Course Specification
(Bachelor)

Course Title:	Microtechnoques
Course Code:	BIO-1218
Program:	Bachelor of Science in Biology.
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University (IMSIU)
Version:	01
Last Revision Date:	*Pick Revision Date.*

Table of Contents

A. Course Identification

1. Credit hours:	2 (0 Lectures + 4 Laboratory + 0 Tutorials)
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	Level 4 / Second Year
4. Pre-requisites for this course (if any)**:**	Taxonomy of Zoology - BIO 111.
5. Co-requisites for this course (if any)**:**	None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	0
2	**Laboratory/Studio**	90
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	90

B. Course Objectives and Learning Outcomes

1. Course Description

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

2. Course Main Objective

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

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

Preservation & storage of histological specimen.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	To describe the structure of normal animal cell and its inclusions.	1.2
1.2	To define the functions of all cellular components.	1.1
1.3		
1...		
2	**Skills :**	
2.1	To summarize methods of preparation of whole mounts, smears, permanent section, and paraffin embedding and sectioning using microtomes.	2.1
2.2	To differentiate between the different cellular organelles.	2.1
2.3	To predict the abnormal ultrastructure of the organelles under different treatments.	2.1
2...		
3	**Values:**	
3.1	To demonstrate ability to communicate with people based on different biological techniques used in biology.	2.2-3.1
3.2	To operate laboratory instruments and computers.	3.3
3.3	To Perform biological experiments and handle various slides during laboratory classes.	3.3
3...		

C. Course Content

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

14	Electron microscopic techniques and methods: show comparison with paraffin method.	6
15	Revision.	6
Total		90

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

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 6th - 7th week	15 %

#	Assessment task*	Week Due	Percentage of Total Assessment Score
2	Midterm 2	Around 11th - 12th week	15 %
3	Quizzes, attendance, participation, home works	All the semester	10 %
4	lab reports	All the semester	5%
5	Lab exam.	Around 15th week	15%
6	Final exam.	Around 15th - 16th week	40%
7	Total		100 %
8			

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

E. Student Academic Counseling and Support

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

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

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

F. Learning Resources and Facilities

1.Learning Resources

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

2. Facilities Required

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

G. Course Quality Evaluation

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

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

H. Specification Approval Data

Council / Committee	Head of biology department
Reference No.	
Date	