



**Marmara University
Faculty of Engineering
Environmental Engineering Department
Fall 2016**

1. COURSE DESCRIPTION

Course Code: ENVE 4001

Course Name: Physical Chemical Processes

Course Objectives: Discussion of fundamentals of physical and chemical processes as they relate to water and wastewater treatment and environmental quality.

Instructor: Zehra Semra Can – zehra.can@marmara.edu.tr

Office Hours: Wednesday 14:30-16:30

Assistant: Zeynep Yücesoy Özkan - zeynep.yucesoy@marmara.edu.tr

Textbook:

Unit Operations and Processes in Environmental Engineering, 2nd edition by Tom D. Reynolds, Paul A. Richards. Publisher: Brooks Cole. 1996

References and Other Materials:

Water Treatment Principles and Design by MWH, Inc., Hoboken, N.J. Publisher : J. Wiley, 2005.

Theory and Practice of Water and Wastewater Treatment by Ronald L. Droste. Publisher: J. Wiley, 1997.

2. COURSE CONTENTS:

1. Introduction

Water and Wastewater Treatment Problems

2. Carbon Adsorption

a) *Adsorption Phenomena*

b) *Adsorption Equilibria and Equilibrium Isotherms*

i. *Adsorption Equilibrium Examples*

c) *Adsorption Column Design*

3. Ion Exchange

a) *Ion Exchange Theory*

b) *Ion Exchange Process Configurations*

c) *Ion Exchange Design Procedures*

4. Aeration, Absorption and Stripping

a) *Henry's Law*

b) *Two-film Theory*

c) *Ammonia Stripping*

d) *Aeration and Determination of Aeration Parameters*

5. Disinfection

a) *Principles of Disinfection*

b) *Disinfection kinetics*

c) *C.t concept*

d) *Ozonation*

6. Chemical Precipitation

a) *Phosphorus Removal from Wastewater by Chemical Precipitation*

b) *Lime Soda Ash Softening*

c) *Sulfate Removal from Industrial Wastewaters*



3. EXAM DATES AND GRADING POLICY

Exam Dates:

Midterm 1 : Nov 05, 2016 – Nov 13, 2016 (To be announced)
Midterm 2 : Dec 13, 2016 - Tuesday
Final : Jan 02, 2017 - Jan 15, 2017 (To be announced)

Grading Policy:

Midterm 1 : 27%
Midterm 2 : 27%
HW + Quizes : 6%
Final : 40%

4. HOMEWORK POLICIES

When submitting Homework, please follow these guidelines. This will help the grader keep things organized.

- All of your homework problems will be submitted electronically before the deadline via email to enve4001@gmail.com
- In the subject line of your email, please include the following information:
HW#no by FirstName LastName. For example, Subject: HW#1 by Zehra Semra Can
- Homework problems submitted after the deadline will be accepted with penalty. A deduction of 50 points for every 24 hours the assignment is late will apply.
- Homework problems submitted to the personal e-mail address of the instructor will not be graded.