

SULTAN QABOOS UNIVERSITY

COURSE OUTLINE

PROGRAM: Water Technology

1.	Course Code	SWAE4217					
2.	Course Title	Transpor	Transport of Chemicals in Porous Media				
3.	Credits	3 CR, 12 CP, 6 ECTS					
4.	Pre-requisite Course(s)	SWAE2	201, MATH1106, PHYS2101,SWAE3	311,SWAE3303			
5.	Co-requisite Course(s)						
6.	Equivalent Course(s)						
7.	Incompatible Course(s)						
8.	Course Category	Univ	University Requirement University Elective				
		Colle	ge Requirement	College Elective			
		🗌 Depa	rtment Requirement	Department Elective			
		Speci	alization Requirement	Specialization Elective			
		Other	(specify):				
9.	Course Owner	College:	Agricultural and Marince Sciences	Department: Soils, Water, & Ag. Eng.			
10. Course Type Lecture			re	Lecture/Lab			
		🗌 Lectu	re/Seminar	Lecture/Studio			
		🗌 Lectu	re/Tutorial	Lecture/Lab/Tutorial or Seminar			
		Tutor	ial	Laboratory (Practical)			
		Field or Work Placement		Studio			
		🗌 Semi	nar	Internship			
		Work	shop	Project			
11.	Language of Instruction	English					
12.	Course Description						
Thi	s advanced course describes	contamin	ants' transport in the vadose (i.e., uns	saturated) zone and groundwater systems.			
Cou fam	irse materials is of interest to iliar with the physics of w	o senior un ater flow	dergraduate and graduate students in soil and groundwater systems, and	science and engineering. Students must be d should be comfortable with the use of			
diff	erential equations to describe	e physics a	nd chemistry problems. However, a re	eview of basic flow concepts will be given			
at t	ne beginning of the semester.	•					
13.	Teaching/Learning Strate	gies					
14 Assessment Components and Weight [%]							
\square Ouizzes 20			Practical 00	Other (specify):			
Homework assignments 10			Project 10				
In-term examination(s) 20			Final examination 40				
15.	15. Grading Method						
A-F Scale Pass/Not passed							
16. Textbook(s) and Supplemental Material							
Var	Variable. Will be provided by the instructor.						
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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	1.	interpersonal communication skills and		relish good citizenship
	relevant to the specialization		alignment with culture of international		qualities, be conscious
2.	communicate effectively and use		labour market to assist them in practical		of their national identity
	information and communication		life and in living successfully		and be socially
	technologies	2.	skills and motivation for independent		responsible, engage in
3.	critically analyze complex		learning and engagement in lifelong		community affairs and
	information and present it in simple		learning and research		be mindful of
	clear manner	3.	work ethics and positive values, and		contemporary issues.
			intellectual independence and autonomy		
		4.	teamwork skills and display potential		
			leadership qualities		

#	Intended Student Learning Outcome	Relevant Program Outcome(s)	Applicable
	/Course Learning Objective		Attribute(s)
	Discuss and be familiar with the physical properties	Provide the required knowledge and skills	
1.	of the soil that control the transport and behavior of	to solve water resources management	
	chemicals	problems in arid regions	
2	Explore the theoretical aspects of water and	Develop an ability to identify, formulate	
2.	chemical transport in porous media	water resources	
	Examine the inter-relationships among various	Impart technical skills, modern problems	
2	physical, chemical, and biological processes that	solving tools, on-the-job training to the	
5.	influence retention, transformation, and transport of	students to enable them contribute	
	chemicals in porous media	effectively in the Omani water sector	
	Discuss the basis of fundamental experimental	Develop abilities to communicate	
4.	work to measure some physical parameters that	effectively, to work in multi-disciplinary	
	control transport and retention of chemicals	teams, and to understand professional and othical responsibility	
	Apply analytical and numerical modeling	Impart technical skills modern problems	
	approaches to solve small- and large-scale transport	solving tools on-the-job training to the	
5.	problems	students to enable them contribute	
	1	effectively in the Omani water sector	
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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	SWAE4217	Course Title	Transport of Chemicals in Porous Media			
Semester/Year	Fall 2017	Section(s)	10			
Day, Time, and Place						
Course Coordinator	Dr. Salem Ali Al Jabri					
Office Location	240	Office Hours	Two hours after the lecture time			
Office Tel. Ext.	3629	Email	salmej@squ.edu.om			

Tentative Schedule						
Week	Lecture #	Assessment				
1	1	Introduction and problem statement				
2	2	Review of soil-water concepts and governing equations				
3	2	Transport mechanisms of solute transport in soil and groundwater systems				
4	4 3 Transport mechanisms of solute transport in soil and groundwater systems					
5	54Solute transport equation (ADE)Quiz One					
6	5	Miscible displacement and breakthrough curves				
7	6	Miscible displacement and breakthrough curves				
8	7	Adsorption of contaminants in porous media	Midterm Exam			
9	7	Transformation of solutes and ADE				
10	8	Volatilization of contaminants and ADE				
11	9	Nonequilibrium solute transport and ADE				
12	10	Numerical approaches for solute transport	Quiz Two			
13	11	HYDRUS for simulation of solute transport in porous media				
14	12,13	Remediation techniques for contaminted soil and groundwater systems				
15	14	General review				
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APPENDIX A: INSTRUCTORS OF MULTIPLE SECTIONS						
Section	Instructor	Day, Time, and Place	Office Location and Extension	Email	Office Hours	

APPENDIX B: ADDITIONAL INFORMATION