



SULTAN QABOOS UNIVERSITY

COURSE OUTLINE

PROGRAM:water technology

1. Course Code	4325	
2. Course Title	Water Treatment	
3. Credits	3 CR, 12 CP, 6 ECTS	
4. Pre-requisite Course (s)	(CHEM1091, MATH1192), SWAE 3315	
5. Co-requisite Course (s)	None	
6. Equivalent Course (s)	None	
7. Course Category (Specify either as Elective or Requirement and appropriate level: College, Department, etc.)	<input type="checkbox"/> University Requirement	<input type="checkbox"/> University Elective
	<input type="checkbox"/> College Requirement	<input type="checkbox"/> College Elective
	<input checked="" type="checkbox"/> Department Requirement	<input type="checkbox"/> Department Elective
	<input type="checkbox"/> Other (specify):	
8. Course Owner	College: CAMS	Department:SWAE
9. Course Type	Lecture	
10. Language of Instruction	English	
11. Course Description		
<p>This course is designed to increase student's understanding of basic theory of most treatment processes dealing with water, wastewater, and saline water. The course will also cover materials dealing with design and operation of treatment processes. Considering the importance of desalination in Oman, various desalination processes will be discussed. The course will cover the following treatment processes: Screening and Sedimentation, Aeration, Coagulation and Flocculation, Filtration, water Softening, Ion Exchange, Carbon Adsorption, Aerobic Biological Treatment, Anaerobic Wastewater Treatment, Membrane Bio Reactors (MBR), Wetlands for Wastewater Treatment, Reverse Osmosis Desalination, etc. Wastewater disposal methods will also be discussed.</p>		
12. Teaching/Learning Strategies		
<p>Apart from normal lectures field trips, videos and 3-4 laboratory sessions are also part of this course. Students will have to do a group project based on what they learn in lectures and in the laboratory sessions. Group project outcomes have to be presented in oral sessions as well as through a written report. There will be 2 tests, 1 comprehensive final and 6 unannounced quizzes to assess student achievements.</p>		
13. Evaluation Methods		
A	Exceptional performance	
B	Very good performance	
C	Satisfactory performance	
D	Minimally acceptable performance	
F	Unacceptable performance	
2 Tests	30%:	
3 Quizzes (Out of 5)	15%	
Final	40%	

Attendance	3%
Reports, Lab, Project, Homework	12%
Total:	100%

14. Required Course Core Material

Textbook:

Basic Water Treatment by George Smethurst.

Wastewater Treatment for Pollution Control by Soli J Arceivala.

Reference Books: (These books are available at SQU library)

1. Theory and Practice of Water and Wastewater Treatment by Ronald L. Droste. John Wiley and Sons, Inc. 1997. TD 430.D76.
2. Water Treatment Principles and Design. James M. Montgomery Consulting Engineers, Inc. John Wiley & Sons. 1985.
3. Wastewater Engineering: Treatment, Disposal, Reuse. Metcalf and Eddy Inc. McGraw-Hill Book Co. 1979. TD 645.M57
4. Reverse Osmosis Treatment of Drinking Water. Talber N. Eisenberg and E. J. Middlebrook. Butterworth, 1986.
5. Sewage Treatment in Hot Climates. Duncan Mara. 1976. TD745.M35
6. Water Treatment Plant Design. ASCE and AWWA. 1990. TD434.W38.
7. Water Quality and Treatment. AWWA. TD430.W365.

15. Matching Course Objectives with the Program Outcomes and with SQU Graduate Attributes

* [Click here](#) to view a list of action verbs use in developing objectives

SQU Graduate Attributes

A. SQU graduates should be able to: <ol style="list-style-type: none"> 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 legible manner 	B. SQU graduates possess <ol style="list-style-type: none"> 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 enjoy intellectual independence and autonomy 4. teamwork skills and display potential leadership qualities 	C. SQU graduates should relish good citizenship qualities, conscious of their national identity and socially responsible, engage in community affairs and mindful of contemporary issues.
---	--	--

#	Course Learning Objective	Relevant Program Outcome(s)	Applicable Attribute(s)
1.	Comprehend basic theory and principles of treatment processes dealing with water, wastewater and saline water	<ul style="list-style-type: none"> • Work independently and in team environments at national and international levels. • Learn emerging technologies and implement them for personal and employer's success. • Contribute to the welfare of the society at 	A1

		<p>regional and global levels.</p> <ul style="list-style-type: none"> • Maintain the standards of health, safety, environment and professional ethics at work and society. • Continue professional development and advanced learning throughout the career. 	
2.	Determine treatment requirements of different types of water for various uses	<ul style="list-style-type: none"> • Work independently and in team environments at national and international levels. Learn emerging technologies and implement them for personal and employer's success. • Contribute to the welfare of the society at regional and global levels. • Maintain the standards of health, safety, environment and professional ethics at work and society. • Continue professional development and advanced learning throughout the career.international levels. 	A1, A3
3.	Design components of treatment plants	<p>Work independently and in team environments at national and international levels.</p> <ul style="list-style-type: none"> • Maintain the standards of health, safety, environment and professional ethics at work and society. • Continue professional development and 	A1, A2, A3

		advanced learning throughout the career.	
4.	Assess wastewater disposal/reuse systems	<p>Work independently and in team environments at national and international levels.</p> <ul style="list-style-type: none"> Contribute to the welfare of the society at regional and global levels. 	A1, A2, A3
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			

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 the Attendance and Student Academic Misconduct policies.

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:

Students should be aware of and abide by all University Regulations.

In the laboratory students must wear safety clothing

COURSE INFORMATION				
Course Code	4325	Course Title	Water Treatment	
Year/Semester	Fall	Section	10	
Day, Time, and Place				
Course Coordinator	Mushtaque Ahmed			
Office Location	Room 217	Office Hours	8 AM to 4 PM	
Office Ext.	1245	Email	ahmedm@squ.edu.om; ahmedm2316@gmail.com	
Tentative Schedule				
Week	Lecture/Topic	Material to be Covered	Assignment /Exam	Weight (%)
1	Water Treatment (Weeks 1-7) Introduction			
2	Quality of Water and Treatment Required			
3	Pre-treatment Coagulation, Mixing and Flocculation			
4	Theory and Principles of Sedimentation			
5	Settling Basins and Filtration			
6	Disinfection		Test 1	15%
7	Wastewater Treatment			
8	Principles of Reactor Design			
9	Principles of Biological Design			
10	Principles of Aeration Extended Aeration Systems			
11	Waste Stabilization Ponds Membrane Bio Reactors			
12	Sludge Dewatering and Disposal Tertiary Treatment			
13	Desalination (Weeks 14-15) Desalting Technologies		Test 2	15%
14	Reverse Osmosis Concentrate Disposal Future Directions			
15	Group Project Presentation	Oral presentation of group projects		

APPENDIX A: INSTRUCTORS OF MULTIPLE SECTIONS

[illegible]

APPENDIX B: ADDITIONAL INFORMATION

<p>Water Technology Program Outcomes</p>
--

- | |
|---|
| <ul style="list-style-type: none">• Work independently and in team environments at national and international levels.• Learn emerging technologies and implement them for personal and employer's success.• Contribute to the welfare of the society at regional and global levels.• Maintain the standards of health, safety, environment and professional ethics at work and society.• Continue professional development and advanced learning throughout the career. |
|---|