

CEE2311: Environmental Engineering Science

Course Syllabus – Spring 2016

Class meetings:	Sec 001: Mon and Wed between 1:30-3:20 PM	CEER205
	Sec 002: Mon and Wed between 3:30-5:20 PM	CEER205

Instructors:

Dr. Metin Duran: 148 Tolentine Hall, (610) 519-4963 (office), metin.duran@villanova.edu
Office hours: M 10:00–11:00 AM; T: 1:00-2:00 PM; or by appointment

Dr. Wenqing Xu: 140 Tolentine Hall, (610) 519-8549 (office), wenqing.xu@villanova.edu
Office hours: M: 10:00 AM-noon; or by appointment

Introduction and course objectives

CEE 2311, Environmental Engineering Science, is a required three-credit course that provides an introduction to the fundamentals of environmental engineering and hands on experience. After taking CEE 2311, students should be able to:

1. Develop an understanding of different disciplines in environmental engineering.
2. Apply fundamental concepts in chemistry and biology to understand challenges in environmental engineering discipline and some contemporary issues in the field.
3. Quantitatively analyze and evaluate water quality issues by applying engineering tools and techniques.

Text and reading materials

There is a laboratory manual for this course. It is the required text and available for purchase at Villanova bookstore.

Lecture notes and handouts will be made available on Black Board. We strongly suggest that you put these notes and handouts into a binder in the order that they were received. Organization of your class materials will help you complete homework and study for exams in a more efficient manner. You are responsible for all material that is discussed in class as well as written on the board (in addition to the handouts). Always have paper available in case it is needed.

Grading policy

The course grade will be based on three 90-minute exams (2 during the semester and one during finals), as well as homework assignments and quizzes. The scale on the right will be used to assign letter grades.

- 3 Exams (25% each)—75%
- Laboratory Reports—12%
- Homework and Quizzes—10%
- Class participation—3%
- Extra Credit—Max. of 2% of total grade

94-100%	A	73-76%	C
90-93%	A-	70-72%	C-
87-89%	B+	67-69%	D+
83-86%	B	63-66%	D
80-82%	B-	60-62%	D-
77-79%	C+	Below 60%	F

If you have a diagnosed disability and plan to utilize academic accommodations, please contact Gregory Hannah, advisor to students with disabilities @ 610-519-3209 or visit the office on the second floor of the Connelly Center as soon as possible. The Office of Disability Services collaborates with students, faculty, staff, and community members to create diverse learning environments that are usable, equitable, inclusive and sustainable. The ODS provides Villanova University students with physical disabilities the necessary support to successfully complete their education and participate in activities available to all students.

Attendance policy

Although attendance will not be taken, you are expected to attend every scheduled class. Be aware that your class participation will be ZERO if you do not attend class. Your class participation will be ZERO if you sleep through the class. If you miss an exam or laboratory due to an unexcused absence, the grade you will receive for that exam or laboratory will be **zero**. Makeup exams will be given only in those cases where the exam is missed for a valid reason **that can be verified**. Makeup laboratory time will not be provided. Dr. Duran and Dr. Xu will make all decisions on this matter on a case-by-case basis.

Homework

Required homework will be due at the **beginning of class on the due date**. You are asked to use paper of uniform size in each assignment. In this course, each student must complete and submit homework **individually**. Evidence of direct copying will be addressed in accordance with the University's Academic Integrity policies (see below). You may confer with other students about **strategies** for approaching homework problems, but **you may not copy or shall full solutions** with any student for any problem or sub-problem. Show all steps of your work in a way that will allow anyone to follow the logic (including yourself at a later date!). Make sure that your work is neat and legible and always **box your answers**, with any dimensional units inside the box. Include the names of any students with whom you consulted in completing a homework assignment. Late homework assignment turned in within 24 hours after due date will be penalized 20%. After that time assignments will not be accepted.

Solutions for most homework problems will be available for student review, and will be posted on Blackboard. Students are encouraged to **first** compare graded homework and the correct solution to find the source of errors in their calculations. If there is still some confusion, the student is encouraged to meet with the professor who assigned the problem. Office hours provide an ideal opportunity to discuss such matters.

Laboratory Reports

Laboratory experiments will be conducted in groups determined by the instructors. One formal laboratory report per group will be due at the **beginning of class on the due date**. Late laboratory reports will not be accepted. Laboratory reports should conform to the format specified by the instructors. Missing class during a scheduled laboratory experiment will result in a grade of zero. Laboratory reports will be graded according to the following:

- Objectives and background: 15%
- Materials and procedure: 10%
- Results and Discussion: 45%
- Conclusions: 10%
- Organization and format: 20%

Examinations

Exam dates are specified in the course outline (see next page). The last exam, the final, is *not* comprehensive and thus it will include material covered since the second exam. Cheating on exams is a serious offense and will be addressed in accordance with the University's Academic Integrity policies (see below).

Academic Integrity

The Code of Academic Integrity of Villanova University addresses cheating, fabrication of submitted work, plagiarism, handing in work completed for another course without the instructor's approval, and other forms of dishonesty. For the first offense, a student who violates the Code of Villanova University will receive 0 points for the assignment. The violation will be reported by the instructor to the Dean's office and recorded in the student's file. In addition, the student will be expected to complete an education program. For the second offense, the student will be dismissed from the University and the reason noted on the student's official transcript. Please visit the website for further details:

<http://www.vpaa.villanova.edu/academicintegrity/code.html>

Course outline

Lecture	Date	Topic
1	1/11	Introduction; What environmental engineers do
PART 1: AQUATIC CHEMISTRY		
2	1/13	Units of concentration
3	1/20	Stoichiometry and chemical kinetics
4	1/25	Thermodynamics
5	1/27	Acid-base chemistry and alkalinity
6	2/1	Lab 1: Acid-base and alkalinity lab (meet in CEER 306/308)
7	2/3	Gas/liquid equilibrium processes (Henry's law)
8	2/8	Solid/liquid equilibrium processes
9	2/10	Precipitation and dissolution
2/15	Exam I (Tentatively to include material covered up to and including February 10, 2016)	
PART 2: FUNDAMENTALS OF MICROBIOLOGY		
10	2/17	Introduction, biological systems of environmental engineering
11	2/22	Organisms (prokaryotes and eukaryotes) and viruses
12	2/24	Cell biology
2/29 - 3/6	<i>Spring Break</i>	
13	3/7	Metabolism
14	3/9	Metabolism and microbial growth
15	3/14	Microbial growth
16	3/16	Public health microbiology and Lab 2: Indicator organisms laboratory (meet in CEER 306/308)
3/21	Exam II (Tentatively to include material covered between February 18 and March 16, 2016)	
3/23-3/28	<i>Easter Break – No Class</i>	
PART 3: WATER QUALITY		

17	3/30	Water quality parameters and Lab 3 (Part 1): Solids laboratory (meet in CEER 306 and 308)
18	4/4	Water quality parameters and Lab 3 (Part 2): Solids laboratory (meet in CEER 306 and 308)
19	4/6	Nutrient pollution and eutrophication
20	4/11	Modeling nutrient removal
21	4/13	Biochemical Oxygen Demand (intro) and Lab 4: BOD Laboratory (meet in CEER 205)
22	4/18	Biochemical Oxygen Demand (BOD) Kinetics
23	4/20	Dissolved oxygen in rivers: Streeter-Phelps modeling
24	4/25	Streeter-Phelps modeling
25	4/27	Wrap-up, Review, CATS
TBA		Exam III (Tentatively to include material covered between 3/30 and 4/27). Note: This is a 90-min exam.