



SULTAN QABOOS UNIVERSITY

COURSE OUTLINE

PROGRAM: Bachelor of Science in Plant Sciences

1. Course Code	PLNT4541	
2. Course Title	Plant-Pathogens Interactions	
3. Credits	3 Cr Hrs , 12 Cr Points, 6 ECTS	
4. Pre-requisite Course(s)	PLNT3201, PLNT3522; BIOL2101, CHEM2101, CAMS3000, CAMS3001, CAMS2003, CAMS2000	
5. Co-requisite Course(s)	None	
6. Equivalent Course(s)	CROP4541, PROT4541	
7. Incompatible Course(s)	None	
8. Course Category	<input type="checkbox"/> University Requirement	<input type="checkbox"/> University Elective
	<input type="checkbox"/> College Requirement	<input type="checkbox"/> College Elective
	<input type="checkbox"/> Department Requirement	<input checked="" type="checkbox"/> Department Elective
	<input type="checkbox"/> Specialization Requirement	<input type="checkbox"/> Specialization Elective
	<input type="checkbox"/> Other (specify):	
9. Course Owner	College: CAMS	Department: Plant Sciences
10. Course Type	<input type="checkbox"/> Lecture	<input checked="" type="checkbox"/> Lecture/Lab
	<input type="checkbox"/> Lecture/Seminar	<input type="checkbox"/> Lecture/Studio
	<input type="checkbox"/> Lecture/Tutorial	<input type="checkbox"/> Lecture/Lab/Tutorial or Seminar
	<input type="checkbox"/> Tutorial	<input type="checkbox"/> Laboratory (Practical)
	<input type="checkbox"/> Field or Work Placement	<input type="checkbox"/> Studio
	<input type="checkbox"/> Seminar	<input type="checkbox"/> Internship
	<input type="checkbox"/> Workshop	<input type="checkbox"/> Project
11. Language of Instruction	English	
12. Course Description		
This course aims to give basic information regarding pathogenicity and virulence of plant pathogens, plant defense mechanisms, plant disease resistance genes, plant defense signalling networks and molecular mechanisms of plant immunity.		
13. Teaching/Learning Strategies		
Lectures Laboratory Assignments Tests Presentations		
14. Assessment Components and Weight [%]		
<input checked="" type="checkbox"/> Quizzes 10	<input checked="" type="checkbox"/> Practical 10	<input type="checkbox"/> Other (specify):
<input checked="" type="checkbox"/> Homework assignments 20	<input type="checkbox"/> Project	
<input checked="" type="checkbox"/> In-term examination(s) 20	<input checked="" type="checkbox"/> Final examination 40	
15. Grading Method		
<input checked="" type="checkbox"/> A-F Scale <input type="checkbox"/> Pass/Not passed		
16. Textbook(s) and Supplemental Material		
Agrios, G.N. (2005). Plant Pathology (5th edition). Academic Press, NY		

17. Matching Course Objectives with Program Outcomes and SQU Graduate Attributes		
SQU Graduate Attributes		
A. SQU graduates should be able to: 1. apply the knowledge and skills relevant to the specialization 2. communicate effectively and use information and communication technologies 3. critically analyze complex information and present it in simple clear manner	B. SQU graduates possess 1. interpersonal communication skills and alignment with culture of international labour market to assist them in practical life and in living successfully 2. skills and motivation for independent learning and engagement in lifelong learning and research 3. work ethics and positive values, and intellectual independence and autonomy 4. teamwork skills and display potential leadership qualities	C. SQU graduates should relish good citizenship qualities, be conscious of their national identity and be socially responsible, engage in community affairs and be mindful of contemporary issues.

#	Intended Student Learning Outcome /Course Learning Objective	Relevant Program Outcome(s)	Applicable Attribute(s)
1.	Demonstrate an understanding of the basic concepts of infection mechanisms of plant pathogens	A.1.1 Graduates will have knowledge and skills in crop sciences	A.1
2.	Describe the plant defense response mechanisms	A.1.1 Graduates will have knowledge and skills in crop sciences A.1.4 Graduates will be able to identify and analyze problems related to crop production systems, and formulate realistic solutions	A.1 A.1
3.	Discuss the genetics of disease resistance	A.1.1 Graduates will have knowledge and skills in crop sciences	A.1
4.	Discuss the role of microbial enzymes, toxins, plant growth regulators and extracellular polysaccharides in plant disease development	A.1.1 Graduates will have knowledge and skills in crop sciences	A.1
5.	Discuss the signal transduction pathways in plants	A.1.1 Graduates will have knowledge and skills in crop sciences	A.1
6.	Demonstrate an understanding of the genetic engineering strategies to improve plant disease resistance	A.1.1 Graduates will have knowledge and skills in crop sciences	A.1
7.	Develop skills in various biochemical and molecular biological techniques to study plant- pathogens interactions	A.1.1 Graduates will have knowledge and skills in crop sciences B.1 Graduates will be able to compete with high standards of academic integrity and professionalism on the national and international scenes	A.1 B.1
8.	Demonstrate the ability to work in a team	B.4 Graduates will have the ability to build teams and work in team for target oriented tasks	B.4
9.	Develop skills for oral presentation and to write scientific reports	A.2.1 Graduates will have ability to effectively communicate orally and in writing	A.2
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16. Student Responsibilities

It is the student's responsibility to know and comply with all University Academic Regulations relevant to participation in this course. These regulations specifically include attendance requirement and students' academic code of conduct.

For attendance, it is the student's responsibility to be punctual and to attend all classes.

Students are expected to perform their work with honesty and avoid any academic misconduct, which is defined as the use of any dishonest or deceitful means to gain some academic advantage or benefit. This can take many forms, including but not limited to, the following: copying, plagiarism, collusion and forging documents. For full details, please refer to the Undergraduate Academic Regulations and to the Student Academic Misconduct Policy.

Additionally, this course requires that you:

COURSE INFORMATION			
Course Code	PLNT4541	Course Title	Plant-Pathogens Interactions
Semester/ Year	Spring	Section(s)	10,11
Day, Time, and Place	As Assigned		
Course Coordinator	Velazhahan Rethinasamy		
Office Location	AGR 212	Office Hours	
Office Tel. Ext.	3646	Email	velazhahan@squ.edu.om

Tentative Schedule			
Week	Lecture #	Topic/Material to be covered	Assessment
1	Lec 1	Introduction to the course	
2	Lec 2	Key concepts and terms (Pathogenicity, virulence, aggressiveness, resistance, tolerance, susceptibility, vertical and horizontal resistance, non-host resistance, gene-for-gene theory)	
	Lab 1	Isolation of <i>Alternaria solani</i> from early blight infected tomato leaves	
3	Lec 3	Infection mechanisms of plant pathogens	
	Lab 2	Testing pathogenicity of <i>A. solani</i> isolate on tomato Analysis of virulence of <i>A. solani</i> isolates on tomato	
4	Lec 4	Microbial toxins in plant disease	
	Lab 3	Analysis of toxin production by <i>A. solani</i>	
5	Lec 5	Enzymes in plant disease	Quiz 5%
	Lab 4	Analysis of plant cell wall degrading enzymes production by <i>A. solani</i>	
6	Lec 6	Extracellular polysaccharides and growth regulators in plant disease	
	Lab 5		
7	Lec 7	Preformed resistance mechanisms in plants	
	Lab 6	Presentations	
8	Lec 8	Induced (Active) resistance mechanisms in plants	Mid term 20%
	Lab 7		
9	Lec 9	Genetics of plant disease resistance	
	Lab 8		
10	Lec 10	Signal transduction pathways	
	Lab 9		
11	Lec 11	Systemic acquired resistance (SAR) and induced systemic resistance (ISR)	
	Lab 10	Analysis of induction of SAR and ISR in tomato to <i>A. solani</i>	
12	Lec 12	Elicitors, Pathogen-associated molecular patterns (PAMPs)/microbe-associated molecular pattern (MAMPs) and Damage-associated molecular patterns (DAMPs)	Quiz 5%
	Lab 11	Isolation of elicitor from the mycelial walls of <i>A. solani</i>	
13	Lec 13	Pattern-recognition receptors (PRRs) and PAMP-triggered immunity (PTI)	
	Lab 12	Analysis of induction of biochemical defense mechanisms (Peroxidase isozymes) in tomato upon elicitor treatment	
14	Lec 14	Effector-triggered immunity (ETI) and Effector-triggered susceptibility (ETS)	
	Lab 13	Presentations	
15	Lec 15	Strategies to improve plant disease resistance with knowledge of plant-pathogen interactions	Assignments 20% Final lab exam 10% Final theory exam 40%
16			
17			

APPENDIX A: INSTRUCTORS OF MULTIPLE SECTIONS

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APPENDIX B: ADDITIONAL INFORMATION