



Course Specifications

Course Title:	Animal micro techniques
Course Code:	BIO356
Program:	Bachelor of Science in Biology
Department:	Department of Biology
College:	Faculty of Science
Institution:	University of Tabuk

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A. Course Identification

1. Credit hours:	3 (2 Theoretical + 1 Practical) hours
2. Course type	
a.	University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b.	Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered:	Level 6, 7 or 8/ Third or Fourth year
4. Pre-requisites for this course (if any):	General Zoology 2 (BIO351)
5. Co-requisites for this course (if any):	None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	2	50%
2	Blended		
3	E-learning		
4	Distance learning		
5	laboratory	2	50%

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	26
2	Laboratory/Studio	26
3	Tutorial	
4	Others (specify)	
	Total	52

B. Course Objectives and Learning Outcomes

1. Course 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.

2. Course Main Objective

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

- To prepare different types of chemical fixatives.
- To identify steps used in animal micro-techniques and staining slides.
- To use light Microscope and their techniques.
- To use electron Microscope and their techniques.
- To prepare animal tissues samples preparation of electron microscopy (TEM & SEM).



3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and understanding	
1.1	List parts and functions of a microscope.	K1
1.2	Describe the preparation of samples and reagents and animal tissues.	K2
2	Skills:	
2.1	Differentiate between different parts of microscope and proper usage of the Light Microscope.	S1
2.2	Apply experimental techniques relative to animal tissues.	S2
2.3	Examine histological Sections showing normal and abnormal structures	S3
3	Values:	
3.1	Work independently and as part of a team.	V1

C. Course Content

No	(List of Topics (Theory part	Contact Hours
1	Fixatives: Advantages & Disadvantages	2
2	Light Microscopy and Animal Micro-techniques	2
3	Transmission Electron Microscope	2
4	Transmission Electron Microscope and Techniques	2
5	Scanning Electron Microscope and its techniques	2
6	Dehydrating agents and methods	2
7	Clearing and embedding	2
	Midterm Exam	
8	Preparatory method techniques of animal tissues	2
9	General principals of sectioning technique	2
10	Different types of microtomes	2
11	Sectioning method	2
12	Chemical basis of Stains	2
13	Staining, whole mount. Revision	2
	Final Exam	
Total		26

No	(List of Topics (Laboratory part	Contact Hours
1	Introduction to Article & Different types of microscopes	2
2	Introduction to Article & Different types of microscopes	2
3	SECTIONING 1- Anesthesia and fixation and types of stabilizers	2
4	SECTIONING 2-Washing, Dehydration and Clearing	2
5	SECTIONING	2



	3-Infiltration & Embedding	
6	SECTIONING 4-Trimming & Installation on the stand	2
7	SECTIONING 6-Preparation for Sectioning and Staining of tissues & Classification of dyes	2
	Midterm Exam	
8	SECTIONING 7-Cover sections and marking slides	2
9	SECTIONING 8- Whole mounts	2
10	The use of the electron microscope methods and examine histological Section	2
11	The use of the electron microscope methods and examine histological Section	2
12	Methods & equipment of collecting insects and pinning board	2
13	Methods & equipment of collecting insects and pinning board	2
13		
	Total	26

D. Teaching and Assessment

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

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding		
1.1	List parts and functions of a microscope	- Lectures. - Activities and homework.	- Quizzes. - Homework. - Final exam.
1.2	Describe the preparation of samples and reagents and animal tissues	- Lectures. - Activities and homework.	- Quizzes. - Homework. - Final exam.
2.0	Skills		
2.1	Differentiate between different parts of microscope and proper usage of the Light Microscope.	- Lectures. - Lab demonstration and working as a part of group. - Individual and small group tasks - Short essay.	- Assessment of lab reports and practical examinations. - Individual and group presentation. - Case studies. - Demonstration through charts and posters.
2.2	Apply experimental techniques relative to animal tissues.	- Lectures. - Lab demonstration and working as a part of group. - Individual and small group tasks.	- Assessment of lab reports and practical examinations.



Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
			<ul style="list-style-type: none"> - Individual and group presentation. - Case studies. - Demonstration through charts and posters.
2.3	Examine histological Sections showing normal and abnormal structures	<ul style="list-style-type: none"> - Lectures. - Short essay. - Lab demonstration and working as a part of group. - Individual and small group tasks 	<ul style="list-style-type: none"> - Assessment of lab reports and practical examinations - Individual and group presentation - Case studies - Demonstration through charts and posters.
3.0	Values		
3.1	Work independently and as part of a team.	<ul style="list-style-type: none"> - Essay writing. - Lab demonstration. - Individual presentation. 	<ul style="list-style-type: none"> - Oral and written scientific report. - Interactive discussion and participation.

2. Assessment Tasks for Students

#	*Assessment task	Week Due	Percentage of Total Assessment Score
1	Quizzes + Assignments + Class discussion	1-13	10%
2	Midterm Theoretical Exam	8	25%
3	Midterm Practical Exam	8	10%
4	Final Practical Exam	14	15%
5	Final Theoretical Exam	15	40%

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

E. Student Academic Counseling and Support

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

- Eight office hours per week per faculty member.
- Academic advising sessions 1hr/ week per faculty member.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	<ul style="list-style-type: none"> - Al-Khalifa, M. S. and Al-Saleh, A. A. (2008). "Microscopes and their Technology "Scientific Publications King Saud University pp 378.
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Essential References Materials	- Not Applicable.
Electronic Materials	- Websites on the internet that are relevant to the topics of the course.
Other Learning Materials	- Multimedia that associated with the textbook and the relevant websites.

2. Facilities Required

Item	Resources
Accommodation Classrooms, laboratories, demonstration) (.rooms/labs, etc	- Available laboratory accommodates up to 30 students.
Technology Resources AV, data show, Smart Board, software,) (.etc	- Well-equipped lab and lecture room with computers and display screens installed with curtains on the windows are required.
Other Resources Specify, e.g., if specific laboratory) equipment is required, list requirements or (attach a list	- microscopes, microtome, reagent, slides, paraffin, Hematoxylin and eosin stain

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
- Effectiveness of teaching and assessment.	- Students.	Indirect - Questionnaires.
- Quality of learning resources.	- Program committee. - Staff members. - Students.	Direct - Questionnaires. - Reports. - Meetings.
- The extent of achieving the course learning outcomes.	- Program leaders. - Peer Reviewer.	Direct & Indirect - Questionnaires. - Reports. - Meetings.

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

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

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Biology Department Council
Reference No.	
Date	1/6/2022

