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

Course Specification
(Bachelor)

Course Title:	**Instrumentation and Microscopic preparations**
Course Code:	**BIOL361**
Program:	**Bachelor of Science**
Department:	**Biology**
College:	**College of Science**
Institution:	**Majmaah University**
Version:	**4th**
Last Revision Date:	26 December 2023

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (2)					
Equalent to ECTS Credit point: 3					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (level 6- third year)					
4. Course General Description:					
The primary objective is to introduce and give students an integrated approach to light microscopy for biology, medicine, and material sciences researchers. This course provides a systematic and in-depth examination of the theory of image formation and the application of video and digital methods for exploring subtle interactions between light and the specimen. This course emphasizes the quantitative issues critical to correctly interpreting images obtained with modern wide-field and confocal microscopes.					
5. Pre-requirements for this course (if any)**:**					
BIOL 101 General Biology					
6. Co-requisites for this course (if any)**:**					
7. Course Main Objective(s):					
Upon course completion, students will learn microscopy concepts, image formation, magnification calculations, and various microscope types and applications. They will also grasp numerical aperture, field of view, and key microscopy techniques like confocal, electron, and atomic force microscopy.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	75
2	E-learning	15	25
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

Workload (based on academic semester)

No	Activity	Contact Hours
1.	**Contact hours**	45
2.	**Self –study hours or Academic learning hours (Assignments, quizzes, reports, discussions, library , research….)**	45
Total Workload		90
Equivalent to ECTS Credit Pionts		3

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 and understand the principal components of a light microscope	K3	Lecture, Videos, Group discussion	Midterm 1 Midterm 2 Quiz E-Exam
1.2	explain the functions of a microscope, identify and label the parts of a compound microscope	K3	Lectures , online course on future X (the national elearning platform)	Midterm 1 Midterm 2 Final exam
2.0	**Skills**			
2.1	Understand why different staining procedures are used on tissue sections	S2	Lectures, Videos, Group discussion, Brain storming, Critical thinking	Midterm 1 Midterm 2 Final exam
2.2	Comprehend the foundational optical	S2	Lectures, Videos, Group discussion, Brain storming,	Short answer, Fill in the blanks, Diagram

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	principles applicable to light microscopes.		Critical thinking	
2.3	Set up and use a light microscope and perform different staining procedures are used on tissue sections, Understanding of the preparation of routine paraffin and frozen sections	S4	Lab experiment, videos, diagrams Labs reports	Practical exams, Lab reports, Group research
3.0	**Values, autonomy, and responsibility**			
3.1	Create a scientific report on various microscopy techniques and deliver a presentation.	V1	Homework, and group discussion	Assignments, Homework, Presentation, Rubrics of behavior and performance in the lab.
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to Microscopy, History, and applications of microscopes.	2
2.	Principals of image formation	2
3.	The parts of a Microscope and their functions, Types of light microscopes.	2
4.	Sample preparation for microscopy	2
5.	**Vortex, Incubator, Shaker**	2
6.	ElISA, PCR, Chemidoc	2
7.	Chromatography, **Biosafety cabinets**	1
8.	pH meter, Weighing machine	1
9.	Centrifugation	1
10.	**Total Theory**	**15**
11.	Exercise #1 — Parts of the Microscope	6
12.	Exercise #2 — Finding & Focusing Report Sheet	6
13.	Exercise #3 — Sample preparation for Microscopy, Oil immersion microscopy	6
14.	Exercise #4 — Centrifuge	6
15.	Exercise #5 — Biosafety cabinets	6
16.	**Total (Practical's)**	**30**
Total		**45**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quiz-1	4th Week	5
2.	Mid-term exam-1	6th Week	10
3.	Mid-term exam-2	8th Week	10
4.	E-Exam-2	10th Week	10
5.	Homework, Assignment, Presentation,	12th Week	5
6.	Practical's,	13th Week	20
7.	Final exam	15th 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	Introduction to Light Microscopy - Savile Bradbury and Brain Bracegirdle ISBN-13: 978-0387915159 ISBN-10: 038791515X
Supportive References	1. Fundamentals of Light Microscopy and Digital Imaging - Douglas B. Murphy. Print ISBN:9780471692140 |Online ISBN:9781118382905 2. Fluorescence Microscopy, 2nd Edition - Brian Herman. ISBN-13: 978-0387915517 ISBN-10: 0387915516. 3. Photography with a Microscope - Fred Rost and Ron Oldfield. ISBN-13: 978-0521770965 ISBN-10: 0521770963.
Electronic Materials	**1.** https://micro.magnet.fsu.edu/primer/books/index.html **2.** https://www.ncbi.nlm.nih.gov/
Other Learning Materials	Light and Electron Microscopy - Elizabeth S. Slayter and Henry M. Slayter ISBN-13: 978-0521339483 ISBN-10: 0521339480.

2. Required Facilities and equipment

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

Items	Resources
Technology equipment (projector, smart board, software)	**Smart board and e podium available**
Other equipment (depending on the nature of the specialty)	**Library and seminar room** **Wi-Fi internet connections**

F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**DEPARTMENT COUNCIL**
REFERENCE NO.	**#7**
DATE	**07/10/2024**