SULTAN QABOOS UNIVERSITY

COURSE OUTLINE

PROGRAM: Soil Sciences

1. Course Code	SWAE3411	
2. Course Title	Environmental Soil Microbiology	
3. Credits	3 CR, 12 CP, 6 ECTS	
4. Pre-requisite Course(s)	BIOL 2101-General Biology I	
5. Co-requisite Course(s)		
6. Equivalent Course(s)		
7. Incompatible Course(s)		
8. Course Category	☐ University Requirement	☐ University Elective
	☐ College Requirement	☐ College Elective
	☐ Department Requirement	☒ Department Elective
	☐ Specialization Requirement	☐ Specialization Elective
	☒ Other (specify): Major requirement	
9. Course Owner	College: CAMS	Department: SWAE
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 will provide students with basic knowledge about soil microbes and their involvement in the biochemical activities in the soil environment. This course addresses the types, growth, and functions of microbes living in soils. Topics to be discussed are: Historical background of soil microbiology, microbial growth, distribution of microbes within the soil media, techniques used for sampling and collection of soil microbes, culturing methods, and the involvement of soil microbes in the biochemical cycling of soils. Applications of soil microbiology for sustainable agriculture and environment including, composting, bioremediation and use of extremophile microorganisms. This course will help students to have a common foundation and basic understanding of soil microbiology.

13. Teaching/Learning Strategies

a) Discussions during lectures
Students will be encouraged to participate in the discussion during lectures.
b) Tests
There will be two exams each of one hour duration. The two exams will count for 40% of the course mark. Students who fail to take any of these tests without a valid reason will receive a mark of zero. Student with a valid reason for not taking any of these exams will be allowed to take a makeup exam or other arrangements are possible.
c) Practical in lab
Hands on training for basic soil concepts will be provided by practical work in lab each week.
d) Projects
After getting acquaintance with the basic procedures of soil microbiology, the students will do one project relevant to their subject and apply the knowledge they got in the lab into practical outcome. In the mini-projects, the student will be assigned different topics that relate to soil environment and microbial activities. It is expected from students to apply the skills and knowledge that they have had learned during the first part to investigating their assigned projects. Students will work in groups and each student should submit his/her own lab report. All topics will be presented in groups and during the last

week of classes. Each student is expected to play a role during the presentations. The presentations will be evaluated as a group and per individual from each group.

14. Assessment Components and Weight [%]

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

15. Grading Method

☒ A-F Scale ☐ Pass/Not passed

16. Textbook(s) and Supplemental Material

Soil Microbiology: An exploratory approach. Mark S. Coyne. 1999. Copyright © Delmar Publisher, Albany, NY.

Lecture notes in the form of ppt. slides will be send by email or available on Moodle at least one day before the class

Supplemental Materials:

1. Soils Environmental Microbiology. Maier, R.M., I.L. Pepper, and C.P. Gerba. 2000. Copyright © Academic Press, San Diego, CA.
2. The nature and properties of soils, 13th Edition, 2002. Nycle C. Brady and Ray R. Weil. Copyright © Pearson Education, Inc., Upper Saddle River, New Jersey USA.

17. Matching Course Objectives with Program Outcomes and SQU Graduate Attributes

SQU Graduate Attributes

A. SQU graduates should be able to:	**B. SQU graduates possess**	**C. SQU graduates should**
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	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	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.	On successful completion of this course, the student will be able to: Explain the basics of the life within soil and appreciate the contribution of the life forms existing in soil on our world. Apply the theoretical and practical skills gained from this course in topics related to agriculture and environment.	Demonstrate proficiency in application of science in solving soil and water management problems	(ABET, a2)
2.	Name and identify different types of organisms present in soil.	Demonstrate proficiency in application of practical and/or theoretical techniques to solve soil and water management problems.	(ABET, a1)
3.	Illustrate the role of microorganisms in the processes of composting, bioremediation and other microbial biotechnologies.	Demonstrate proficiency in application of soil sciences principles in real world problems	(ABET, a3)
4.	Culture, examine, and thoroughly describe the main types of soil microbes.	Perform the experiments using relevant equipment and following safe procedure to collect data	(ABET, b2)
5.	Gain the skills of effective oral and written communication	Present a technical report with demonstrated good command of English and language of the discipline	(ABET, g3)

6.	The ability to work in teams and solve problems related to Applied Soil Microbiology.	Ability to form a team based on the goal in real world soil and land design projects	(ABET, d1)
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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	SWAE3411	**Course Title**	Environmental Soil Microbiology
Semester/ Year	Fall 2017	**Section(s)**	10
Day, Time, and Place	Sunday 14:15-16:05 CMT/B13 Tuesday 14:15-16:05 AGR/0012		

Course Coordinator	Daniel M. Blackburn		
Office Location	SWAE 236	**Office Hours**	Monday and Wednesday 8:00 am – 10:00 am
Office Tel. Ext.	3668	**Email**	danielblac@squ.edu.om

Tentative Schedule			
Week	**Lecture #**	**Topic/Material to be covered**	**Assessment**
1	Topic 1	Introduction	
2	Topic 1	Introduction, importance and history of soil microbiology, Ch.1	
3	Topic 2	Microbial growth & metabolism, Ch.2	
4	Topic 3	Soil as microbial habitat, Soil moisture contents and availability to soil microbes, Ch.12	
5	Topic 4	Soil Microbial Interactions (Ecology), Ch.26	
6		EXAM I (Sunday Class)	20%
7	Topic 5	Major groups of soil organisms (Macro- and meso-fauna), Ch.4,5	
8	Topic 6	Major groups of soil organisms (Micro-fauna) Porkaryonts, Ch.9, 10	
9	Topic 7	Major groups of soil organisms (Micro-fauna) Fungi, Ch.8, 29	
10	Topic 8	Biochemical cycles-Carbon cycle,Ch. 23-25	
11	Topic 9	Biochemical cycles- nitrogen cycle, Ch.18-22	
12		EXAM II (Sunday Class)	20%
13	Topic 7	Soil microbes and environnemental quality (composting), Ch. 30	
14	Topic 8	Soil microbes and environnemental quality (Bioremediation), Ch. 31	
15	Topic 9	Extremophilic microorganisms, Ch.26	
16		Final Exam	40%
17			

APPENDIX A: INSTRUCTORS OF MULTIPLE SECTIONS					
Section	**Instructor**	**Day, Time, and Place**	**Office Location and Extension**	**Email**	**Office Hours**
10	Daniel Blackurn	Sunday 14:15-16:05 CMT/B13 Tuesday 14:15-16:05 AGR/0012	236 Anx; Ext. 3668	danielblac@squ.edu.om	Monday 8:00 am – 10:00 am & Wednesday 8:00 am – 10:00 am

APPENDIX B: ADDITIONAL INFORMATION