

Philadelphia University	 PHILADELPHIA UNIVERSITY THE WAY TO THE FUTURE	Approval date:
Faculty: Science		Issue:
Department: Biotechnology and Genetic Engineering		Credit hours: 1
Academic year: 2022/2023		Bachelor

Course information

Course#	Course title	Prerequisite
0240323	Plant tissue culture laboratory	0240326
Course type		Room #
☐ University Requirement ☐ Faculty Requirement ☐ Major Requirement ☐ Elective ☒ Compulsory		6615
		Class time 13:00-16:00 Sun, Tue

Instructor Information

Name	Office No.	Phone No.	Office Hours	E-mail
Ayat Al-Azab	1018	2475	Sun, Tue: ٩:٤٥ – ١١:٠٠ Mon, Wed: ١٤:٠٠ – 13:00	aalazab@philadelphia.edu.jo

Course Delivery Method

Course Delivery Method			
☒ Physical	☐ Online	☐ Blended	
Learning Model			
Precentage	Synchronous	Asynchronous	Physical

Course Description

This laboratory course in the first few weeks, aims to introduce the students to the principles and applications of plant tissue culture as well as the biology of cultured plant cells. Later through the course, Students will be exposed to some molecular techniques using plant systems. The designed experiments will illustrate the principles and ideas discussed in the plant biotechnology module. Lab sheets will be mailed or handed to the students a week before the scheduled lab. The students are expected to read and comprehend these sheets pre the lab session.

Course Learning Outcomes

Number	Outcomes	Corresponding Program outcomes
Knowledge		
K01	Understand the application of plant cell culture	Kp2
K02	Describe the basic techniques of culturing plants under aseptic conditions.	Kp2
K03	Understand callus formation and somatic embryo culturing.	Kp1
K04	Explain the protocol of culturing meristematic tissue to generate plant virus-free plant.	Kp2
K05	Describe the protocol of protoplast generation and its application.	Kp2
Skills		
S01	Demonstrate the responsibility in using and preserving laboratory equipment's.	Sp1
S02	Demonstrate, maintain, and preserve plant cell culture using aseptic techniques and standard procedures.	Sp3
S03	Collaborate with team members for the best utilizing time for the experimental work.	Sp5
Competencies		
C01	Apply critical thinking skills and utilize different sources of information.	Cp1
C02	Perform analytical lab work, and interpret scientific ideas through written reports.	Cp2
C03	Demonstrate professional and ethical conduct.	Cp4

Learning Resources

Course textbook	(1) Lindsey, K. (Ed.). (2013). <i>Plant Tissue Culture Manual-Supplement 7: Fundamentals and Applications</i> . Springer Science & Business Media. (2) Park, S. (2021). <i>Plant Tissue Culture: Techniques and Experiments</i> . Academic Press. (3) Patra, J. K., Das, G., Das, S. K., & Thatoi, H. (2020). <i>A Practical Guide to Environmental Biotechnology</i> . Springer.
Supporting References	Loyola-Vargas, V. M., & Vázquez-Flota, F. (Eds.). (2006). <i>Plant cell culture protocols</i> (Vol. 318). USA: Humana Press.
Supporting websites	
Teaching Environment	☐ Classroom ☒ laboratory ☐ Learning platform ☐ Other

Meetings and subjects timetable

Week	Topic	Learning Methods	Tasks	Learning Material
1	Introduction Media preparation, contamination tests, and	Lectures and Experiment		

	sterilization			
2	Germinating seeds under aseptic conditions	Lectures and Experiment		
3	Callus cultures using different explants, initiation and subculturing	Lectures and Experiment		
4	Regeneration and morphogenesis	Lectures and Experiment		
5	Meristem culture for virus-free plants	Lectures and Experiment		
6	Cell Suspension Culture	Lectures and Experiment		
7	Midterm exam			
8	Haploid plants from anther culture	Lectures and Experiment		
9	Sweet corn embryo culture	Lectures and Experiment		
10	Somatic embryogenesis	Lectures and Experiment		
11	Protoplast generation and culture	Lectures and Experiment		
12	Final Exam			

* includes: Lecture, flipped Class, project- based learning, problem solving based learning, collaborative learning

Course Contributing to Learner Skill Development

Using Technology
Communication skills
Application of concepts learnt

Assessment Methods and Grade Distribution

Assessment Methods	Grade Weight	Assessment Time (Week No.)	Link to Course Outcomes
Mid Term Exam	% 30	7	K01-K04 S01-S03 C01-C03
Various Assessments *	% 30	1,2,3,4,5,6,8,9,10,11	K01-K05

			S01-S03 C01-C03
Final Exam	% 40	12	K01-K05 S01-S03 C01-C03
Total	%100		

* includes: quiz, in class and out of class assignment, presentations, reports, videotaped assignment, group or individual projects.

Alignment of Course Outcomes with Learning and Assessment Methods

Number	Learning Outcomes	Learning Method*	Assessment Method**
Knowledge			
K01-K05	All outcomes	Lectures and Experiment	Quizzes, reports, and exams
Skills			
S01-S03	All outcomes	Lectures and Experiment	Quizzes, reports, and exams
Competencies			
C01-C03	All outcomes	Lectures and Experiment	Quizzes, reports, and exams

* includes: Lecture, flipped Class, project- based learning, problem solving based learning, collaborative learning

** includes: quiz, in class and out of class assignment, presentations, reports, videotaped assignment, group or individual projects.

Course Policies

Policy	Policy Requirements
Passing Grade	The minimum passing grade for the course is (50%) and the minimum final mark recorded on transcript is (35%).
Missing Exams	- Missing an exam without a valid excuse will result in a zero grade to be assigned to the exam or assessment. - A Student who misses an exam or scheduled assessment, for a legitimate reason, must submit an official written excuse within a week from the exam or assessment due date. - A student who has an excuse for missing a final exam should submit the excuse to the dean within three days of the missed exam date.
Attendance	The student is not allowed to be absent more than (15%) of the total hours prescribed for the course, which equates to two lab sessions. If the student misses more than (15%) of the total hours prescribed for the course without a satisfactory excuse accepted by the dean of the faculty, s/he will be prohibited from taking the final exam and the grade in that course is considered (zero), but if the absence is due to illness or a compulsive excuse accepted by the dean of the college, then withdrawal grade will be recorded.
Academic Honesty	Philadelphia University pays special attention to the issue of academic integrity, and the penalties stipulated in the university's instructions are applied to those who are proven to have committed an act that violates academic integrity, such as: cheating, plagiarism (academic theft), collusion, and violating intellectual property rights.

Program Learning Outcomes to be assessed in this Course

Number	Learning Outcome	Course Title	Assessment Method	Target Performance level
1	Kp1	Plant tissue culture lab	Quizzes, reports, and exams	
2	Kp2	Plant tissue culture lab	Quizzes, reports, and exams	
3	Sp1	Plant tissue culture lab	Quizzes, reports, and exams	
4	Sp3	Plant tissue culture lab	Quizzes, reports, and exams	
5	Sp5	Plant tissue culture lab	Quizzes, reports, and exams	
6	Cp1	Plant tissue culture lab	Quizzes, reports, and exams	
7	Cp2	Plant tissue culture lab	Quizzes, reports, and exams	
8	Cp4	Plant tissue culture lab	Quizzes, reports, and exams	

Description of Program Learning Outcome Assessment Method

Number	Detailed Description of Assessment
Kp1	Quizzes, reports, and exams
Kp2	Quizzes, reports, and exams
Sp1	Quizzes, reports, and exams
Sp3	Quizzes, reports, and exams
Sp5	Quizzes, reports, and exams
Cp1	Quizzes, reports, and exams
Cp2	Quizzes, reports, and exams
Cp4	Quizzes, reports, and exams

Assessment Rubric of the Program Learning Outcome

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