



Course Specifications

Course Title:	Plant Physiology I
Course Code:	4013261-3
Program:	BSc Biology
Department:	Biology Department
College:	Applied science
Institution:	Umm Al-Qura university

Table of Contents

A. Course Identification	3
6. Mode of Instruction (mark all that apply)	3
B. Course Objectives and Learning Outcomes	3
1. Course Description	3
2. Course Main Objective.....	4
3. Course Learning Outcomes	4
C. Course Content	5
D. Teaching and Assessment	5
1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods	5
2. Assessment Tasks for Students	6
E. Student Academic Counseling and Support	7
F. Learning Resources and Facilities	7
1. Learning Resources	7
2. Facilities Required.....	7
G. Course Quality Evaluation	7
H. Specification Approval Data	8

A. Course Identification

1. Credit 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: 3 rd Year / Level 5
4. Pre-requisites for this course (if any): Biochemistry (4012172-3)
5. Co-requisites for this course (if any):

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom		70 %
2	Blended		
3	E-learning		10 %
4	Correspondence		10 %
5	Other		10 %

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	Lecture	28
2	Laboratory/Studio	42
3	Tutorial	6
4	Practical/Field work/Internship	6
5	Others (specify)	10
	Total	92
Other Learning Hours*		
1	Study	
2	Assignments	
3	Library	
4	Projects/Research Essays/Theses	
5	Others (specify)	
	Total	

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description
The course will cover a comprehensive knowledge of plant organ functions including plant cell water relations, uptake of water and minerals, translocation of solutes, definition and

importance of enzymes, photosynthesis, and respiration as well as plant growth and hormones, and plant tissue culture. The course aims to give students a detailed and comprehensive idea of the basics of the various processes within the plant in terms of water relations. Furthermore, it aims to give a brief picture of enzymes, photosynthesis, and respiration as well as plant growth and hormones, and plant tissue culture.

2. Course Main Objective

After completing this course student should be able to:

- Define the major concepts of Plant Physiology.
- Identify how plant structure relates to function.
- Describe fundamental functions of plants at all levels; cells, tissues, organs and whole plant system.
- Acquire the essential practical skills relevant to the use of instruments in chemical analysis.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge:	
1.1	Upon successful completion of this course the student will be able to: Recognize the concept and importance of water relations and the related processes as well as enzymes, photosynthesis, respiration, plant growth and hormones, and plant tissue culture.	
1.2	Describe the relation between water potential, solute potential and turgor pressure.	
1.3	List and describe the three pathways of water absorption, sap ascent and transpiration.	
1.4	Describe the types and stages of plant growth as well as the tissue culture techniques.	
1.5	List the factors affecting water absorption and transpiration.	
1.6	List and describe the importance of minerals and mineral deficiency symptoms.	
2	Skills :	
2.1	After successfully completed the course students should be able to: Compare between solutions, between the three pathways of water movement, macro- and micronutrients, and photosynthesis and respiration.	
2.2	Differentiate between types of growth and growth stages as well as classes and types of growth regulators.	
2.3	Acquire the essential practical skills relevant to the use of instruments in chemical analysis.	
2.4	Analyse physiological experimental data and draw sensible conclusions	
3	Competence:	
3.1	- Developing oral presentations.	
3.2	- Communicating personal ideas and thoughts.	
3.3	- Work independently and as part of a team to finish some assignments.	
3.4	- Communicate results of work to others	

C. Course Content

No	List of Topics	Contact Hours
1	<ul style="list-style-type: none"> • Introduction to the course - Course syllabus and grading Protoplast, solutions, pH value & buffer solution.	2
2	<ul style="list-style-type: none"> • Colloidal systems Definition, types, properties and precipitation.	4
3	<ul style="list-style-type: none"> • Plant cell-water relations - Chemical structure of plant cell. - Water-movement processes (imbibition, diffusion and osmosis). - Plant-cell osmotic system, and relation between water potential, solute potential and turgor pressure. - Factors affecting osmotic pressure of plant cell. - Role of osmotic pressure and osmosis in plant life. Membranes and permeability.	6
4	<ul style="list-style-type: none"> • Plant-water relations - Water absorption, by roots, from soil (mechanism & types). - Factors affecting water absorption. - Water loss and transpiration (Definition & types). Factors affecting transpiration.	6
5	<ul style="list-style-type: none"> • Mineral Nutrition - Importance of minerals. Mineral deficiency symptoms.	4
6	<ul style="list-style-type: none"> • Introduction to enzymes, photosynthesis & respiration (definition and importance)	4
7	Introduction to plant growth and hormones (definition, types and importance)	2
8	<ul style="list-style-type: none"> • Introduction to plant tissue culture (definition, types of techniques and importance)	2
Total		28hrs

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		
1.1	Upon successful completion of this course the student will be able to: Recognize the concept and importance of water relations and the related processes as well as enzymes, photosynthesis, respiration, plant growth and hormones, and plant tissue culture.	Lectures and student research In-class lecturing where the previous knowledge is linked to the current and future topics. Homework assignments.	Homework, exams and research papers
1.2	Describe the relation between water potential, solute potential and turgor pressure.	Discussions (connecting what they learn in the class and applying this information in laboratory).	
1.3	List and describe the three pathways of water absorption, sap ascent and transpiration.		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.4	Describe the types and stages of plant growth as well as the tissue culture techniques.	Handout of lecture notes for each topic	
1.5	List the factors affecting water absorption and transpiration.		
1.6	List and describe the importance of minerals and mineral deficiency symptoms.		
2.0	Skills		
2.1	After successfully completed the course students should be able to: Compare between solutions, between the three pathways of water movement, macro- and micronutrients, and photosynthesis and respiration.	Application of essential scientific techniques through lectures, classes and essays. <input type="checkbox"/> Small group discussion. <input type="checkbox"/> Ask the students to make small search project during the semester. <input type="checkbox"/> Making connections between different topics across the course.	Course work reports. Evaluation of the topics prepared by students according to the content, arrangement, and covering of the topic. Midterm and final exams. Checking the homework assignments
2.2	Differentiate between types of growth and growth stages as well as classes and types of growth regulators.		
2.3	Acquire the essential practical skills relevant to the use of instruments in chemical analysis.		
2.4	Analyse physiological experimental data and draw sensible conclusions		
3.0	Competence		
3.1	- Developing oral presentations.	Oral presentations. <input type="checkbox"/> Internet search assignments and essays. <input type="checkbox"/> Incorporating the use and utilization of computer in the course requirements. <input type="checkbox"/> Students will be asked for delivering a summary regarding certain topics related to the course.	Evaluation of student essays and assignments. <input type="checkbox"/> Evaluating the laboratory written reports. <input type="checkbox"/> Marks given to for good reports and presentations <input type="checkbox"/> Evaluating during the discussion in lecture and reports. Part of the grad is put for student's written participation
3.2	- Communicating personal ideas and thoughts.		
3.3	- Work independently and as part of a team to finish some assignments.		
	- Communicate results of work to others		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Home works, search or presentation	4th and 8th weeks	10 %
2	Midterm "Written Test (1)"	8th week	30%
3	Final Exam "Practical Test"	15th week	20%
4	Final Exam Written Test		40%
5			
6			
7			
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 :

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Lecture notes prepared by faculty member responsible for the
Essential References Materials	<ul style="list-style-type: none"> • General Plant Physiology - Part II - reform, Mohammad Omar, Ali Crescent, Mohammed Hamad Al Wahaibi - King Saud University Press for publishing scientific and presses - Riyadh (2002). • E. E. Conn, P. K. Stumpf, "Outlines of Biochemistry" John Wiley & Sons Inc Date Published: 1972. • General Plant Physiology - Part II - reform, Mohammad Omar, Ali Crescent, Mohammed Hamad Al Wahaibi - King Saud University Press for publishing scientific and presses - Riyadh (2002). • Photosynthesis, by Eaton-Rye, Julian J.; Tripathy, Baishnab C.; Sharkey, Thomas D. (Eds.), 2012.
Electronic Materials	<ul style="list-style-type: none"> • www.ucalgary.ca/plantmetabolism. • www.ecomii.com/.../plant-metabolism. • www.ufv.br/dbv/pgfvg/.../metabolism/NMR.pdf.
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms, laboratories
Technology Resources (AV, data show, Smart Board, software, etc.)	data show, Smart Board
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods

Evaluation Areas/Issues	Evaluators	Evaluation Methods

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	
Reference No.	
Date	