Course Specification

(Bachelor)

Course Title:	*Animal specimen preparation*
Course Code:	*BIO1406*
Program:	*Bachelor of Science in Biology*
Department:	*Department of Biology*
College:	*Faculty of Science*
Institution:	*University of Tabuk*
Version:	***Course Specification Version Number***
Last Revision Date:	*September 2023*

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours:					
3 Credit (2 theoretical + 1 practical) hours					
2. Course type					
A.	☐University	☐ College	☒ Department	☐Track	☐Others
B.	☐ Required		☒ Elective		
3. Level/year at which this course is offered: (7th Level / 4th year)					
4. Course general Description:					
The course covers topics on chemical fixatives, different types of microscopes and their uses in Animal Micro-techniques, steps of histological methods and techniques; dehydration, clearing, embedding, sectioning, staining and different types of microtomes.					
5. Pre-requirements for this course (if any):					
Vertebrates (BIO1207).					
6. Co-requirements for this course (if any):					
None					
7. Course Main Objective(s):					
By the end of this course the student will be able to: - prepare different types of chemical fixatives. - Identify steps used in animal micro-techniques and staining slides. - Use light Microscope and their techniques. - Use electron Microscope and their techniques. - Prepare animal tissues samples preparation of electron microscopy (TEM & SEM).					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	2	50%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		

No	Mode of Instruction	Contact Hours	Percentage
4	Distance learning		
5	**Others (Lab work)**	2	50%

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 CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	List parts and functions of a microscope.	K1	-Lectures. -Class discussion. -Group discussion. -Case studies.	-Quizzes -Midterm examination. -Final examination. -Class discussion and participation. - Homework (Problem-solving).
1.2	Describe the preparation of samples and reagents and animal tissues.	K2	-Lectures. -Class discussion. -Group discussion. -Homework assignments. -Case studies.	-Quizzes -Midterm examination.

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
				-Final examination. -Class discussion and participation. -Homework assignments.
2.0	**Skills**			
2.1	Differentiate between different parts of microscope and proper usage of the Light Microscope	S1	-Lectures. -Short essay -Class discussion. -Group discussion. -Brainstorming. -Lab work.	-Quizzes -reports -Final examination. -Class discussion and participation. - Homework (Problem-solving).
2.2	Apply experimental techniques relative to animal tissues.	S2	-Lectures. -Short essay -Class discussion. -Group discussion. -Brainstorming. -Lab work.	-Quizzes -reports -Final examination. -Class discussion and participation. - Homework (Problem-solving).
2.3	Examine histological Sections showing normal and abnormal structures.	S4	-Lectures. -Short essay -Class discussion. -Group discussion.	-Quizzes -reports -Final examination.

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
			-Brainstorming.	-Class discussion and participation. - Homework (Problem-solving).
3.0	**Values, autonomy, and responsibility**			
3.1	Work independently and as part of a team.	V1	-Lectures. -Short essay -Class discussion. -Group discussion.	-Class discussion and participation. -Homework (Problem-solving).

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction	2
2.	Fixatives: Advantages & Disadvantages.	2
3.	Light Microscopy	2
4.	Animal Micro-techniques	2
5	Transmission Electron Microscope	2
6.	Transmission Electron Microscope and Techniques	2
7.	Scanning Electron Microscope and its techniques	2
8.	Dehydrating agents and methods	2
9.	Clearing and embedding	2
10.	Clearing and embedding (cont)	2
11.	Preparatory method techniques of animal tissues	2
12.	Preparatory method techniques of animal tissues (cont)	2
13.	General principles of sectioning technique	2
14.	General principles of sectioning technique (cont)	2
15.	Different types of microtomes /Sectioning method/Chemical basis of Stain	2
Total		**30**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Class Participation	During whole teaching period	5
2.	Homework (Problem-solving)	3 to 13	5
3.	Short Exams (Quizzes)	During whole teaching period	5
4.	Midterm Theoretical Examination	8-9	20
4.	Reports (For Practical)	During whole teaching period	10
5.	Final Practical Examination	15	15
6.	Final Theoretical Examination	17	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	- Tizro P, Choi C, Khanlou N. Sample Preparation for Transmission Electron Microscopy. Methods Mol Biol. 2019;1897:417-424. doi: 10.1007/978-1-4939-8935-5_33. PMID: 30539461.
Supportive References	- Al-Khalifa, M. S. and Al-Saleh, A. A. (2008). "Microscopes and their Technology "Scientific Publications King Saud University pp 378.
Electronic Materials	- Websites on the internet that are relevant to the topics of the course.
Other Learning Materials	- Multimedia that is associated with the textbook and the relevant websites.

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	The laboratory accommodates up to 30 students
Technology equipment (projector, smart board, software)	Well-equipped lab and lecture room with computers and display screens installed with curtains on the windows are required
Other equipment (depending on the nature of the specialty)	Microscopes, microtome, reagent, slides, paraffin, Hematoxylin and eosin stain

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	- Students. - Faculty members.	Indirect & direct: - Questionnaires. - Meetings.
Effectiveness of Students assessment	- Quality and development committee. - Department chair.	- Course report. - Program annual report.
Quality of learning resources	- Plan and program committee. - Students. - Staff members.	Indirect & direct: - Questionnaires. - Meetings. - Reports.
The extent to which CLOs have been achieved	- Quality and development committee. - Peer Reviewer. - Program leaders.	Indirect & direct: - Questionnaires. - Meetings. - Reports.
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**PROGRAMS AND STUDY PLANS COMMITTEE**
REFERENCE NO.	
DATE	**SEPTEMBER 2023**