Department of Civil and Environmental Engineering
University of Connecticut
CE/ENVE-3230 Air Pollution Control
Spring 2020

Instructor: Marina Astitha, PhD
Associate Professor
Department of Civil & Environmental Engineering
Email: marina.astitha@uconn.edu
Phone: (860)-486-3941
Office: CAST 311
Office hours via webex1*: Tuesdays 1-2pm

Teaching Assistant: Tasnim Zaman, tasnim.zaman@uconn.edu, Office: Bronwell-319

Class meets: Mo We Fr 1:25-2:15 pm webex1* 01/23/2020 - 05/01/2020
TA Office Hours: Tues, Thurs 12:15-1:15 pm webex2*

***webex1:** **https://uconn-cmr.webex.com/meet/maa13014**
***webex2:** **https://uconn-cmr.webex.com/meet/taz19002**

Website (HuskyCT): http://huskyct.uconn.edu (all assignments shall be uploaded in HuskyCT at the due dates; students are expected to check the HuskyCT section of the course at least one time between classes; email announcements will be sent out using HuskyCT as a means of direct communication and updates related to the course)

Textbook: Air Pollution control: A design approach, C.D. Cooper and F.C. Alley, 4th edition.

Course goals and objectives
The ***goal*** of this course is to provide in-depth understanding of the properties and behavior of atmospheric pollutants and the ability to design appropriate control measures for key classes of pollutants.
Course Objectives:

1. Relate main air pollutants with their sources, transport pathways and effects
2. Examine various systems for air pollution control
3. Design control systems for key pollutants

Learning objectives
At the end of this course you will be able to:

1. Analyze and evaluate air pollution control techniques (*homework; lectures*)
2. Design air pollution control systems (*homework; in-class activities; exams*)
3. Collaborate with colleagues to compile or create new knowledge about air pollution (*in-class activities; final project*)

METHODS
Moving into online delivery throughout the end of the semester means we will change the way the material is delivered to you. Look at the detailed list below to get a better understanding of how we move forward:

1. Notes and lecture slides are already available to you in HuskyCT.

2. You will still get the 1 credit for quiz participation before spring break; quizzes after the break will be available to all for self-assessment; solutions will also be provided.
3. Homework assignments will continue through HuskyCT as usual.
4. Prerecorded lecture videos will be available weekly before Monday's class.
5. During our scheduled class time, I will be online using webex (find link webex1 above). The class time will be structured as: 10min recap of notes/slides, 10min questions on recorded sessions, 30min problem solving.
6. Final exam will be open books/open notes (same as the midterm); the exam will be provided in HuskyCT at the designated date/time and the solutions should be uploaded by the due time.
7. Final projects should be continued as planned. The reports and presentations (slides) must be developed as required. The projects will be presented online via the webex1 platform for Q&A (detailed schedule will be sent out beginning of April).

Final Project

The term papers should be done in **groups of four (4) people**. They should focus on a special topic related to air quality, review the pertinent literature and present an overview in written and oral format. The written document should be a maximum of 12 pages of double-spaced text (1" page margin, font Times New Roman 12 or Arial 11), including figures, tables and references. An oral presentation using PowerPoint will be given during the last week of classes, of 10min duration. Instruction on how to write a term paper and deliver a presentation will be provided in-class during the semester. I will always be available to guide you through the final project development. All you have to do is ask!

Indicative list of topics:

1. Cap and trade systems as policy measures for air quality control
2. Measures for CO2 capture and control
3. Indoor air pollution sources, significance and control
4. Ozone depletion in the stratosphere: an overview of the issue and current status
5. Mobile air pollution sources and control
6. Mercury as an atmospheric pollutant: sources, fate and transport
7. Lead as an atmospheric pollutant: sources, fate and transport
8. A comparison of renewable energy technologies in terms of air quality and climate change
9. Waste-to-energy technologies and impacts on air quality
10. The contribution of agriculture and livestock management to air quality
11. Dioxins and furans: sources, properties, removal technologies
12. Air quality issues in developing countries
13. Global circulation and impacts of air pollution
14. Acid rain

You can come up with your own ideas as well. Topics are handed out on a first-come, first-serve basis and will be approved by the instructor by the due date (see schedule) following a brief proposal through email that indicates the team members, title and few sentences describing the topic.

Air Pollution topics covered during the semester:

- Introduction, sources of air pollution, legislation (chapter 1);
- Air pollution and meteorology (chapters 19&20; hmwk#1)
- Particulate matter (chapter 3; hmwk#2)
- Cyclones (chapter 4; hmwk#2)

- Electrostatic precipitators (chapter 5; hmwk#3)
- Filters and baghouses (chapter 6; hmwk#4)
- Scrubbers (chapter 7; hmwk#5)
- Volatile Organic Compounds (VOCs) Incinerators (chapter 11; hmwk#6)
- Gas Absorption/ Gas Adsorption (chapters 12,13)

Tentative Course schedule

The course schedule might change in the event of inclement weather or other unforeseeable circumstances. The updated schedule and any subsequent changes will be communicated through HuskyCT.

WEEK	DATE	TOPIC	MATERIAL	ASSIGNMENTS*
Week 1	01/22 01/24	Air Pollution overview Air Pollution overview	Chap. 1	
Week 2	01/27 01/29 01/31	Air Pollution overview Quiz1/Air pollution and meteorology Air pollution and meteorology	Chap. 19	
Week 3	02/03 02/05 02/07	Air pollution and meteorology Final Projects/Problem solving Quiz2/Air Dispersion modeling	Chap. 20	Hw#1(Ch19-20)
Week 4	02/10 02/12 02/14	Air Dispersion modeling Problem solving Chap20 Particulate Matter	Chap. 3	**Final Project Proposal**
Week 5	02/17 02/19 02/21	PM efficiency Examples Problem Solving Chap3 Cyclones	Chap. 4	Hw#2 (Ch3)
Week 6	02/24 02/26 02/28	Cyclones Problem solving Chap4 Problem solving Chap4		Hw#3 (Ch4)
Week 7	03/02 03/04 03/06	Quiz3-ESP ESP Problem solving Chap5	Chap. 5	
Week 8	03/09 **03/11** 03/13	Midterm review **MIDTERM EXAM** Filters and baghouses	 Chap. 6	
SPRING BREAK	03/16- 03/20			
Week 9	03/23 03/25 03/27	Filters and baghouses Survey/Problem solving Chap6 Quiz4(5&6)/Scrubbers	Chap. 7	Hw#4 (Ch5&6)

Week 10	03/30 04/01 04/03	Scrubbers Scrubbers/venturi Problem solving Chap7		Hw#5 (Ch7)
Week 11	04/06 04/08 04/10	VOCs incinerators VOCs incinerators VOCs incinerators	Chap. 11	
Week 12	04/13 04/15 04/17	Problem solving Chap11 Quiz5(7&11) Gas Adsorption/Absorption	 Chaps 12,13	Hw#6 (Ch11)
Week 13	04/20 04/22 04/24	Gas Adsorption/Absorption Quiz6(12&13)Gas Adsorption/Absorption Final Exam Review		
Week 14	04/27 04/29 05/01	Final Projects Final Projects Final Projects		 Project Reports Due
Week 15	**TBD**			

*These are not due dates! Due dates are shown in the assignments on HuskyCT.

Assessment
The assessment will be based on class participation, homework assignments, projects, midterm and final exams. I will provide feedback on your grades continuously throughout the semester.

Weighting of course requirements:

Participation/Homework: 30%
Final Project: 20%
Midterm Exam: 25%
Final Exam: 25%

Grade conversion chart			
Excellent	A	4	91 - 100
	A-	3.7	89 - 90
Very Good	B+	3.3	87 - 88
Good	B	3	81 - 86
	B-	2.7	79 - 80
	C+	2.3	77 - 78
Average	C	2	71 - 76
Fair	C-	1.7	69 - 70
Poor	D+	1.3	67 - 68
	D	1	61 - 66
Merely Passing	D-	0.7	59 - 60
Failure	F	0	<59

Resources
College can be tough and you might find yourself struggling at some point in the semester. I am always available to discuss any concerns you have regarding your academic performance; together we can find a solution. The earlier in the semester, the better!
Please, also remember that the University of Connecticut offers a lot of resources to help you cope (Student Health and Wellness, https://studenthealth.uconn.edu/; Center for Students with Disabilities, https://csd.uconn.edu/).

Code of conduct:
All students that participate in the class are expected to be respectful towards others and their views. Distracting behavior will not be tolerated and will lead to a deduction of up to 20 points from the final grade. This course requires your active involvement. If you want to learn as much as possible, you are invited to come to class ready to initiate ideas and participate in vivid discussions on the course material. There are no "right" or "wrong" questions and all will be treated with equal respect. Students are expected to conduct themselves in accordance with UConn's Student Conduct Code (http://community.uconn.edu/the-student-code/).

Academic Integrity Statement
This course expects all students to act in accordance with the Guidelines for Academic Integrity at the University of Connecticut. Because questions of intellectual property are important to the field of this course, we will discuss academic honesty as a topic and not just a policy. If you have questions about academic integrity or intellectual property, you should consult with your instructor. Additionally, consult UConn's guidelines for academic integrity.

POLICY STATEMENTS

Collaboration Policy:
Students are encouraged to work together (in groups of 2 or 3) on homework assignments in the interest of gaining better understanding of the material. However, any evidence of direct copying will result in a zero homework grade for all involved parties.

Copying from solutions manuals will also result in a zero homework grade. Collaborating on exams will result in an F for the course for all parties involved.

Final Exam Policy
In accordance with UConn policy, students are required to be available for their final exam and/or complete any assessment during the time stated. If you have a conflict with this time you must obtain official permission to schedule a make-up exam with the Office of Student Support and Advocacy (OSSA). If permission is granted, OSSA will notify the instructor. Please note that vacations, previously purchased tickets or reservations, graduations, social events, misreading the assessment schedule, and oversleeping are not viable reasons for rescheduling a final.

Policy Against Discrimination, Harassment and Inappropriate Romantic Relationships
The University is committed to maintaining an environment free of discrimination or discriminatory harassment directed toward any person or group within its community – students, employees, or visitors. Academic and professional excellence can flourish only when each member of our community is assured an atmosphere of mutual respect. All members of the University community are responsible for the maintenance of an academic and work environment in which people are free to learn and work without fear of discrimination or discriminatory harassment. In addition, inappropriate Romantic relationships can undermine the University's mission when those in positions of authority abuse or appear to abuse their authority. To that end, and in accordance with federal and state law, the University prohibits discrimination and discriminatory harassment, as well as inappropriate Romantic relationships, and such behavior will be met with appropriate disciplinary action, up to and including dismissal from the University. More information is available at http://policy.uconn.edu/?p=2884.

Sexual Assault Reporting Policy
To protect the campus community, all non-confidential University employees (including faculty) are required to report assaults they witness or are told about to the Office of Diversity & Equity under the Sexual Assault Response Policy. The University takes all reports with the utmost seriousness. Please be aware that while the information you provide will remain private, it will not be confidential and will be shared with University officials who can help.
More information is available at http://sexualviolence.uconn.edu/.