

Syllabus for ENVR 418

Course Name: Water Treatment		
Course Code: ENVR418	Course Type (Elective)	Course Credits: 2+1
Class Timings: Day and Timings: Monday, Wednesday, Friday 09:00-09:50, Class Room: S109		Student Meeting Hours Tuesday, Thursday 10:00am-12:00 pm Office S326
Instructor Name: Dr. Shazia Ilyas Designation: Assistant Professor (Environmental Sciences)		
Instructor Contact Details Email: shaziailyas@fccollge.edu.pk Mobile and WhatsApp (03316671689) Office Hours: You can visit me during office hours (Tuesday and Thursday 10:00am-12:00pm for any query) Guidelines for contacting instructor: If you have any question please send me an email or visit my office.		
Course Description: Pre-requisites if any: Teacher approval This course provides thorough understanding of the key concepts and principals involved in water treatment and management. The core is the unit operations involved in surface and ground water treatment (physical and chemical processes), the effect of treatment on water quality and the importance of the unit processes in the treatment chain. Several case studies throughout the course will illustrate how water utilities are incorporating multiple treatment processes into their water treatment plants. Overall this course will provide thorough understanding of the theory of the water treatment processes, as well as the real-world application of each unit process.		
Main Mode of Instruction: Course material delivery: Course material will be available on Moodle . All students are required to use their Moodle account to access the course. Course material includes textbook chapters, printable lecture slides, recording of class lectures, videos, reading material etc. Students have to prepare the assignments/activities as instructed and submit on Moodle within due date.		
Course Objectives or Student Learning Outcomes_(SLOs) Students will be able to: <ul style="list-style-type: none"> • Understand the fundamentals of potable water supply and water treatment • List and describe the major physical, chemical and biological characteristics of clean fresh water • Describe the mode by which potable water is produced through unit processes like screening, coagulation-flocculation, sedimentation, filtration, disinfection • Explain the functions of each unit operations (physical and chemical processes) in water treatment and supply services • Analyze the role of different treatment technologies for water treatment and assess when to use those technologies 		

Course Content, Learning Material & Activities Schedule

Week	Topic/ Title
1	Introduction to Water resources, Water Challenges (quantity and quality)
2	Water quality and Public Health concerns, waterborne diseases Assignment#1 Water borne diseases
	Lab1- Measurement of pH and Electrical conductivity of water
3	Overview of water characteristics (water quality parameters) and public health concerns
	Lab2- Water Sampling Protocols in Rural, remote and periurban communities
4	Water quality standards, Water usage (demand and supply)
	Lab3- Water Sampling Protocols for Surface and Ground water systems
5	Water treatment Process Selection, Water supply design considerations
	Lab4- Total Dissolved Solids, Total Suspended Solids
6	Water Intake structures, Storage and distribution systems Quiz1
	Lab5- Dissolved Oxygen (DO), Turbidity
7	Unit processes for water treatment (Screening)
	Lab6- Nutrients in water (Nitrates, Phosphates)
8	Unit processes for water treatment (Coagulation; Flocculation)
	Lab7- Coagulation-Flocculation
9	Unit processes for water treatment (Softening; Sedimentation) Assignment#2 Arsenic pollution in waters
	Lab8- Hardness
10	Unit processes for water treatment (Granular Filtration) Quiz2
	Lab9- Arsenic in water
11	Unit processes for water treatment (Membrane filtration, Ultrafiltration, Nanofiltration, Reverse Osmosis)
	Lab10- Filtration experiment

12	Adsorption
	Lab11 -Membrane Filtration
13	Disinfection
	Lab12 : Microbiological analysis
14	Fluoridation
	Lab13 -Tour of Water Treatment Plant
15	Advanced Oxidation Processes
16	Advanced Oxidation Processes
17	Final Exam

‘Out-of-class’ Study Required (across all 3 categories of students -- those attending in-person, online, or asynchronously)

Attend the class sessions regularly and take notes during class. Reading material will be available on Moodle before class so please read that before coming to class. If you have any question then ask/post in chat in QA session of class (10 min for QA at the end of each class).

You will be given guidance to prepare your assignments and all assessments activities.

You expected to spend 4 hours per week for class and around 5-8 hours out of class study that includes reading and activities preparation.

Textbooks, Materials, Supplies and other Resources

1. “Principles of Environmental Engineering & Science” by Mackenzie Davis and Susan Masten (2nd edition, 2008)
2. “Principles of Water Treatment” by R. Rhodes Trussell, David W. Hand, , George Tchobanoglous, Kerry J. Howe, John C. Crittenden, Kerry J. Howe, and John C. Crittenden (2012).
3. “Water Treatment Unit Processes: Physical and Chemical” by David W. Hendricks (1st edition, 2006).

Course Requirements:

In order to pass this course students need to complete assessment activities given in above table.

The breakup is as follows:

Assignments (written, PowerPoint, Poster, discussion blogs)	30%
Quizzes (2*5):	10%
Final term exam:	20%
Midterm Exam	10
Final Project	10%
Labs	20%
TOTAL	100

Attendance Policy: *Attendance will be marked for all the classes. If you will miss any class inform me in advance. To pass this course you should maintain 75% of attendance.*

Classroom Participation: *Classroom participation will be part of your assessment. You will be given tasks in groups during class where you are required to participate actively.*

Grade Determination & Course Assessment as per FCC Policy: *Missed exams will influence your over grades. Late submissions of assignments will affect your grades as it carries 5% marks*

Grading Legend

Below is the grading legend of FCCU

Grade	Point Value	Numerical Value	Meaning
A	4.00	93-100	Superior
A-	3.70	90-92	
B+	3.30	87-89	Good
B	3.00	83-86	
B-	2.70	80-82	
C+	2.30	77-79	Satisfactory
C	2.00	73-76	
C-	1.70	70-72	
D+	1.30	67-69	Passing
D	1.00	60-66	
F	0.00	59 or below	Failing

Student Conduct & Other Issues:

- Classroom interactions will remain civil, respectful, and supportive.

Student Support Services

Go through following documents for additional support

[Student Counseling Services](#)

[Writing Center](#)

[Mercy Health Center](#)

[Sexual Harassment Policy](#)

[Anti-Corruption Policy](#)

[Academic integrity](#)

[Plagiarism Policy](#)

[Academic Calendar](#)

[FCC Policy for Fall Semester 2020](#)

Note:

I expect that you will strictly follow the core values of FCCU and put your entire efforts to learn as per the course requirements, attend classes, read the textbook(s)/other assigned reading material and do the assignments in the stipulated time period