principles, techniques, and applications of genetic engineering and biotechnology. The students will have the chance to get acquainted with recombinant DNA technology, cloning strategies, gene expression systems, and genome editing tools such as CRISPR. The course emphasizes the biotechnological advancements in the areas of medicine, agriculture, industry, and environmental science, including the production of recombinant proteins, genetically modified organisms, and biopharmaceuticals. Additionally, students will gain insights into the fermentation biotechnology and the industrial production of enzymes, with an emphasis on the related wide-scale bioprocesses and microbial systems. Ethical considerations,					

biosafety regulations, and societal impacts of genetic engineering are the course topics that ensure the reasonable applications of biotechnology in real life situations. Through a combination of accurately selected lectures and laboratory work, students will the opportunity to develop critical thinking skills, practical expertise, and the ability to employ the biotechnological concepts to solve the existing problems in the relevant work fields.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	75	100 %
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	45
2.	**Laboratory/Studio**	30
3.	**Field**	0
4.	**Tutorial**	0
5.	**Others (specify)**	0
Total		75

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Explain the fundamental principles of genetic	K1	Interactive Lecture Discussion and Dialogue	Written tests Class discussion

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	engineering and biotechnology, including recombinant DNA technology, cloning, and gene expression systems		Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Describe the genome editing techniques such as CRISPR-Cas9 and their applications in medicine, agriculture, and industry	K1, K2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.3	Identify the key industrial biotechnological processes, including enzyme production and fermentation technology	K3	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
2.0	**Skills**			
2.1	Perform the basic molecular biology techniques, including DNA extraction, PCR, and bacterial transformation	S1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			Collaborative Learning	
2.2	Design and optimize the cloning strategies using appropriate vectors and host systems	S2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Employ the critical thinking and skills to Troubleshoot and solve the technical problems encountered during conducting lab work related to genetic engineering and biotechnology	S2, S3	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Show independency to accomplish the assigned tasks and cooperate effectively in multidisciplinary teams	V1	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.2	Share in the discussion of genetic engineering and biotechnology issues and communicate scientific data professionally as oral presentation and written format	V2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Demonstrate ethical	V3	Modeling	Observation

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	responsibility in genetic engineering practices, including the biosafety and regulatory compliance		Dialogue and discussion Self-learning Collaborative learning	Self-assessment Peer assessment Achievement file

C. Course Content

No	List of Topics (Lectures)	Contact Hours
1.	Introduction to Genetic Engineering and Biotechnology	3
2.	Tools of Genetic Engineering-I (Enzymes).	6
3.	Tools of Genetic Engineering-II (Vectors).	6
4.	Recombinant DNA Technology-I (purification techniques and cloning strategies).	3
5.	Recombinant DNA Technology-II (Construction of gene libraries).	3
6.	Polymerase Chain Reaction (PCR)	6
7.	Gene Editing and CRISPR Technology	3
8.	Genetic Engineering in Medicine	3
9.	Agricultural Biotechnology	3
10.	Industrial Enzymes and Fermentation Biotechnology	3
11.	Ethical, Legal, and Social Issues in Genetic Engineering	3
12.	General revision	3
Total		**45**

No	List of Topics (Labs)	Contact Hours
1	Tissue culture-I	2
2	Tissue culture-II	2
3	DNA Extraction	4
4	Agarose gel electrophoresis	2
5	Polymerase Chain Reaction (PCR)	4
6	Bacterial transformation and plasmid isolation	2
7	Hybridization	2
8	Restriction enzymes	4
9	Enzyme production using microbial fermentation	2
10	Genetically Modification Organisms (GMOs)	2
11	Genetic Firngerprint	2

12	Biological Database	2
Total		**30**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Nicholl, D. S. T. (2023). An Introduction to Genetic Engineering (4th ed.). Cambridge University Press. Glick, B. R., Pasternak, J. J., & Patten, C. L. (2017). Molecular Biotechnology: Principles and Applications of Recombinant DNA (5th ed.). ASM Press. ISBN: 978-1-55581-968-2.
Supportive References	Brown, T. A. (2020). Gene Cloning and DNA Analysis: An Introduction (8th ed.). Wiley-Blackwell. ISBN: 978-1-119-64957-4.
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories
Technology equipment (projector, smart board, software)	Projector and Smart board
Other equipment (depending on the nature of the specialty)	Biotechnology-related instruments, including safety cabinet, centrifuges, incubators, light microscopes, spectrophotometers, microplate reader.

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

هيئة تقويم التعليم والتدريب
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2024
TP-153

Course Specification
(Bachelor)

Course Title: Virology	
Course Code: BIO 1345	
Program: Bachelor of Science in Biology	
Department: Biology	
College: Science	
Institution: Imam Mohammad Ibn Saud Islamic University	
Version: 1	
Last Revision Date: 29 September 2024	

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A. General information about the course:

1. Course Identification

1. Credit hours: 3 (2 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☒ Required			☐Elective	
3. Level/year at which this course is offered: (Level 6 / Year 3)					
4. Course General 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.					
5. Pre-requirements for this course (if any)**:**					
BIO 1241					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
By the end of this course, the students 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.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Define the Introduction, structure and	1.1-1.2	Interactive Lecture Discussion and Dialogue	Written tests Class discussion

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	methods of multiplication of viruses		Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Outline the virus classification, transmission and spread of viruses in host	1.1-1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
2.0	**Skills**			
2.1	Reconstruct information about the functions of the organs and arrange them logically and sequentially	2.2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Explain and identify the relationship between cause and consequence in the different mechanisms	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
2.3	Analyze data and information and view discussion of sound scientific debate	2.2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Write reports and preparation of presentations and the preparation of graphics and models by using technology	3.1-3.2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.2	Use of computers and means of modern technology	3.2-3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Appraise the collaborative work skills	3.1	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No	List of Lecture Topics	Contact Hours
1.	Discovery of viruses, nature and definition of viruses, general properties of viruses	2
2.	Concept of viroids, virusoids, satellite viruses and prions Theories of viral origin	2
3.	Structure of viruses	2

	Capsid symmetry, enveloped and non-enveloped viruses Isolation, purification and cultivation of viruses	
4.	Viral Taxonomy	2
5.	Classification and nomenclature of different groups of viruses infecting microbes, plants and animals	2
6.	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	2
7.	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)	2
8.	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	2
9.	Applications of bacteriophages	2
10.	Viral multiplication and replication strategies Interaction of viruses with cellular receptors and entry of viruses	2
11.	Replication strategies of viruses as per Baltimore classification Assembly, maturation and release of virions	2
12.	Transmission of viruses Persistent and non-persistent mode	2
13.	Oncogenic viruses. Types of oncogenic DNA and RNA viruses	2
14.	Prevention and control of viral diseases Antiviral compounds, interferons and viral vaccines	2
15.	Applications of Virology Use of viral vectors in cloning and expression, Gene therapy and Phage display	2
Total		**30**

No	List of Laboratory Topics	Contact Hours
3.	Viruses Lab safety levels	2
4.	Animal viruses (rhabdo, influenza, paramyxo, Hepatitis B & retroviruses)	2
3.	Animal viruses (rhabdo, influenza, paramyxo, Hepatitis B &	2

	retroviruses)	
4.	Animal viruses (rhabdo, influenza, paramyxo, Hepatitis B & retroviruses)	2
5.	Plant viruses (calico, gemini, tobacco ring spot, cucumber mosaic & alpha-alpha mosaic viruses)	2
6.	Plant viruses (calico, gemini, tobacco ring spot, cucumber mosaic & alpha-alpha mosaic viruses)	2
7.	Plant viruses (calico, gemini, tobacco ring spot, cucumber mosaic & alpha-alpha mosaic viruses)	2
8.	Bacterial viruses (λ, T4 & ϕX174)	2
9.	Bacterial viruses (λ, T4 & ϕX174)	2
10.	Bacterial viruses (λ, T4 & ϕX174)	2
11.	Isolation and propagation of animal viruses	2
12.	Isolation and propagation of plant viruses	2
13.	Isolation and propagation of bacterial viruses	2
14.	Isolation and enumeration of bacteriophages from water/sewage samples	2
15.	Cytopathic effects of viruses	2
Total		**30**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Flint et al. Principles of virology .3rd eds.2008, ISBN: 13: 9781555814434
Supportive References	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.
Electronic Materials	None

Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories
Technology equipment (projector, smart board, software)	Projector and Smart board
Other equipment (depending on the nature of the specialty)	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, centrifuge, thermal cycler, illuminator, centrifuges, incubators, ovens and other glassware

F. Assessment of Course Quality

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

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)
Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

هيئة تقويم التعليم والتدريب
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TP-153

Course Specification
(Bachelor)

Course Title: Embryology	
Course Code: BIO 1415	
Program: Bachelor of Science in Biology	
Department: Biology	
College: Science	
Institution: Imam Mohammad Ibn Saud Islamic University	
Version: 1	
Last Revision Date: 29 September 2024	

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A. General information about the course:

1. Course Identification

1. Credit hours: 3 (2 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐ College	☒ Program	☐Track	☐Others
B.	☒ Required			☐Elective	
3. Level/year at which this course is offered: (Level 7 / Year 4)					
4. Course General Description:					
This course is designed to provide 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.					
5. Pre-requirements for this course (if any)**:**					
BIO 1314					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					

On 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.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Describe human development and	1.1	Interactive Lecture Discussion and	Written tests Class

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	organogenesis		Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Define stem cell biology and regeneration, and how major congenital birth abnormalities arise	1.1-1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
2.0	**Skills**			
2.1	Apply basic practical laboratory skills and work with embryo	2.1-2.2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Summarize regeneration models, annotate embryonic structures	2.1-2.2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			Learning	
2.3	Explain developmental and regenerative stages	2.1-2.2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Demonstrate critical thinking and problem-solving skills in diverse contexts	2.2-3.1	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.2	Show ability to communicate effectively with class mates and teaching staff	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Appraise team work and management of resources and time	3.2-3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No	List of Topics	Contact Hours
1.	The saga of the sex cells: gametogenesis overview. Female sex cells: oogenesis. Male sex cells: spermatogenesis & spermatogenesis. Transport of gametes & fertilization.	4

2.	Cleavage.	4
3.	Gastrulation - becoming trilaminar.	4
4.	Implantation Embryonic membranes.	4
5.	Twining.	4
6.	Neurulation. Nervous system.	4
7.	Maternal support & fetal interactions.	4
8.	Pattern formation, Determination and Differentiation.	4
9.	Organogenesis.	4
10.	Regeneration.	4
11.	Congenital Malformation.	4
12.	Embryonic cells and Tumor.	4
13.	Tissues and Embryonic Cells Culture.	4
14.	Stem cells.	4
15.	Assisted reproductive technologies.	4
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	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.
Supportive References	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	None
Other Learning Materials	None

2. Required Facilities and equipment

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

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Department of Biology Council
REFERENCE NO.	Meeting No. 6
DATE	29/9/2024

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد
NCAAA

2024
TP-153

Course Specification
(Bachelor)

Course Title: Bioinformatics	
Course Code: BIO 1434	
Program: Bachelor of Science in Biology	
Department: Biology	
College: Science	
Institution: Imam Mohammad Ibn Saud Islamic University	
Version: 1	
Last Revision Date: 29 September 2024	

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A. General information about the course:

1. Course Identification

1. Credit hours: 2 (1 lectures, 0 laboratories, 2 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☒ Required			☐Elective	
3. Level/year at which this course is offered: (Level 7 / Year 4)					

4. Course General Description:
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. 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.

5. Pre-requirements for this course (if any):
STA 1217

6. Co-requisites for this course (if any):
None

7. Course Main Objective(s):

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

- To illustrate biological data sequences.
- To describe similar sequences of DNA/RNA.
- To describe similar of protein sequences.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	15
2.	**Laboratory/Studio**	-
3.	**Field**	-
4.	**Tutorial**	30
5.	**Others (specify)**	-
Total		45

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Recognize the study of biological sequences data	1.1	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Describe the analysis of Similar DNA sequences	1.1-1.2	Interactive Lecture Discussion and Dialogue	Written tests Class discussion

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	questions Class assignments Homework Short research/reports Summaries Presentations
2.0	**Skills**			
2.1	Analyze the biological sequences data	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Analyze and compare methods and topics related to microorganisms	2.1-2.2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Analyze and compare methods and topics related to bioinformatics for plants and animals	2.1-2.2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Appraise	3.1-3.2	Modeling	Observation

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	collaborative work skills		Dialogue and discussion Self-learning Collaborative learning	Self-assessment Peer assessment Achievement file
3.2	Appraise understanding the views of the other aspects of the temporal, spatial and personality	3.1-3.2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Use of computers and means of modern technology	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No	List of Lecture Topics (Lectures)	Contact Hours
1.	Bioinformatics: What and why?	1
2.	Genomic sequences. Online databases. Intro to sequence alignment.	1
3.	Sequence alignment. Scoring Matrices. Pairwise alignment Gaps.	1
4.	Database searching; BLAST. Limits of detection, significance.	1
5.	Advanced BLAST: PSI-BLAST, Genomic DNA. Find-a-gene project.	1
6.	Multiple sequence alignment. Relevance to inferences about evolution.	1
7.	Midterm review; molecular phylogeny introduction.	1
8.	Molecular phylogeny and evolution.	1
9.	mRNA and gene expression introduction.	1
10.	Statistics for differential expression, multiple testing.	1
11.	Functional interpretation of array data.	1
12.	Characterizing eukaryotic genomes.	1
13.	Human variation and disease.	1
14.	Linking genes and disease.	1
15.	Sequence variation, phenology, and comparative genomics.	1
Total		**15**

No	List of Tutorial Topics (Labs)	Contact Hours
1.	Finding information in online databases	2
2.	Sequence alignment tools	2
3.	Sequence alignment tools	2
4.	Pairwise sequence alignment	2
5.	Pairwise sequence alignment	2
6.	Nucleotide BLAST	2
7.	Protein BLAST	2
8.	Primer BLAST	2
9.	Finding differentially expressed genes	2
10.	Finding differentially expressed genes	2
11.	Interpreting expression variation	2
12.	Interpreting expression variation	2
13.	Molecular phylogeny	2
14.	Molecular phylogeny	2
15.	SNPs	2
Total		**30**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	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.
Supportive References	Pavel pevezer, Bioinformatics for biologists.1th ed. 2011.ISBN: 13: 978-1107648876. Cynthia Gibas and Per Jambeck. Developing Bioinformatics

	Computer Skills, (2001).
Electronic Materials	NCBI, EMBL, UCSC
Other Learning Materials	Biological software

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories
Technology equipment (projector, smart board, software)	Projector and Smart board
Other equipment (depending on the nature of the specialty)	Specific laboratory equipment for this course including online tools, applications, and Software

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

Course Specification
(Bachelor)

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
Version:	1
Last Revision Date:	29 September 2024

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A. General information about the course:

1. Course Identification

1. Credit hours: 3 (2 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☒ Required			☐Elective	
3. Level/year at which this course is offered: (Level 7 / Year 4)					
4. Course General Description:					
This course is introduces microbial processes of environmental and geochemical significance and provide detailed information on the most up to date methods used to study the diversity and activity of micro-organisms in their natural habitats. 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 catalyzed by microorganisms are related to major elemental cycles, biogeochemical processes and contamination.					
5. Pre-requirements for this course (if any)**:**					
BIO 1242 and BIO 1345					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
At the end of this course, the students will 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.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-

No	Mode of Instruction	Contact Hours	Percentage
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Describe the contamination with microorganisms in the environment (water, air, soil)	1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Recognize treatment for contaminated soil, water, or air	1.1	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning	Written tests Class discussion questions Class assignments Homework Short

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			Cooperative Learning Field Visits	research/reports Summaries Presentations
2.0	Skills			
2.1	Analyze the information about the general pathogenic microbial features	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Design and conduct microbial contamination experiments	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Evaluate the results of the experiments through the development of standards and criteria for evaluation	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Appraise team work skills and participation in scientific groups	2.2 -3.1	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
				file
3.2	Write reports, preparation of presentations, graphics, and models	3.2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Use of computers and means of modern technology	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No	List of Topics	Contact Hours
1.	Air pollution with microorganisms.	4
2.	Soil contamination with microorganisms.	4
3.	Water pollution with microorganisms.	4
4.	Microorganisms causing for pollution.	4
5.	Methods of studying bacteria.	4
6.	Methods of studying viruses.	4
7.	Sources of pollution with microorganisms.	4
8.	Problems of microbiological contamination.	4
9.	Means of preventing microbiological contamination.	4
10.	Role of microorganisms in the detection of environmental pollution.	4
11.	Reagents with microorganisms for air pollution.	4
12.	Reagents with microorganisms for soil pollution.	4
13.	Reagents with microorganisms for water pollution.	4
14.	Microorganisms and treatment of environmental pollution.	4
15.	Treatments for contaminated air, soil and water.	4
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	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.
Supportive References	None
Electronic Materials	None
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories
Technology equipment (projector, smart board, software)	Projector and Smart board
Other equipment (depending on the nature of the specialty)	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, centrifuge, thermal cycler, illuminator, centrifuges, incubators, ovens and other glassware

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

Course Specification
(Bachelor)

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	
Version: 1	
Last Revision Date: 29 September 2024	

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A. General information about the course:

1. Course Identification

1. Credit hours: 2 (1 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☒ Required		☐ Elective		
3. Level/year at which this course is offered: (Level 7 / Year 4)					
4. Course General Description:					
This course focuses on the 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.					
5. Pre-requirements for this course (if any)**:**					
BIO 1252					
6. Co-requisites for this course (if any)**:**					
None					

7. Course Main Objective(s):
Upon successful completion of this course, the students will 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.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	15
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		45

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Describe concepts of animal behavior	K.1	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	List the mechanisms involved in the production of a behavioral sequence by an animal	K.1, K.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps	Written tests Class discussion questions Class

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	assignments Homework Short research/reports Summaries Presentations
2.0	**Skills**			
2.1	Explain patterns of behavior of animals	S.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Summarize the relationship between the cause and the effect of an animal behavior	S1,S2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Analyze animals' behavior	S3	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Appraise working within the group to reach the desired	V1	Modeling Dialogue and discussion	Observation Self-assessment

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	result		Self-learning Collaborative learning	Peer assessment Achievement file
3.2	Write reports and preparation of presentations, graphics, and models	V1, V2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Use of computers and means of modern technology	V3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction: Course Overview; Course Goals; History of Animal Behavior.	4
2.	Background Information (1): Evolution & Natural Selection; Fitness & Adaptation; Levels & Units of Selection.	4
3.	Proximate Causes of Behavior: Behavioral Genetics (1): Nature vs. Nurture; Reaction Norms; Relationship between Genes and Behavior.	4
4.	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.	4
5.	Hormones: The Endocrine System; Hormonal Influences	2
6.	Methods of Studying Hormone-Behavior Systems; Organizational and antinational Effects; Sex Differences and Sexual Behavior	2
7.	Ultimate causes of behavior (focus on individual): 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	4
8.	Deception Mechanisms; Fighting; Vigilance; Communal Defense	2

9.	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.	4
10.	Mating Systems: Classifications; evolution of mating systems; mating systems and their ecological correlates	4
11.	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	4
12.	Communication (1): Definition; Channels; Functions; Signals vs.Cues. Communication (2): Principals of Communication; Evolution of Honesty	2
13.	Eusociality: The Evolution of Eusociality; Reproductive Skew Models. Animal Cognition: Animal Minds.	1
14.	Ultimate causes on behavior (focus on human): Darwinian Medicine (1): Definition; Applications.	2
15.	Darwinian Medicine (2): Examples. Human Sociobiology (1): Adaptations Approach; Mating Systems. Human Sociobiology (2): Examples	2
Total		**45**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Shawn E.Nordell and Thomas J. Valone(2013) : AnimalBehavior; Concepts, Methods, Applications,1e.OxfordUniversity Press. Drickamer, Lee C., Stephen H. Vessey, and Elizabeth Jakob. 2002. Animal Behavior: Mechanisms, Ecology, and Evolution. Fifth

	edition. McGraw-Hill Publishers. ISBN 9780070121997.
Supportive References	Brown R, Payne A, Graham KK and Starks PT. 2012. Preycapture and caste-specific payloadcapacities 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 Behavior1st 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	http://www.cbu.edu/~aross/animbeh/Animal_Behavior.htm
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories
Technology equipment (projector, smart board, software)	Projector and Smart board
Other equipment (depending on the nature of the specialty)	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, centrifuges, incubators, ovens, other glassware. Animal house equipped with controlled conditions in terms of light and temperature.

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد
NCAAA

2024
TP-155

Field Experience Specification
(Bachelor)

Course Title: **Field Training**	
Course Code: **BIO 1497**	
Program: **Bachelor of Science in Biology**	
Department: **Biology**	
College: **Science**	
Institution: **Imam Mohammad Ibn Saud Islamic University**	
Field Experience Version Number: **1**	
Last Revision Date: **29 September 2024**	

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A. Field Experience Details:

1. Credit hours: 6

2. Level/year at which Field Experience is offered: (Level 8 / Year 4).

3. Time allocated for Field Experience activities

(12) Weeks	4 days/week	8 hours/day

This schedule serves as a general reference and is subject to modifications as required, provided the total training hours remain at or above the mandatory minimum of 384 hours.

4. Corequisite (or prerequisites, if any) to join Field Experience

Students must provide evidence of completing a minimum of 126 credit hours.

5. Mode of delivery

☒ In-person/onsite	☐hybrid (onsite/online)	☐Online

B. Field Experience Course Learning Outcomes (CLOs), Training Activities and Assessment Methods

Code	Learning Outcomes	Aligned PLO Code	Training Activities	Assessment Methods	Assessment Responsibility
1.0	**Knowledge and understanding**				
1.1	Recall the knowledge pertaining to the professional career context before graduation.	1.1	Participation with the field supervisor at the workplace	Direct: Discussion Specific rubric	Field Supervisor
1.2	Explain the theories relevant to biology and recognize the comprehensive knowledge that enhances competitivene	1.1	Subject-based study essays written-short answer/long answer/report	Direct: Rubric of evaluation	Field Supervisor

Code	Learning Outcomes	Aligned PLO Code	Training Activities	Assessment Methods	Assessment Responsibility
	ss in the labor market				
1.3	Outline the fundamental processes and best practices drawn from modern biology.	1.2	Oral test Presentation Written report	Direct: Evaluate student's Discussion	Field Supervisor
2.0	**Skills**				
2.1	Employ critical thinking and innovative problem-solving skills and construct with other professionals.	2.1	Written research questions/ Reflection	Direct: Student portfolio	Field Supervisor
2.2	Analyze the data raised from field studies to support the related research work	2.2	Participation with the field supervisor at the workplace	Direct: Direct observation	Field Supervisor
2.3	Apply the acquired theoretical knowledge and skills to real-life situations.	2.3	Workplace performance. Oral Presentations	Direct: Portfolio Student's diary/journal	Field Supervisor Student Teaching staff
3.0	**Values, autonomy, and responsibility**				
3.1	Participate in addressing social issues and adhere to relevant ethical	3.1	Discussion, behavior	Direct: Direct observation portfolio	Field Supervisor Teaching staff

Code	Learning Outcomes	Aligned PLO Code	Training Activities	Assessment Methods	Assessment Responsibility
	guidelines to demonstrate awareness of societal responsibility.				
3.2	Demonstrate the ability to engage in lifelong learning and collaborate with peers to make evidence-based decisions.	3.2	Discussion, behavior	Direct: Direct observation portfolio	Field Supervisor
3.3	Show independence and take responsibility while performing assigned tasks, and collaborate effectively within a team.	3.3	Discussion, behavior	Direct: Direct observation	Field Supervisor

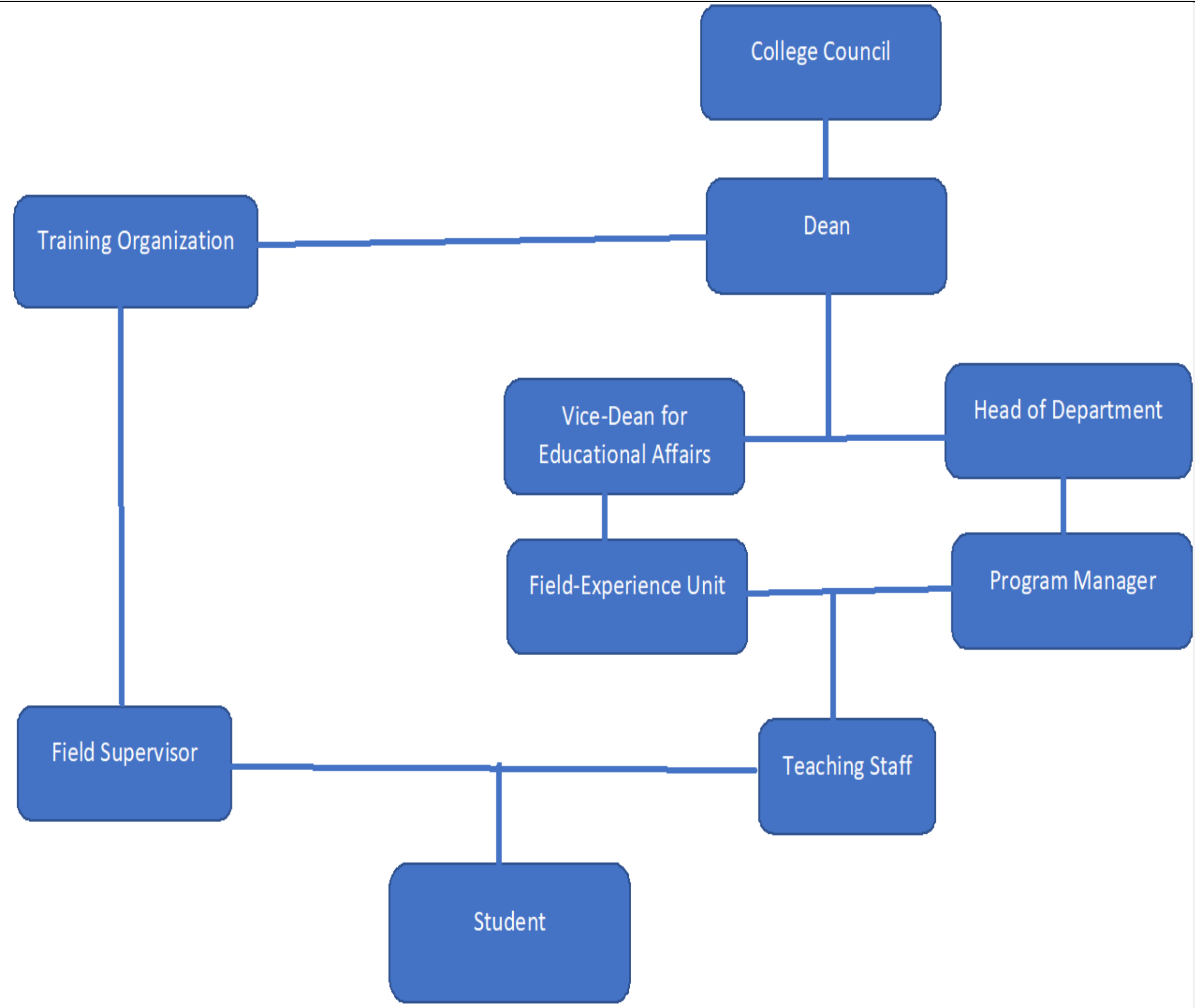
*Assessment methods (i.e., practical test, field report, oral test, presentation, group project, essay, etc.).

- Discussions/Debates: Encourage comprehension and active engagement with key concepts.
- Written Tasks: Comprise essays and reports to assess understanding and critical thinking.
- Oral Presentations: Evaluate communication skills and the effectiveness of information delivery.
- Portfolios: Serve as a record of learning and a means for reflecting on experiences.
- Direct Observation: Allow for immediate assessment of skills and professional conduct in real-time situations.
- Supervisor Evaluation: Monitors and assesses on-site performance and professional interactions.
- Instructor Assessment: Evaluates written assignments, presentations, and overall mastery of the course learning outcomes.

C. Field Experience Administration

1. Field Experience Flowchart for Responsibility

Including units, departments, and committees responsible for field experience identifying by the interrelations.



In addition, the College should develop a comprehensive Field Training Guide (FTG) that serves as a valuable resource for both students and supervisors, enhancing the overall field training experience. This guide will maximize learning opportunities and help ensure successful training outcomes.

Key Roles of the Guide:

- Clarifies Expectations: Outlines the objectives and responsibilities for students and supervisors.
- Provides Structure: Details the procedures, timelines, and necessary documentation.
- Facilitates Learning: Offers resources and best practices for skill development.
- Standardizes Assessment: Defines assessment criteria for consistent evaluation.
- Supports Reflection: Includes prompts for students to reflect on their experiences.
- Serves as a Resource: Provides information about organizations and industry standards.
- Enhances Communication: Outlines protocols for effective collaboration.
- Ensures Compliance: Addresses ethical considerations and legal requirements.

2. Distribution of Responsibilities for Field Experience Activities

Activities	Department or College	Teaching Staff	Student	Training Organization	Field Supervisor
Selection of a field experience site	✓		✓		
Selection of supervisory staff	✓			✓	
Provision of the required equipment				✓	✓
Provision of learning resources				✓	✓
Ensuring the safety of the site				✓	
Commuting to and from the field experience site		✓	✓		✓
Provision of support and guidance		✓			✓
Implementation of training activities (duties, reports, projects ...)		✓			✓
Follow up on student training activities		✓			✓
Monitoring attendance and leave		✓			✓
Assessment of learning outcomes		✓		✓	✓
Evaluating the Quality of Field Experience	✓	✓	✓	✓	✓
Others (specify)					

3. Field Experience Location Requirements

Suggested Field Experience Locations	General Requirements*	Special Requirements**
Ministry of Health	Life, Biological and Biomedical Sciences Laboratory facilities and equipment	• The field experience location activities must be appropriate and consistent with the mission of IMSUI and the requirements for field training learning outcomes • Safe environment for both male and female students. • Awareness of the Ethical Code of Conduct.
Medical Cities	Biomedical Sciences Laboratory facilities and equipment	• The field experience location activities must be appropriate and consistent with the mission of IMSUI and the requirements for field training learning outcomes • Safe environment for both male and female students. • Awareness of the Ethical Code of Conduct.
Research centers	Life, Biological and Biomedical Sciences Laboratory facilities and equipment	• The field experience location activities must be appropriate and consistent with the mission of IMSUI and the requirements for field training learning outcomes • Safe environment for both male and female students. • Awareness of Ethical Code of Conduct.
Public Hospitals	Biomedical Sciences Laboratory facilities and equipment	• The field experience location activities must be appropriate and consistent with the mission of IMSUI and the requirements for field training learning outcomes • Safe environment for both male and female students. • Awareness of the Ethical Code of Conduct.
Private Hospitals	The workplace must be registered and approved by competent Saudi instances Legal status as determined by the law in Saudi Arabia Biomedical Sciences Laboratory facilities and equipment	• The field experience location activities must be appropriate and consistent with the mission of IMSUI and the requirements for field training learning outcomes • Safe environment for both male and female students. • Awareness of Ethical Code of Conduct.
Public Schools	Learning and teaching resources	• The field experience location activities must be appropriate and consistent with the mission of IMSUI and the requirements for field training learning outcomes • Safe environment for both male and female students. • Awareness of Ethical Code of Conduct.

Suggested Field Experience Locations	General Requirements*	Special Requirements**
Private Schools	The workplace must be registered and approved by the competent Saudi instances Legal status as determined by the law in Saudi Arabia Learning and teaching resources	• The field experience location activities must be appropriate and consistent with the mission of IMSUI and the requirements for field training learning outcomes • Safe environment for both male and female students. • Awareness of Ethical Code of Conduct.

* E.g., Provides information technology, equipment, laboratories, halls, housing, learning sources, clinics … etc.
** E.g., Criteria of the institution offering the training or those related to the specialization, such as safety standards, dealing with patients in medical specialties … etc.

4. Decision-Making Procedures for Identifying Appropriate Locations for Field Experience

- Establish Partnerships: The college should develop a diverse range of partnerships with potential training organizations that offer high-quality training opportunities.
- Availability of Partnerships: A comprehensive list of these partnerships should be accessible on the College of Science website.
- Partnership Criteria: The selection of partnerships must align with the specific requirements outlined in this document.
- Communication with Organizations: The college should share this document, which includes qualifications and responsibilities, with the training organizations to ensure that they can meet the skills requirements for selecting suitable field supervisors.

5. Safety and Risk Management

Potential Risks	Safety Actions	Risk Management Procedures
Potential Risks depend on the workspace and production activities of the training organization.	Basic safety rules and tips that need to be followed at the worksite.	Respecting the last updated version of the booklet “Implementation of Risk Management and Safety Culture” published by The Ministry of Labor and Social development.
Potential sources of harm and hazards should be identified. This issue should be discussed with Training Organization before starting the training	Safety guidelines must be established and maintained: safety procedures for laboratory investigations and field trips should be implemented.	Providing an understanding of how to deal with different types of work-training to help reduce exposure risks. Offering short risk management training at the beginning of training.

D. 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.	Teaching staff	Indirect
• Student performance	Teaching staff, Program manager	Indirect
• Evaluation of the field experience (workspace). • Quality of learning resources, supervisory, achievements, skills, behavior, time	Teaching staff, Program manager	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	Department of Biology Council
Reference No.	Meeting No. 6
Date	29/9/2024

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد
NCAAA

2024

TP-153

Course Specification
(Bachelor)

Course Title: Research Project	
Course Code: BIO 1499	
Program: Bachelor of Science in Biology	
Department: Biology	
College: Science	
Institution: Imam Mohammad Ibn Saud Islamic University	
Version: 1	
Last Revision Date: 29 September 2024	

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G. Specification Approval 8

A. General information about the course:

1. Course Identification

1. Credit hours: 4					
2. Course type					
A.	☐University	☐ College	☒ Program	☐Track	☐Others
B.	☒ Required			☐Elective	
3. Level/year at which this course is offered: (Level 8 / Year 4)					
4. Course General Description:					
The capstone Research Project in Biology is the culminating course for students in the Bachelor of Science in Biology program. This course provides an opportunity to apply biological methods to tackle real-world problems. Students will select a relevant research topic, conduct a literature review, and develop biological models. They will work closely with faculty advisors to refine their research methodologies and address ethical considerations in data collection and in final written reports. The course concludes with a comprehensive written report and an oral presentation, showcasing students' ability to effectively communicate their findings. This capstone experience prepares students for advanced academic pursuits and equips them with essential skills for careers in biology and related fields.					
5. Pre-requirements for this course (if any)**:**					
The student must have completed a minimum number of 126 credit hours. Upon specifying the research Project. BIO 1318 STA 1217					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
The main objective is to enable students to apply their biological knowledge and tools to solve real-world problems using biological methods. The project aims to enhance critical thinking, research skills, and effective communication, preparing students for professional careers or further academic study.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	-	-
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-
5	Others (specify): Research Activities	60	100%

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	-
2.	**Laboratory/Studio**	-
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify): Research Activities**	60
Total		**60**

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Describe the basic concepts and up-to-date technical knowledge of the scientific research in Biology	1.1	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.2	List the essential processes and procedures for the investigation in Biology	1.1	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
2.0	**Skills**			
2.1	Summarize and analyze existing academic literature serving the Biology arguments	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Prepare a research project proposal	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Analyze research project results	1.1-2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			Learning	
3.0	**Values, autonomy, and responsibility**			
3.1	Show the ability to deal with various sources of knowledge	2.3-3.1	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.2	Demonstrate good research project management skills	2.2-2.3-3.2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Demonstrate critical thinking and problem-solving skills in diverse contexts	2.2-3.1	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No	List of Topics	Contact Hours
1.	Plan and execute a 15-week project in experimental or theoretical Biology (or a mixture of both) and might involve substantial computing, construction and design, theory, measurements, and numerical modeling or analysis.	6
2.	Project topic selection and accompanying justification.	6
3.	Proposed project outline.	6
4.	Project schedule, individual or as a team member, task identification	6
5.	Setting and meeting deadlines and dealing with changes to the project plan as they arise.	6
6.	Weekly reports.	6
7.	Regular interaction and discussion with student’s project supervisor, regarding experimentations and the results.	6
8.	Undertake a literature review on a topic of relevance to the overall project.	6

9.	Research project thesis, including literature review, materials, methods, results with appropriate tables, figures, curves, and discussion, conclusion, as well as references.	6
10.	Oral presentation of student's project work, summarizing the essential scientific and practical aspects and outcomes of the project at the end of semester.	6
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	1st report by the supervisor	4th week	20%
2.	2nd report by the supervisor	8th week	20%
3.	3rd report by the supervisor	12th week	20%
4.	Final report by the examination committee	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	These are detected depending on the nature of the specialty of the research project
Supportive References	These are detected depending on the nature of the specialty of the research project
Electronic Materials	These are detected depending on the nature of the specialty of the research project
Other Learning Materials	These are detected depending on the nature of the specialty of the research project

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Laboratories
Technology equipment (projector, smart board, software)	Software
Other equipment (depending on the nature of the specialty)	These are detected depending on the nature of the specialty of the research project

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد
NCAAA

2024

TP-153

Course Specification
(Bachelor)

Course Title: Hematology	
Course Code: BIO 1417	
Program: Bachelor of Science in Biology	
Department: Biology	
College: Science	
Institution: Imam Mohammad Ibn Saud Islamic University	
Version: 1	
Last Revision Date: 29 September 2024	

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A. General information about the course:

1. Course Identification

1. Credit hours: 2 (1 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☐ Required		☒ Elective		
3. Level/year at which this course is offered: (Level 6 / Year 3)					
4. Course General Description:					
This course covers 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.					
5. Pre-requirements for this course (if any)**:**					
BIO 1314					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
Upon successful completion of this course, the students will 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 leukemia.
- 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.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Describe the general components of blood and their functions	1.1	Interactive Lecture Discussion and Dialogue Mind Maps	Written tests Class discussion questions

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Class assignments Homework Short research/reports Summaries Presentations
1.2	List all diseases related to blood components abnormalities	1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
2.0	Skills			
2.1	Explain the types and mechanisms of anemia	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Summarize the blood coagulation process	2.1-2.3	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Analyze the relationship between	2.1-2.3	Practical Application	Observation / Rating Scales

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	blood components and hematological disorders		Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Perform hematological tests.	2.2 -3.1-3.2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.2	Use tools, kits, and instruments in diagnosing hematological disorders	3.1-3.2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Appraise team work skills	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No	List of Topics	Contact Hours
1.	Definition of Hematology What is blood? Blood composition	4
2.	Red Blood Corpuscles (RBCs) Hematopoiesis RBCs cell lines in bone marrow	4
3.	Hemoglobin Hemoglobinopathy	4

	Aspect of Anemia	
4.	Types of anemia Iron deficiency anemia & other hypochromic microcytic anemias Megaloblastic anemia	4
5.	Hemolytic Anemias I- Introductions & Classification Hemolytic Anemias II- Structural hemoglobinopathy Hemolytic Anemias III-Thalassemia	4
6.	Hemolytic Anemias IV- Membrane abnormalities. Hemolytic Anemias V- Enzymopathies. Hemolytic Anemias VI- Immune Hemolytic Anemias. Aplastic Anemia. Anemia of chronic disorders	4
7.	Red blood cell morphologic abnormalities	4
8.	White Blood Cells (WBCs) Types of WBCs Formation of WBCs	4
9.	Leukemia	4
10.	Acute leukemia Chronic leukemia Myeloproliferative disorders Myelodysplastic syndromes	4
11.	Coagulation & Hemostasis	4
12.	Bleeding disorders Congenital bleeding disorders Acquired bleeding disorders.	4
13.	platelet disorders	4
14.	Thrombophilia	4
15.	Thrombocytopenia Thrombocytosis	4
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	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.
Supportive References	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
Electronic Materials	None
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories
Technology equipment (projector, smart board, software)	Projector and Smart board
Other equipment (depending on the nature of the specialty)	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, spectrophotometers, ELISA unit for detecting Ag-Ab reactions, gel electrophoresis, hematocrit centrifuge, automated blood analyzer, centrifuges, incubators, ovens, other glassware special for hematology

F. Assessment of Course Quality

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

Assessment Areas/Issues	Assessor	Assessment Methods
Other	-	-

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

Course Specification
(Bachelor)

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	
Version: 1	
Last Revision Date: 29 September 2024	

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A. General information about the course:

1. Course Identification

1. Credit hours: 2 (1 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☐ Required		☒ Elective		
3. Level/year at which this course is offered: (Level 6 / Year 3)					
4. Course General Description:					
This course deals with the comparative study in reproduction, gametogenesis, fertilization, cleavage and morphogenesis; development of organ systems in animals.					
5. Pre-requirements for this course (if any):					
BIO 1314					
6. Co-requisites for this course (if any):					
None					
7. Course Main Objective(s):					
Upon successful completion of this course, the students will 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. • Analyze 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.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Describe experimental embryology and organogenesis	1.1	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning	Written tests Class discussion questions Class assignments Homework Short

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			Cooperative Learning Field Visits	research/reports Summaries Presentations
1.2	Recognize stem cell biology and regeneration, and how major congenital birth abnormalities arise	1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
2.0	Skills			
2.1	Explain developmental and regenerative stages	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Summarize regeneration models, annotate embryonic structures	1.2-2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Appraise team work and management of resources and time	2.2 -3.1	Modeling Dialogue and discussion Self-learning	Observation Self-assessment Peer

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			Collaborative learning	assessment Achievement file
3.2	Demonstrate critical thinking and problem-solving skills in diverse contexts	3.2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Show ability to communicate effectively with class mates and teaching staff	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to experimental embryology	4
2.	Organogenesis	4
3.	Apoptosis	4
4.	Aging	4
5.	Morphogenesis	4
6.	Regeneration	4
7.	Pattern formation	4
8.	Pattern Determination	4
9.	Differentiation	4
10.	Abnormal development	4
11.	Twining	4
12.	Teratogenesis	4
13.	Fertilization	4
14.	In-Vitro Fertilization (IVF)	4
15.	Cryopreservation of embryo	4
Total		60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	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.
Supportive References	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	None
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories
Technology equipment (projector, smart board, software)	Projector and Smart board

Items	Resources
Other equipment (depending on the nature of the specialty)	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 experimental embryological parameters, centrifuges, incubators, ovens and other glassware

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد
NCAAA

2024

TP-153

Course Specification
(Bachelor)

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	
Version: 1	
Last Revision Date: 29 September 2024	

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A. General information about the course:

1. Course Identification

1. Credit hours: 2 (1 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☐ Required		☒ Elective		
3. Level/year at which this course is offered: (Level 6 / Year 3)					
4. Course General Description:					
This course covers 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.					
5. Pre-requirements for this course (if any)**:**					
BIO 1353					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
Upon successful completion of this course, the students will 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.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Outline procedures for biological control of fungal and bacterial pathogens on aerial surfaces.	1.1-1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Describe biological control of soil-borne pathogens	1.1-1.2	Interactive Lecture Discussion and Dialogue	Written tests Class discussion

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	questions Class assignments Homework Short research/reports Summaries Presentations
2.0	Skills			
2.1	Compare between biological control by microorganisms and by insects	2.1-2.3	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Analyze how tests with organic extracts are used in biological control	2.1-2.3	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Explain parasites, parasitoids, and predators of insects relevant to biological control	2.1-2.3	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Appraise working	2.2 -3.1	Modeling	Observation

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	within the group to reach the desired result		Dialogue and discussion Self-learning Collaborative learning	Self-assessment Peer assessment Achievement file
3.2	Write reports and preparation of presentations, graphics, and models	3.2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Use of computers and means of modern technology	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

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*	4
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 *Ampelomyce* Virus and induced systemic resistance.	4
3.	Biological control of soil - borne pathogens and concepts of biotechnology: Bacterial pathogens.	4

	eg. *Agrobacterium tumefaciens* - *A. radiobacter* K84 and K1026and *Ralstonia* (=*Pseudomonas*) *solanacearum* - an example of plectropism andthe transference of resistant gene. Fungal pathogens. eg. *Fusarium* spp. - bacterial biocontrol agents and nonpathogenicfusaria. *Rhizoctonia solani* - bacterial agents and nonpathogenic*Rhizoctonia* *Pythium* spp. - bacterial biocontrol agents and hyperparasitic *Pythium* spp.	
4.	Biological control of post-harvest pathogens: Bacterial pathogens eg. *Erwinia carotovora* soft-rots. Fungal pathogens Monilinia on peaches, *Mucor* and *Rhizopus* onapple 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	4
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.	4
6.	Biological control of insects: Definitions and importance. Parasitoids definitions and examples: eg. *Trichogramma;Apanteles*. Predators: eg. *Chrysopa, Hippodamia,* etc.	4
7.	Biology, ecology, and population dynamics.	4
8.	Microbial Control. Bacteria: eg. *Bacillus thuringiensis; B. popilliae.*	4
9.	Microbial Control. Fungi: eg. *Entomophthora, Beauveria*	4
10.	Microbial Control. Viruses: eg. Nucleopolyhedrosis and granulosis viruses.	4
11.	Biological control using entomopathogenic nematodes Introduction: *Steinenema, Heterorhabditis.* Mode of action. Production and formulation.	4

12.	Application and commercialization.	4
13.	Biological control of weed using insects: 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.	4
14.	Industry and commercialization: Technology transfer. Market size and marketability. Timely availability and shelf-life.	4
15.	Consumer acceptance of produce protected by non-engineered and engineered biocontrol agents: Cost/benefit ratio.	4
	Total	**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	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.

Supportive References	Roy Van Driesche and 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
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories
Technology equipment (projector, smart board, software)	Projector and Smart board
Other equipment (depending on the nature of the specialty)	Specific laboratory equipment for this course including posters, light microscopes, centrifuges, incubators, ovens and other glassware

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

Course Specification

(Bachelor)

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	
Version: 1	
Last Revision Date: 29 September 2024	

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G. Specification Approval 8

A. General information about the course:

1. Course Identification

1. Credit hours: 2 (1 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☐ Required		☒ Elective		
3. Level/year at which this course is offered: (Level 6 / Year 3)					
4. Course General 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.					
5. Pre-requirements for this course (if any)**:**					
BIO 1252					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
Upon successful completion of this course, the students will 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.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Define the major approaches to physiological ecology	1.1	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Describe the relevance of physiology to ecology	1.1-1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
2.0	Skills			
2.1	Describe the basic physiological ecology issues	1.2-2.1-3.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Explain how individual-level physiology affects and is affected by	2.1	Practical Application Microteaching Modeling and	Observation / Rating Scales Practical Tests Self-

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	ecological phenomena across the diversity of life		Simulation Project-Based Learning Discovery Learning Collaborative Learning	Assessment Peer Assessment
2.3	Compare how, in the context of evolution, organisms exhibit similarities and differences in their basic physiology	2.1-2.3	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Appraise working within the group to reach the desired result	2.2 -2.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.2	Use of computers and means of modern technology	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to Physiological Ecology	4
2.	Energetics: The Basics of Metabolism	4
3.	Energetics: Survival, Growth and Reproduction	4
4.	Thermal Biology: Temperature Effects on Biological Rates	4
5.	Thermal Biology: Temperature Effects on Biological Times	4
6.	Thermal Biology: Temperature adaptation and acclimatization	4
7.	Water and Osmotic Balance: Plants	4

8.	Water and Osmotic Balance: Animals	4
9.	Nutritional Ecology: Feeding	4
10.	Nutritional Ecology: Digestion	4
11.	Nutritional Ecology: Ecological Stoichiometry	4
12.	Stress and Organism Function	4
13.	Stress and Life	4
14.	Sensory Physiology	4
15.	Sensory Physiology	4
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	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).
Supportive References	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	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories

Items	Resources
Technology equipment (projector, smart board, software)	Projector and Smart board
Other equipment (depending on the nature of the specialty)	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, incubators, ovens, other glassware specific for physiological ecology

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

Course Specification
(Bachelor)

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
Version: 1
Last Revision Date: 29 September 2024

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F. Assessment of Course Quality 8

G. Specification Approval 8

A. General information about the course:

1. Course Identification

1. Credit hours: 2 (1 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☐ Required		☒ Elective		
3. Level/year at which this course is offered: (Level 7 / Year 4)					

4. Course General Description:

This is an introductory course 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.

5. Pre-requirements for this course (if any)**:**

BIO 1251

6. Co-requisites for this course (if any)**:**

None

7. Course Main Objective(s):

Upon successful completion of this course, the students will 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.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	List the rare species of plants and animals	1.1	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Recognize the types of rare plants and animals that are	1.2	Interactive Lecture Discussion and Dialogue	Written tests Class discussion

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	resident, migratory, exotic and endangered extinction		Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	questions Class assignments Homework Short research/reports Summaries Presentations
2.0	Skills			
2.1	Explain how to collect marine fauna, invertebrate species, of Saudi Arabia	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Create the application of conservation of all types of flora and fauna	2.1-2.3	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Differentiate between resident and immigrant birds	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Appraise working	2.1-2.2-3.1	Modeling	Observation

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	within the group to reach the desired result		Dialogue and discussion Self-learning Collaborative learning	Self-assessment Peer assessment Achievement file
3.2	Write reports and preparation of presentations, graphics, and models	3.2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Use of computers and means of modern technology	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No	List of Topics	Contact Hours
1.	The concept of biodiversity	4
2.	Topography of the Kingdom	4
3.	Climate and geographical site of the Kingdom	4
4.	Plant and animal species in the Kingdom in terms of their characteristics	4
5.	Plant and animal species in the Kingdom in terms of their geographic distribution	4
6.	Plant and animal species in the Kingdom in terms of their density	4
7.	A brief history of the evolution of life studies (Wildlife) in the plants of the kingdom.	4
8.	A brief history of the evolution of life studies (Wildlife) in the animals of the kingdom.	4
9.	Types of rare plants that resident and migratory, exotic and endangered Extinction.	4
10.	Types of rare animals that resident and migratory, exotic and endangered Extinction	4
11.	Flora structures and their various systems	4
12.	Fauna structures and their various systems	4

13.	The environmental protectorates	4
14.	Threats facing the flora and fauna of the Kingdom	4
15.	Maintaining flora and fauna of the Kingdom	4
	Total	**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	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.
Supportive References	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	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories
Technology equipment (projector, smart board, software)	Projector and Smart board

Items	Resources
Other equipment (depending on the nature of the specialty)	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 glassware and tools, instruments required for collecting specimens of flora and fauna

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

Course Specification
(Bachelor)

Course Title:	Endocrinology
Course Code:	BIO 1461
Program:	Bachelor of Science in Biology
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University
Version:	1
Last Revision Date:	29 September 2024

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A. General information about the course:

1. Course Identification

1. Credit hours: 2 (1 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☐ Required		☒ Elective		
3. Level/year at which this course is offered: (Level 7 / Year 4)					
4. Course General Description:					
This course provides an overview of endocrinology from both an anatomical and physiological view. It discusses synthesis, distribution and regulation of the entire human endocrine system. In addition, contextual examples of these functions through human endocrine disorders are also explored.					
5. Pre-requirements for this course (if any)**:**					
BIO 1314					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
Upon successful completion of this course, the students will 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.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-

No	Mode of Instruction	Contact Hours	Percentage
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	List the basic components of the endocrine system, including hormones and receptors	1.1	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Describe how the organization and regulation of the endocrine system determines its function	1.1-1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method	Written tests Class discussion questions Class assignments Homework

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			Self-Learning Cooperative Learning Field Visits	Short research/reports Summaries Presentations
2.0	Skills			
2.1	Compare the physiological endocrine system to the pathological endocrine responses	1.2-2.1-3.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Develop specific knowledge of select endocrine disorders that illustrate divergent organization or function of the endocrine system	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Integrate knowledge of hormone molecular and cellular mechanisms to current pharmaceutical and biomedical interventions	2.1	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Demonstrate group leadership skills	2.2-2.3-3.1	Modeling Dialogue and discussion Self-learning Collaborative	Observation Self-assessment Peer assessment

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			learning	Achievement file
3.2	Use of computers and means of modern technology	3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No		Contact Hours
1.	Principles of Endocrinology	4
2.	Hormones and receptors	4
3.	Mode of action of hormones	4
4.	What are hormones, types of release, homeostasis and feedback, causative vs. permissive, organization vs. activation	4
5.	Peptide Hormones, Steroids, catechol amines and prostaglandins	4
6.	Hypothalamus	4
7.	Pituitary gland	4
8.	Thyroid Hormones	4
9.	Calcium and Phosphate Homeostasis: Parathyroid hormone, Calcitonin	4
10.	Pancreatic Functions	4
11.	The Endocrine Pancreas: Pancreas Anatomy, Insulin and Glucagon	4
12.	Adrenal gland Steroids: Adrenal anatomy, Aldosterone, Adrenal Medulla	4
13.	Gastrointestinal Hormones	4
14.	Reproductive hormones: Male and Female	4
15.	Stress hormones	4
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	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 2ndEdition
Supportive References	Guyton and Hall. Textbook of Medical Physiology, 12thedition. 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	None
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories
Technology equipment (projector, smart board, software)	Projector and Smart board
Other equipment (depending on the nature of the specialty)	Specific laboratory equipment for this course including posters, models of different experimental animals, light microscopes, mixer, fluorescent microscopes, spectrophotometer ELISA unit for detecting Ag-Ab reactions, instrument of gel electrophoresis, centrifuges, incubators, ovens, other glassware

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

Course Specification
(Bachelor)

Course Title:	Applied Biology
Course Code:	BIO 1471
Program:	Bachelor of Science in Biology
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University
Version:	1
Last Revision Date:	29 September 2024

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G. Specification Approval 8

A. General information about the course:

1. Course Identification

1. Credit hours: 2 (1 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☐ Required		☒ Elective		
3. Level/year at which this course is offered: (Level 7 / Year 4)					

4. Course General Description:
This course offers students a dynamic gateway into the world of practical biological applications. This course equips learners with hands-on skills, fostering a deeper comprehension of real-world biological processes. From biotechnology to environmental management, students engage with versatile topics that amplify their career opportunities.
5. Pre-requirements for this course (if any):
BIO 1333
6. Co-requisites for this course (if any):
None
7. Course Main Objective(s):
On successful completion of this course students should be able to: • Use practical laboratory techniques to complement and extend their understanding of the concepts discussed within the context of a laboratory study. • Use biological data to drive decision making in the context of an applied science business • Develop written and oral communication skills that enable them to communicate biological concepts, and the objectives and results of, and conclusions drawn from, biological studies.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Understand the research skills utilized in applied biology	1.1-1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Describe the scientific processes involved in applied	1.1-1.2	Interactive Lecture Discussion and Dialogue	Written tests Class discussion

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	biology research		Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	questions Class assignments Homework Short research/reports Summaries Presentations
1.3	Outline essential biological concepts and the results of biological studies		Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
2.0	Skills			
2.1	Analyze the scientific literature on a chosen methodology	2.1-2.2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Conduct biological studies using appropriate laboratory tools and techniques	2.1-2.3	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Communicate in the	2.2-2.3	Practical	Observation /

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	context of the applied biology discipline		Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Show the ability to generate plans for self-development	3.1-3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.2	Assemble discipline-based knowledge and skills to investigate problems and drive decision making	3.2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Demonstrate competencies in standard laboratory methodologies	3.2-3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No		Contact Hours
1.	Developmental biology	4
2.	Bioengineering	4
3.	Bioremediation	4
4.	Phytoremediation	4
5.	Agriculture	4
6.	Aquaculture	4
7.	Astrobiology	4

8.	Biofuels	4
9.	Forensics	4
10.	Food Processing	4
11.	Environmental Restoration	4
12.	Bioactive Natural compounds	4
13.	Industrial Microbiology	4
14.	Vaccine development	4
15.	Biological Data Analysis	4
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Th. J. Abatzopoulos (ed.), J. A. Beardmore (ed.), J. S. Clegg (ed.), P. Sorgeloos (ed.). Artemia: Basic and Applied Biology. Publisher: Springer, Year: 2002. ISBN: 978-90-481-6073-0,978-94-017-0791-6
Supportive References	Waite, Lee; Waite, Gabi Nindl. Applied cell and molecular biology for engineers. Publisher: McGraw-Hill, Year: 2007. ISBN: 9780071509527
Electronic Materials	None
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories
Technology equipment (projector, smart board, software)	Projector and Smart board

Items	Resources
Other equipment (depending on the nature of the specialty)	Specific laboratory equipment for this course including posters, models of different experimental animals, light microscopes, mixer, fluorescent microscopes, spectrophotometer ELISA unit for detecting Ag-Ab reactions, thermal cycler, instrument of gel electrophoresis, flow cytometer, centrifuges, incubators, ovens, other glassware

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد
NCAAA

2024
TP-153

Course Specification
(Bachelor)

Course Title: Scientific Methodology	
Course Code: BIO 1473	
Program: Bachelor of Science in Biology	
Department: Biology	
College: Science	
Institution: Imam Mohammad Ibn Saud Islamic University	
Version: 1	
Last Revision Date: 29 September 2024	

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A. General information about the course:

1. Course Identification

1. Credit hours: 2 (1 lectures, 2 laboratories, 0 tutorials)					
2. Course type					
A.	☐University	☐College	☒ Program	☐Track	☐Others
B.	☐ Required		☒ Elective		
3. Level/year at which this course is offered: (Level 7 / Year 4)					
4. Course General Description:					
The course provides the student with a basic understanding of the scientific methodology and enables the student to develop research, analyze collected data of various forms and ask critical questions recording data collection and analysis process. It also discusses the techniques and tools to be employed in completing a research project. In addition, it enables the students to prepare report writing and framing research proposals. The students learn to define good problem statements and learns how data can be used to support decisions and strategic choices.					
5. Pre-requirements for this course (if any)**:**					
STA 1217					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
On successful completion of this course students should be able to: • Understand and comprehend the basics in research methodology and applying them in research/ project work. • Select an appropriate research design. • Take up and implement a research project/ study. • Collect the data edit it properly and analyze it accordingly. • Develop skills in qualitative and quantitative data analysis and presentation. • Choose methods appropriate to research objectives.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	30
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Name basic concepts, aims, and problems of the scientific research	1.1-1.2	Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
1.2	Describe different steps of a scientific	1.1-1.2	Interactive Lecture Discussion and Dialogue	Written tests Class discussion

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	research		Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	questions Class assignments Homework Short research/reports Summaries Presentations
1.3	Recognize scientific methods and different points of view concerning them		Interactive Lecture Discussion and Dialogue Mind Maps Concept Maps Standard Method Inductive Method Self-Learning Cooperative Learning Field Visits	Written tests Class discussion questions Class assignments Homework Short research/reports Summaries Presentations
2.0	Skills			
2.1	Plan and carry out a simple research	2.1-2.2	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.2	Summarize techniques of data collection and data analysis	2.1-2.3	Practical Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Observation / Rating Scales Practical Tests Self-Assessment Peer Assessment
2.3	Analyze and	2.2-2.3	Practical	Observation /

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	interpret different kinds of research data		Application Microteaching Modeling and Simulation Project-Based Learning Discovery Learning Collaborative Learning	Rating Scales Practical Tests Self-Assessment Peer Assessment
3.0	**Values, autonomy, and responsibility**			
3.1	Demonstrate competence to search for academic publications using central databases	3.1-3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.2	Report scientific research results	3.2	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file
3.3	Show a clear ethical attitude in relation to how scientific methodology is used	3.2-3.3	Modeling Dialogue and discussion Self-learning Collaborative learning	Observation Self-assessment Peer assessment Achievement file

C. Course Content

No		Contact Hours
1.	Basic concepts of science	4
2.	History of science and philosophy of science	4
3.	The nature of scientific research	4
4.	Scientific research methods	4
5.	Different points of view about scientific research	4
6.	Research question	4
7.	Research model	4

8.	Sampling	4
9.	Qualitative techniques of data collection	4
10.	Quantitative techniques of data collection	4
11.	Data entry	4
12.	Data analysis	4
13.	Data interpretation	4
14.	Examining a sample research study	4
15.	Writing research report	4
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, oral test, oral presentation, group project, essay, and Attendance	During the semester	10%
2.	Midterm 1	5th week	15%
3.	Midterm 2	10th week	15%
4.	Lab reports and Lab Exam	15th week	20%
5.	Final Exam	16th week	40%

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Leedy, P D, and Ormrod, J E: "Practical Research, -Planning and design", 11 th ed. Pearson Educational Int.
Supportive References	Additional handouts and material made available on Blackboard
Electronic Materials	None
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms and Laboratories
Technology equipment (projector, smart board, software)	Projector and Smart board
Other equipment (depending on the nature of the specialty)	Specific laboratory equipment for this course including posters, models of different experimental animals, light microscopes, mixer,

Items	Resources
	fluorescent microscopes, spectrophotometer ELISA unit for detecting Ag-Ab reactions, thermal cycler, instrument of gel electrophoresis, flow cytometer, centrifuges, incubators, ovens, other glassware

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**Department of Biology Council**
REFERENCE NO.	**Meeting No. 6**
DATE	**29/9/2024**