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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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 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**