هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

T-104
2022

Course Specification

Course Title:	**Plant Physiology**
Course Code:	**441-BOTN**
Program:	**Bachelors (BSc)**
Department:	**Biology**
College:	**Biology**
Institution:	**Jazan University**
Version:	**4**
Last Revision Date:	*Pick Revision Date.*

Table of Contents:

A. General information about the course:

Course Identification					
1. Credit hours:	3Hours				
2. Course type					
a.	University ☐	College ☐	Department☒	Track☐	Others☐
b.	Required ☒	Elective☐			
3. Level/year at which this course is offered:			10^{th} Level/4^{th} Year		
4. Course general Description: - This course provide the students complete knowledge about all physiological process occurring in plants that includes knowledge about mechanism, role, types and classification of enzymes, different theories suggested by Scientists on the mode of action of enzymes, Kinetics of enzymes, Photosynthesis (structure of chloroplast, light reaction/dark reaction) Respiration (aerobic and anaerobic) along with the response of plants towards different biotic and abiotic stresses that plant encountered on daily basis, mechanism that plants adopt to survive in harsh environmental conditions, along with the response of different plants (C3, C4, CAM plants) towards steresses..					
5. Pre-requirements for this course (if any): Plant Water and Soil Relation Ship (341-BOT-2)					
6. Co- requirements for this course (if any): None					
7. Course Main Objective(s):- After completing this course Students would be able: **1. To Understand completely the mode of action of enzymes.** **2. To Explain theories related to enzyme action (Key and lock theory, induced fit model theory), Enzyme classification, Different factors affecting rate of action of enzymes** **3. To understand Michaelis-Menten Kinetics of Enzymes** **4. To explain Photosynthetic process occurring in plants, its mechanism, theories, and definitions related to Photosynthesis.** **5. To understand the structure of chloroplast, reactions occurring in chloroplast.** **6. To understand and explain the light and dark reaction of Photosynthesis** **7. To Understand structure of Photosystem I and Photosystem II (PSI/PSII)** **8. To Understand how electron get transferred between two Photosystems** **9. To Understand Electron transport chain** **10.To explain and differentiate between Cyclic and linear photophosphorylation** **11. To differentiate among C3, C4 and CAM plants** **12. To understand the process of respiration (aerobic and anaerobic).**					

13. To Study the details of all cycles occurring in plant to accomplish the processes of photosynthesis and respiration process in plants (Calvin Cycle, TCA, Glycolysis)
14. To Understand the Mechanism of alternative respiration
15.To Explain different stress occurring in environment (abiotic and biotic stress)
16. To understand the mechanism of avoidance, adoption and resistance adopted by the plants during these stress conditions.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	44	100%
2.	E-learning		0%
3.	Hybrid • Traditional classroom • E-learning		0%
4.	Distance learning		0%

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	22
2.	Laboratory/Studio	22
3.	Field	
4.	Tutorial	
5.	Others (specify)	
	Total	44

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	Define all principals, concepts, theories, and aspects concerning plant physiology	K1.1	Interactive lectures. Classroom discussions Tutorials. Self-learning activities.	MCQs. Short answer questions. True/False, Quiz Midterm, Final examination
1.2	Differentiate between different mechanisms,	K2.1	Interactive lectures. Classroom discussions	MCQs. Short answer questions.

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	functions, practices, and processes related to Plant Physiology		Tutorials. Self-learning activities.	True/False. Compare, Midterm Final examination
2.0	Skills			
2.1	Debate the plant physiology theories, principals, and processes.	S2.1	Interactive lectures. Classroom discussions Tutorials. Self-learning activities.	MCQs. Short answer questions. True/False, Quiz, Midterm, Final Examination
2.2	Set-up experiment, investigation and research project for complex issues and problems in Plant Physiology	S2.2	Interactive lectures. Classroom discussions Tutorials. Self-learning activities.	MCQs. Short answer questions. True/False, Final examination
3.0	Values, autonomy, and responsibility			
3.1	Illustrate awareness of risk assessment and safety observation when dealing with various equipment at various fields.	V3.2	Interactive lectures. Classroom discussions Tutorials. Self-learning activities.	Group Assignment. Observation. Group Discussion. Oral exam. Laboratory work.

C. Course Content

No	List of Topics	Contact Hours
1.	Enzymology. Enzyme Structure. Enzyme Catalysis	2
2.	Enzymology. Enzyme Classification. Mechaelis-Menten Kinetics. Regulation.	6
3	Photosynthesis. Chloroplast. Thylakoid Molecular Assembly. Pigments.	2
4	Photochemical Reactions. Biochemical Reactions. C3, C4, CAM.	2
5	Photosynthesis. Photorespiration. CO2 Enrichment.	6
6	Respiration. Mitochondria. Glycolytic Pathway. TCA Cycle.	2
7	Stress Physiology	2
Total		22

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Theoretical quiz	4	5
2.	Mid-term exam	6	10
3.	Practical quiz	5	5
4	Practical assignment	6	5
5	Final practical exam	11	20
6	Final Exam	12	50

*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	Hopkins, WG & Huner, NPA (2008). Introduction to plant physiology, 4th edn, John Wiley and Sons, New York. (ISBN 0 470 24766 5.) Davis P.J. (2005) Plant Hormones. Kluer Academic Publishers, Dordrecht. Hamad Alwahibi and Mohammsd Basalah (2006) physiology of p King Saud University (In Arabic).
Supportive References	Salisbury F., Ross C. (2012) Plant Physiology. Butterworth, London
Electronic Materials	www.users.rcn.com/jkimball.ma.ultranet/BiologyPages/ www.emc.maricopa.edu www.biology.clc.uc.edu
Other Learning Materials	Contents uploaded on Blackboard system, Power-point presentations given by the instructors practical and theoretical

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	1 Lecture room(s) for groups of 25 students. 1 Laboratory for group of 15 students.
Technology equipment (Projector, smart board, software)	Internet connection, data show or smart board
Other equipment (Depending on the nature of the specialty)	Light microscopes, microscopic slides for the course subjects, models of different stages of plant growth and development, consumables, incubators, chemicals, and glassware's.

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer to peer Reviewer, students	Indirect (Surveys)
Effectiveness of student's assessment	Program quality committee, Program leader, peer reviewer	Direct (Cross Check), Indirect (Surveys)
Quality of learning resources	Students	Indirect (Surveys)
The extent to which CLOs have been achieved	Course coordinator	Excel sheet of CLOs assessment (direct), Surveys (indirect)
Other	Peer to peer Reviewer, students	Indirect (Surveys)

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	BIOLOGY PROGRAM BOARD
REFERENCE NO.	BIO2214
DATE	20/9/2022AD