

## Syllabus for CEE 6330 – PHYSICOCHEMICAL PROCESSES

Spring 2019

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**Lecture Days and Place:** TR; 16:30 – 17:45 pm; Molecular Sciences & Engr G021  
**Office hours:** By appointment

**References:**

**BOOKS**

1. MWH (2012) *Water Treatment Principles and Design*, third edition
2. AWWA (1999) *Water Quality and Treatment 5th Edition*
3. M. M. Clark (1996) *Transport Modeling for Environmental Engineers and Scientists*

**JOURNALS**

1. *Environmental Science and Technology*, American Chemical Society
2. *Journal American Water Works Association*, American Water Works Association
3. *Journal of Environmental Engineering*, American Society of Civil Engineers
4. *Water Research*, International Water Association
5. *Water Science and Technology*, International Water Association
6. *Journal of Water Supply: Research and Technology – AQUA*, International Water Association

**Class Notes:**

Class notes can be downloaded from the course website at T-square.gatech.edu. Students should make their own hard copy for each class.

**Course Objectives:**

This course is designed to introduce the students to the Fundamental theory and application of the physical and chemical processes in water and wastewater treatment, including coagulation, flocculation, sedimentation, disinfection/disinfection byproducts, chemical oxidation, air stripping, adsorption, membrane filtration, and ion exchange. By the end of the course, you should be able to do the following things:

- Remembering and understanding legislation/regulations related to areas of water quality;
- Analyzing and evaluating water and wastewater treatment processes;
- Applying and formulating fundamentals of water and wastewater treatment principles to design water and wastewater treatment systems.

**Evaluation and Grading:**

If you believe that an error was made in grading the homework, you should write a short justification of your claim and attach it to the original homework assignment in question. Put justification and homework paper (stapled together) and hand/email it to me after my class.

The final grade will be calculated as follows:

Homework problems (5):	20%
Quiz	10%
Midterm Exam 1:	15%
Midterm Exam 2:	15%
Class Participation:	10%
Independent Final Project:	30%

*Grading Scale:* A: 90-100%; B: 80-89%; C: 70-79%, D: 60-69%

**Expectations/Policy:**

**1. Homework problems:** Five homework problems will be assigned and collected as scheduled. Evident collaboration on homework will be penalized in accordance with Honor Code in Environmental Engineering.

**2. Exams.** There will be one quiz and two midterm exams during the semester and a comprehensive final exam.

**3.** Failure to attend an exam or failure to submit assignment on time is recorded as a zero except when it is unavoidable because of legitimate emergency. In such a case, it is desired that the instructor be contacted before the exam or before the due date of the assignment. Adjustment of an exam or assignment score will be

made only within one week after the exam or assignment is returned to the students. No extra work will be provided for students wishing to improve their grade.

4. Though attendance will not be evaluated numerically, attendance and class participation will be considered for the final grade (10% of the total points).

**Georgia Tech Honor Code:** Students in this class are expected to abide by the Georgia Tech Honor Code and to avoid any instances of academic misconduct, including but not limited to:

1. Use of cell phones during class. Place cell phones in your bag and turn them off/manner mode.
2. Possessing, using, or exchanging improperly acquired written or oral information in the preparation of homework, class project, and exams.
3. Use of material that is wholly or substantially identical to that created or written by another individual or group (including *Plagiarizing*).
4. False claims of performance or work that have been submitted by a student.

For any questions involving there of any other Academic Honor Code issues, please consult the instructor or visit <http://www.honor.gatech.edu/honorcode/honorcode.html>

## CEE 6330 Detailed Schedule -Spring 2020

1	Jan. 7	Lecture Note 1. Introduction
2	Jan. 9	Lecture Note 2. Coagulation
3	Jan. 14	Lecture Note 3. Coagulation
4	Jan. 16	Quiz
5	Jan. 21	Lecture Note 4. Flocculation
6	Jan. 23	Lecture Note 5. Flocculation
7	Jan. 28	Lecture Note 6. Sedimentation
8	Jan. 30	Lecture Note 7. Water Conditioning
9	Feb. 4	Lecture Note 8. Softening
10	Feb. 6	Lecture Note 9. Transport Basics
12	Feb. 11	Lecture Note 10. Transport Basics
13	Feb. 13	Atlanta Water Treatment Plant Tour
11	Feb. 18	<b>Midterm EXAM-1</b>
14	Feb. 20	Lecture Note 11. Disinfection
15	Feb. 25	Lecture Note 12. Disinfection
16	Feb. 27	Lecture Note 13. Advanced Oxidation and Photocatalysis
17	March 3	Lecture Note 14. Ozone Contactor Design
18	March 5	Lecture Note 15. Air Stripping
19	March 10	Midterm Exam-2 Preparation, No Class
20	March 12	<b>Midterm EXAM-2</b>
	March 16-20	<b>Spring Break</b>
21	March 24	On-line class testing and questions
22	March 26	On-line class preparation
23	March 31	Lecture Note 16. Membrane Introduction and Low-Pressure Membrane Process (HW-3 Due and Assign HW-4)
24	April 2	Lecture Note 17. High-Pressure Membrane Process
25	April 7	Lecture Note 18. High-Pressure Membrane Process
26	April 9	Lecture Note 19. Adsorption (HW-4 Due and Assign HW-5)
27	April 14	Lecture Note 20. Adsorption
28	April 16	Lecture Note 21. Ion Exchange (HW-5 Due)
29	April 21	Independent Final Project Assignment
	<b>April 23- April 30</b>	<b>Final Project Due (Final Project Due at 12:00 pm April 28th, 2020)</b>

<Note>: The lecture schedule is tentative and subject to change.