SULTAN QABOOS UNIVERSITY

COURSE OUTLINE

PROGRAM: Bachelor of Science in Plant Sciences

1. Course Code	PLNT4529	
2. Course Title	Pesticides in Agriculture	
3. Credits	3 Cr Hrs , 12 Cr Points, 6 ECTS	
4. Pre-requisite Course(s)	PLNT3522, PLNT3526; BIOL2101, CHEM2101, CAMS3000, CAMS3001, CAMS2003, CAMS2000	
5. Co-requisite Course(s)	NA	
6. Equivalent Course(s)	CROP4529, PROT4529	
7. Incompatible Course(s)	NA	
8. Course Category	☐ University Requirement	☐ University Elective
	☐ College Requirement	☐ College Elective
	☒ Department Requirement	☐ Department Elective
	☐ Specialization Requirement	☐ Specialization Elective
	☐ Other (specify):	
9. Course Owner	College: CAMS	Department: Plant Sciences
10. Course Type	☐ Lecture	☒ Lecture/Lab
	☐ Lecture/Seminar	☐ Lecture/Studio
	☐ Lecture/Tutorial	☐ Lecture/Lab/Tutorial or Seminar
	☐ Tutorial	☐ Laboratory (Practical)
	☐ Field or Work Placement	☐ Studio
	☐ Seminar	☐ Internship
	☐ Workshop	☐ Project
11. Language of Instruction	English	

12. Course Description

This course is an introduction to the study of pesticides (insecticides, fungicides and herbicides) used in agricultural environments. This course covers several aspects of pesticides including history and benefits, formulations/types, chemical groups (inorganic, organic and natural products), uses and modes of action. Students also learn about pesticide spray equipment and their proper calibration, dose calculation and maximum residue limits on produce. Some alternative pesticides (anti-feedant, IGRs and bio-pesticides), pesticide hazards to human/non-target species including bees, environmental impacts, pesticide resistance and use of pesticides in IPDM programs are also covered.

13. Teaching/Learning Strategies

Lectures, group discussion, videos, practical sessions, field trip

14. Assessment Components and Weight [%]

☒ Quizzes 6	☒ Practical 26	☐ Other (specify):
☒ Homework assignments 8	☐ Project	
☒ In-term examination(s) 20	☒ Final examination 40	

15. Grading Method

☒ A-F Scale ☐ Pass/Not passed

16. Textbook(s) and Supplemental Material

This course has been designed with the help of many textbooks. Lecture notes and on-line resourses will be provided. PDF on selected topics will be provided throughout the course

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.	Classify types of pesticides based on mode/site of action, describe pesticide formulations, and choose appropriate pesticides for use against different pests	A.1.1 Graduates will have knowledge and skills in crop sciences A.1.5 Graduates will be able to identify and analyze problems related to crop production systems, and formulate realistic solutions	A1
2.	Describe pesticides hazards to human, routes of entry, poisoning symptoms, and environmental fate of pesticides	A.1.1 Graduates will have knowledge and skills in crop sciences C. Graduates will have knowledge of relavant Omani laws, and understanding and motivation for environmental protection, resource conservation and social service	A1, C
3.	Compare pesticides modes of action and explain their effects on living organisms	A.1.1 Graduates will have knowledge and skills in crop sciences	A1
4.	Explain pesticide label and MSDS, and calculate the right amount of a pesticide for use	A.2.1 Graduates will have ability to effectively communicate orally and in writing B.2 Graduates will be motivated to engage in independent life-long learning	A2, B2
5.	Explain maximum residue limits and laws/ regulations related to import/export of produce, and describe national and international laws on pesticides	A.3 Graduates will be able to analyze and interpret data, draw conclusion and propose solutions to different issues in crop production, landscape design, and crop protection B.3 Graduates will understand and follow professional and social norms and ethics	A3,B3
6.	Select and calibrate appropriate pesticide application equipment for use in field based on type of pest and available formulations	A.1.5 Graduates will be able to identify and analyze problems related to crop production systems, and formulate realistic solutions B.4 Graduates will have the ability to build teams and work in team for target oriented tasks	A1, B4
7.	Select and plan suitable transportation, storage and safe disposal of pesticides in accordance with Omani laws/regulations and environment protection	B.1 Graduates will be able to compete with high standards of academic integrity and professionalism on the national and international scenes	B1, C

		C. Graduates will have knowledge of relavant Omani laws, and understanding and motivation for environmental protection, resource conservation and social service	
8.	Review scientific literature and write report on a selected topic related to any aspect of pesticides	A.2.2 Graduates will be able to use the information technology for searching and processing data relevant to crop sciences and landscape design	A2
9.	Determine pesticide serial dilutions and experiment with arthropod bioassays for toxicity and insecticde resistance monitoring	B.4 Graduates will have the ability to build teams and work in team for target oriented tasks.	B4
10.	Develop, present and defend a poster on selected topic related to any aspect of pesticides	A.2.1 Graduates will have ability to effectively communicate orally and in writing B.1 Graduates will be able to compete with high standards of academic integrity and professionalism on the national and international scenes	A2, B1
11.	Take part in Labs and field trips and report on related activities	B.2 Graduates will be motivated to engage in independent life-long learning B.3 Graduates will understand and follow professional and social norms and ethics.	B2, B3
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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	PLNT4529	**Course Title**	Pesticides in Agriculture
Semester/ Year	Fall	**Section(s)**	10,11
Day, Time, and Place	TBD		

Course Coordinator	Ali K. AlWahaibi		
Office Location	AGR1009	**Office Hours**	TBD
Office Tel. Ext.	1220	**Email**	awahaibi@squ.edu.om

Tentative Schedule

Week	Lecture #	Topic/Material to be covered	Assessment
1		Course outline and overview No Lab	
2	Lec 1	Unit 1: Pesticide Information Introduction and History; Types/groups of Pesticides/ Classification Lab 1: Safety and PPE in Lab	
3	Lec 2	Unit 1: Pesticide Information Formulations; Pesticide labels, MSDS Lab 2: Identification of Pesticide formulations	
4	Lec3	Unit 1: Pesticide Information Mode of action: Insecticides (Inorganics, Oils, Dusts, etc) Lab 3: Identification of pesticide labels and MSDS	Lab report 1 covering Lab 2,3&4 (4%)
5	Lec 4	Unit 1: Pesticide Information Mode of action: Insecticides (OP, Carbamates, Pyrethroids, Neonicotinoid) Lab 4: Reading pesticide labels and finding recommended doses	Quiz 1 (3%)
6	Lec 5	Unit 1: Pesticide Information Mode of action: Fungicides and Herbicides Use of biotechnology in pesticide delivery Lab 5: Performing pesticides serial dilutions for toxicological studies	
7	Lec 6	Unit 2: Health and Environmental Risks/Management Pesticides exposer and Health risks Pesticides and the Environment Mid-term review	
8		Mid term exam Lab : Field trip (Pesticides in agriculture)	Midterm (20%)
9	Lec 7	Unit 2: Health and Environmental Risks/Management Pesticide residues Pesticide resistance Pesticides and pollinators Lab 6: Determining LD50 in a toxicological experiment	Lab report 2 covering Lab 5&6 (4%)
10	Lec 8	Unit 3: Pesticide Safety Practices Protective clothing and PPEs Pesticide Transportation, storage and disposal of pesticides;Pesticide spills Lab 7: Detecting pesticide resistance in a pest	Lab report 3 covering Lab 7 (4%)
11	Lec 9	Unit 4: Pesticide Application Technology Pesticide drift factors and management Lab 8: Measuring pesticide drift	Quiz 2 (3%)
12	Lec 10	Unit 4: Pesticide Application Technology Application equipment Lab 9: Calibration of sprayers	Lab report 4 covering Lab 8,9&10 (4%)
13	Lec 11	Unit 4: Pesticide Application Technology Types of nozzles Lab 10: Applying the right amount of pesticide	Term paper (8%)
14	Lec 12	Unit 5: Regulation and Future	

		Pesticides regulation and Pesticides in IPDM Lab: Practical exam	Practical exam (10%)
15		General review of the course	
16		Final Exam	Final exam (40%)
17			

APPENDIX A: INSTRUCTORS OF MULTIPLE SECTIONS					
Section	**Instructor**	**Day, Time, and Place**	**Office Location and Extension**	**Email**	**Office Hours**

APPENDIX B: ADDITIONAL INFORMATION
Submit Lab reports before due date. There is 15% and 25% deductions on one and two week late submissions, respectively. No lab report will be accepted after 2 weeks.