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

Course Specification
(Bachelor)

Course Title:	Plant Physiology
Course Code:	BIOL_223
Program:	BIOLOGY
Department:	BIOLOGY DEPARTMENT
College:	College of science
Institution:	Majmaah University
Version:	4th
Last Revision Date:	26 December 2023

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A. General information about the course:

1. Course Identification

1. Credit hours: 3(2+1)					
Equivalent to ECTS Credit Point: 4.5					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (four .)					
4. Course General Description:					
This course is an introduction to the physiological processes underlying the mechanism of water uptake by root, upward movement of water and ions translocation, photosynthesis, respiration and nitrogen metabolism. In addition, this course explains structure, function, nomenclature, assay of different enzymes and plant growth regulators specially hormones and their major role in growth.					
5. Pre-requirements for this course (if any)**:**					
Plant Taxonomy (BIOL 222)					
6. Co-requisites for this course (if any)**:**					
N/A					
7. Course Main Objective(s):					
• The main objective of a plant physiology course is to provide students with a comprehensive understanding of how plants work, covering the fundamental chemical and physical processes that govern their life, energy Conversion (Photosynthesis & Respiration), water relations, mineral nutrition, tropisms and movements and regulation of growth development. • The laboratories' main objective is to introduce plant physiology tools by running basic experiments, formulating and testing hypotheses, processing, analyzing, presenting results, and preparing a report.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	83%
2	E-learning	12	17%
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**	0
4.	**Tutorial**	0
5.	**Others (specify)**	0
Total		60

Workload (based on academic semester)

No	Activity	Work load (In hours)
1.	**Contact hrs**	60
2.	**Self –study hours or Academic learning hours (Assignments, quizzes, reports, discussions, library , research….)**	60
Total Workload		120
Equivalent to ECTS Credit Pionts		4.5

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	Understanding the importance of water mineral nutrients and plant hormones for plant growth and development.	**K2**	Lectures, individual and group dissection,	Midterm 1 Midterm 2 Final exam Quizzes. Class exercises E exam
1.2	Recognize how plants get their energy through photosynthesis and respiration	**K2**	**Lectures , online course on future**	Midterm 1 Midterm 2 Final exam

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
			X(the national e-learning platform	
...				
2.0	**Skills**			
2.1	Explain the different physiological pathway of transpiration ,photosynthesis and respiration	**S1**	Lecture, homework and assignments	Midterm 1 Midterm 2 Final exam
2.2	Performing laboratory experiment on various physiological phenomenon(imbibition , osmosis , plasmolysis....etc)	**S1**	Lab experiment, videos, diagrams	Practical Exam Group research Assignment
...	Analysis laboratory data	**S4**	**Labs reports**	Practical Exam group presentation Group research Assignment
3.0	**Values, autonomy, and responsibility**			
3.1	Effective communication of scientific concepts by submitting assignment and report	**V1**	Lectures, individual and group dissection	Reports, Assignment Homework Rubrics of behavior and performance in the lab.
3.2				
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Physiology of transport through the plant body: Water relations of plants – Water absorption, Transpiration (water loss), Ascent of sap,	4

2.	Mineral nutrition: Macronutrients, micronutrients, Absorption of minerals	2
3.	Enzyme – Nomenclature, Structure, Mechanism of action and factor affecting enzyme activities (inhibitors and activators).	4
4.	Photosynthesis – Mechanisms of photosynthesis, Calvin (C3) cycle ,C4 cycle, Factors affecting photosynthesis	4
5.	Phloem translocation of organic solutes – Source sink relations	2
6.	Respiration – Glycolysis (anaerobic respiration), Citric acid cycle (aerobic respiration), Electron transport system, Pentose phosphate pathway	4
7.	Nitrogen metabolism – Nitrogen fixation and assimilation	4
8.	Plant hormone physiology: Plant growth, Growth hormones – auxins, IAA, gibberellins	4
9.	Stress physiology – water, heat, salt and cold stress	2
10.	Practical : Experiments demonstrate imbibition and diffusion. Experiments demonstrate osmosis phenomenon. Experiments demonstrate ascent of sap. Experiments demonstrate Minerals nutrition. Experiments demonstrate photosynthesis. Experiments demonstrate enzymes activities Experiments demonstrate respiration Experiments demonstrate role of plant growth regulator on plant growth and development.	30
11.		
12.		
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Mid- term I exam	5^{th} - 6^{th} week	10%
2.	Mid-term II exam	9^{th} -10^{th} week	10%
3.	Quiz, Oral test and Home works	Every two weeks	10%
4.	E exam (online)	11^{th} week	10%
5.	Practice exam	14-15^{th} week	20%

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
6.	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	Plant Physiology: Lecture Notes on Principles and Concepts. Misganaw Meragiaw Mollaw. LAP LAMBERT Academic Publishing. 2016. 978-3330013919 Plant Physiology Paperback. A Malcolm Campbell and Christopher J Paradise. Momentum Press. 2016. 978-1944749118
Supportive References	Plant Physiology. Vladimir Ivanovich Palladin. Forgotten Books. 2016. 978-1334418778
Electronic Materials	• Britannica https://www.britannica.com/science/cell-biology • • Khan academy https://www.khanacademy.org/science/biology/structure-of-a-cell
Other Learning Materials	Electronic materials of Lecture notes and PowerPoints available in 'Black board' database

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom
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	Stydents	Direct assessment
Effectiveness of Students assessment	Progarm 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	**BIOLOGY DEPARTMENT COUNCIL**
REFERENCE NO.	**7**
DATE	**4/4/1446 H (07/10/2024)**