College of Engineering

Civil Engineering Department

Semester: Fall / 2020

About The Course

Course Title: Environmental Engineering **Class**: 3
Course No: 901310
Credit Hours: 3 **Lecture Room**: ---
Obligatory/ Optional: Obligatory
Text Book: Introduction to Environmental Engineering, Mackenzie Davis, David Cornwell - fourth edition

The Instructor

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Course Description

Review of fundamentals in chemistry, biochemistry and microbiology as applied to water and environmental engineering. Physical, biological and chemical water quality and water quality parameterization. Water and environmental regulations. Standards and criteria. Reactors and Reactor engineering. Multiple barrier concept. Unit operations and processes. Chemical and biological kinetics. Basics in water and wastewater engineering design. Wastewater generation and collection. Biological wastewater treatment and reuse. Population estimation. Water treatment design. Impact of source quality on treatment units' selection. Sedimentation, filtration, coagulation-flocculation and disinfection. Water quality in the distribution systems.

Course Objectives

1: Problem solving in the basic concepts and kinetics of chemistry and biochemistry
2: Understand water quality and water quality parameters (TDS, TSS, BOD, Pathogenicity, etc….)
3: Design of Disinfection basin, aeration basin among other treatment units and apply the concepts of mass balance and the mixing equation
4: Develop engineering judgment to design safe and efficient transportation engineering facilities.

Learning Outcome

1. Appreciate the importance of Chemical and Biochemical Kinetics as applied to Water and Wastewater Engineering design.
2. and the importance of Regulations (standards and Criteria) in the context of water and wastewater treatment and environmental protection
3. Understand reactor engineering and practice design problem solving
4. Understand unit operations and processes in water and wastewater treatment lines and the concept of multiple barriers (aeration basin, settling, disinfection, coagulation-flocculation, filtration, etc…..)
5. Understand the concepts of ecosystems, global environmental issues as well as population estimation.
6. Understand the attached and suspended growth methods of wastewater treatment

Course Outline and Time schedule

Week	Course Outline
1st week	Introduction to course outlines, objectives and grading
	Review of Chemistry, Biochemistry and Microbiology
2nd week	Importance of Chemical and Biochemical Kinetics Water and Wastewater Engineering design.
	water quality and water quality parameters
3rd week	reactor engineering
	concepts of mass balance
4th week	the mixing equation, state of mixing
	Mixing including reactions
5th week	Plug flow with reactions
	Steady state flow
	First exam
6th week	unit operations and processes in water and wastewater treatment lines
	Design of Disinfection basin
	Potable and palatable water
7th week	Environmental chemistry and status of impurities in water
8th week	Chemical reactions
9th week	Oxidation - reduction
10th week	Water treatment plant
11th week	TDS, TSS, BOD, Pathogenicity
12th week	Water hardness

	Second exam
13th week	Disinfection
14th week	Concepts of ecosystems, global environmental issues as well as population estimation.
15th week	**Final exam**

Presentation methods and techniques

Methods of teaching varied according to the type of text, student and situation. The following techniques are usually used:

1- Lecturing with active participations.
2- Problem solving.
3- Cooperative learning.
4- Discussion.
5- Learning by activities.
6- Connecting students with different sources of information

Assessment Strategy and its tools

The assigned syllabus is assessed and evaluated
Through: feedback and the skills that are acquired by the students

The tools:
1- Diagnostic tests to identify the students level and areas of weakness
2- Formal (stage) evaluation
   a) Class Participation
   b) Ist Exam
   c) 2nd Exam
   d) Activity file

Tool & Evaluation

Tests are permanent tools & assessment, in addition to the activity file which contains curricular and the co-cussiculor activities, research, report papers and the active participation of the student in the lecture.

The following table clarifies the organization of the assessment schedule:

Test	Date	Grade
1st Exam	According to the department schedule	20%
2nd Exam	According to the department schedule	20%
Activities & Participation	Students should be notified about their marks	20%
Final Exam	According to the department schedule	40%

Activities and Instructional Assignment

1- Practical assignments to achieve the syllabus objectives.

2- Weekly Pop quiz and Homeworks

3- Semester-End project

Regulations to maintain the Teaching-Learning Process in the Lecture:

1- Regular attendance.

2- Respect of commencement and ending of the lecture time.

3- Positive relationship between student and teacher.

4- Commitment to present assignments on time.

5- High commitment during the lecture to avoid any kind of disturbance and distortion.

6- High sense of trust and sincerity when referring to any piece of information and to mention the source.

7- The student who absents himself should submit an accepted excuse.

8- University relevant regulations should be applied in case the student's behavior is not accepted.

9- Allowed Absence percentages is (15%).

References:

1. Water Supply and Pollution Control, 5th edition, Viessman, Jr. and Hammer, Harper Collins College Publishers.
2. Wastewater Engineering: Treatment, Disposal and Reuse, Metcalf & Eddy, Inc., 3rd ed.
Water and Wastewater Technology, 3rd edition, Hammer and Hammer, Jr, Prentice-Hall, Inc.
3. Handout Materials

Syllabus Classification

Objectives	***Learning outcomes***	***Assessment tools***
1-	Students are able to identify engineering problems	
2-	Students are able to design a component to meet certain constraints	
3-	Students are able to use modern engineering tools for engineering practice	
4-	Students are able to recognize the impact of engineering solutions in an environmental context	
5-	Students are able to formulate a collective solution to a Problem	