

Elements of Atmospheric Pollution

ENV4101-6789, (Class Number: 12525 (Section: EAP1) and 20315 (Section: EAP2))

EAP1 for 12525: M 2-3 (8:30AM-10:25AM), W 2 (8:30AM-9:20AM)

EAP2 for 20314: M 4 (10:40AM-11:30AM), W 3-4 (9:35AM-11:30AM)

Location: Room: BLK 415

Academic Term: Spring/2022 (01/05/2022-04/20/2022)

Instructor:

Name: Myoseon Jang

Email Address: mjang@ufl.edu

Office Phone Number: 352-846-1744

Office Hours: 5:30PM-7:00PM on Monday (by appointment)

Teaching Assistant/Peer Mentor/Supervised Teaching Student:

Please contact through the Canvas website

- Harnish, Delaney E, delaney.harnish@ufl.edu, 5PM-7PM on Wednesday

Course Description

The class provides the platform for undergraduate and first year graduate students to learn the atmospheric processes of air pollutants and the emerging issues in the Earth's atmospheric environments. This course covers topics in air quality, including the structure and the composition of the atmosphere; the properties of gaseous compounds and aerosol; ozone formation engaged in NO_x chemistry; the photochemical reactions of hydrocarbons; monitoring instruments; emissions; the effects of air pollution on health and climate; dispersion; and air quality regulation and policy. The class materials include lecture notes based on 14 topics, textbook, flip questions, and cooperative learning based on team activities.

Course Pre-Requisites / Co-Requisites

EES 4203 and PHY 2049

Course Objectives

Through this course, the student will be able:

- 1) To *explain* the structure and composition of atmosphere
- 2) To *determine* the properties of atmospheric gases and aerosols.
- 3) To *explain* atmospheric ozone formation *via* photochemical reactions of ambient NO_x and VOC.
- 4) To *explain* the atmospheric, health and welfare effects of air pollution.
- 5) To *derive* the kinetics and equilibrium of gas phase reactions in combustion systems
- 6) To *explain* the scales of air motion, to *determine* the atmospheric stability and to *calculate* air dispersion.
- 7) To *describe* the principles of gaseous and particulate monitoring systems
- 8) To *describe* air regulation policy
- 9) To *explain* air resources topics to both professionals and the general public

Materials and Supply Fees

none

Professional Component (ABET):

Understanding sustainability in air pollution is essential to educate the next generation of engineers. Class ENV4101 and Class ENV5101 cover a variety of topics associated with sustainability and public health, climate forcing, ozone holes, photooxidation of volatile hydrocarbons, secondary aerosol formation, and ozone formation has been included. Students will learn the mathematical equations and the definitions, which are fundamental to understand pollution sources, processes of atmospheric pollutants and impacts on health, nature, and wealth. Students will apply what they learn in class to actual examples through questions in quizzes, in class assignments, and a project.

3 Credit Hours of engineering science

Relation to Program Outcomes (ABET):

The table below is an example. Please consult with your department's ABET coordinator when filling this out.

Outcome	Coverage*
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	Medium
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	
3. An ability to communicate effectively with a range of audiences	Medium
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments , which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	High
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	Medium
6. An ability to develop and conduct appropriate experimentation , analyze and interpret data, and use engineering judgment to draw conclusions	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	High

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course.

Required Textbooks and Software

- Title: Air Quality
- Author: Thad Godish
- Publication date and edition: Lewis publishers, 2015, 5th edition
- ISBN number: 978-1-4665-8444-0

(if course notes derived from various published sources are used, provide information above for each source)
(if course notes are developed by the instructor, so state)

Recommended Materials

Atmospheric Pollution, Mark Z. Jacoson
Fundamentals of Air Pollution by Daniel Vallero
Chemistry of the Upper and Lower Atmosphere, Finlayson-Pitts and Pitts Jr., Academic Press, 1999

Course Schedule

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EAP2 for 20314: M 4 (10:40AM-11:30AM), W 3-4 (9:35AM-11:30AM)

BLK415

Wk	Date		Topics	HW and Project	Quiz
1	1/5	3	Overview (Introduction)/Fundamental Laws of Gases and Particles		HW101
2	1/10	1	Fundamental Laws of Gases and Particles		
		2	Fundamental Laws of Gases and Particles	HW101 (10 pt bonus)	Q set 1
		3	Atmospheric Composition and Structure		
3	1/17		Holiday		
	1/19	3	Atmospheric Composition and Structure		Quiz 1, Q set 2
4	1/24	1	Atmospheric Composition and Structure, Gaseous pollutant		Q set 2
		2	Gaseous Pollutants		
		3	Gas Pollutants: Ozone formation		Quiz 2 (W)
5	1/31	1	Gas Pollutants: Ozone formation		Quiz 3 for L3
		2	Gas Pollutants: Ozone formation		Q. set 3
		3	Particulate Matter		
6	2/7	1	Particulate Matter		Quiz 4, Q set 4
		2	Fundamental Kinetics and Equilibrium Constants		
		3	Fundamental Kinetics and Equilibrium Constants		Quiz 5 (W)
7	2/14	1	Energy Sources and Combustion		
		2	Energy Sources and Combustion		
	2/14		Exam 1		3PM-9PM (M)
	2/16	3	Energy Sources and Combustion	Posting project topics	
8	2/21	1	Energy Sources and Combustion		Q set 5
		2	Atmospheric Motion, Removal, and Circulation		
		3	Atmospheric Motion, Removal, and Circulation		Quiz 6 (W)
9	2/28	1	Atmospheric Motion, Removal, and Circulation		Q. set 6
		2	Air Quality Modeling		
		3	Air Quality Modeling		Quiz 7 (W)
10	3/7	1	Spring Break		
		2	Spring Break		
		3	Spring Break		
11	3/14	1	Air Quality Modeling		Q set 7
	3/16	3	Exam II		Exam II (W)
12	3/21	1	Atmospheric Effects		
		2	Atmospheric Effects		
		3	Health Effects	2 page proposal	
13	3/28	1	Health Effects		
		2	Health Effects and Atmospheric Effects		Q set 8
		3	Air Monitoring		
14	4/4	1	Air Monitoring		Quiz 8
		2	Air Monitoring		Q set 9, Lab tour
		3	Air Regulation		
15	4/11	1	Air Regulation Discussion about project		Quiz 9 Q set 10
	4/11				Quiz 10 (7PM)
	4/13		No class, Exam III		Exam II (W)
16	4/18	1	Project presentation		
		2	Project presentation		
		3	Project presentation		
	4/25	1		Project report due	

Course Evaluation Period Opens on

The class ends on 04 20, 2022.

Course Title, Prefix, and Number
Course Instructor and Academic Term

Online Course Recording

Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

Attendance Policy, Class Expectations, and Make-Up Policy

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Click here to read the university attendance policies:

<https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Homework Sets (10)	100 each	Bonus point
Quizzes (10)	100 each	25%
3 Exam	100	60%(20/20/20)
Project	100	15%
		100%

Requirements for class: attendance, quiz, exam, solving questions in classroom, and project

a. Solving question in the classroom (Flip class)

The student will individually **submit the activity on Flip questions to Dr. Jang by 8 PM on the same day with the flip question solving.** The student will take photo of hand wiring for flip activities and submit it to e-learning. **Each submission will be counted as 2 point and added into the total quiz score.** (file name: **Question set X_your name**)

b. Quiz Policy

A 10-minute quiz is administered in the beginning of class (see class schedule). It is a close book & close note test. Only the content covered after the previous quiz will be tested. **NO make-up** quiz will be allowed. Every student is allowed to drop two quizzes (for any reason including sickness, traveling, family event, etc) with the lowest grades when calculating the final grade.

c. Exam Policy

There is no final. You have three exams. Exam will be open book. The exam begins at **3:PM and ends 9PM. Exam I covers lecture 1-5, Exam 2 covers lecture 6-9, and Exam 3 covers all lecture materials.** You need a calculator for exams. No discussion with other students is allowed. A make-up for the exam will not be allowed except the case only with certified medical excuse (only one make-up exam).

d. Project Policy

5% will be deducted for the late project report submitted on the same day after the last class, 10% for that submitted on the 2nd day, and 20% for that on the 3rd day. Any assignment submitted late for more than 3 days will **NOT** be accepted unless with a certified medical excuse or if it is agreed by Dr. Jang prior to the due time with reasonable explanation.

ENV4101Students will have a project (individually or as a team, depending upon class size). If the project is performed as a team, each team should elect a **TEAM LEADER**. If a member is regarded by the team for not

contributing to the project, Dr. Jang may request the member to conduct his/her project **individually**. In the project, **the contribution from each team member to both the presentation and the report should be clearly documented.** ENV5105 students will have an **individual project**.

Objectives of the project and tasks: identify the sources for such a pollutant, health effects, regulations (Federal/State/Local, EPA/OSHA) and possible measures to lower its concentration. Each team should discuss the potential content with Dr. Jang and inform the **project title** (subject) till the **due date in the schedule of this syllabus**. To avoid multiple teams choosing the same topic, the first team to finalize the topic with Dr. Jang gets the right.

A **2-Page Proposal** (1.5 line spacing, 12 Times New Romans, 1 inch margin on each side, letter size paper, no hand writing) should be submitted to Dr. Jang by the deadline specified in Schedule (**due date in the schedule of this syllabus**).

A **Project Presentation** will be scheduled at the end of the semester.

A **Project Report** is also required (due date specified in Schedule). The final report should be **reviewed** by one other team before submitted to Dr. Jang. It is the team's responsibility to arrange the review done before their submission, and the reviewers should sign on the draft (which should be submitted, too). In the report, the team should document how they respond to reviewer's comments. 5% of your project's final grade is based on the response to reviewer's comments, and 5% of your project final grade is based on your review of other's report. The purpose of this review is to get comments/suggestions from your classmates (regarding content, format, flow, etc), and you certainly should incorporate the comments/suggestions in the final version to be submitted.

The weight of the grade of the project: preliminary 2 page proposal 10%, final presentation 40% and final report 40%, report review by other team 5%, review of other team's report 5%. Guidelines for the proposal/reports/presentation will be available at the course's website.

Grading Policy

The following is given as an example only.

Percent	Grade	Grade Points
90	A	4.00
87.0 - 89.99	A-	3.67
84.0 - 86.99	B+	3.33
80.0 - 83.99	B	3.00
77.0 - 79.99	B-	2.67
74.0 - 76.99	C+	2.33
70.0 - 73.99	C	2.00
67.0 - 69.99	C-	1.67
64.0 - 66.99	D+	1.33
60.0 - 63.99	D	1.00
57.0 - 59.99	D-	0.67
0 - 56.9	E	0.00

More information on UF grading policy may be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Students Requiring Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Online Course Recording

Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

University Honesty Policy

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Conduct Code (<https://sccr.dso.ufl.edu/process/student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Jennifer Nappo, Director of Human Resources, 352-392-0904, jpennacc@ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>

Campus Resources:

Health and Wellness

U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: <https://counseling.ufl.edu>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.
<https://lss.at.ufl.edu/help.shtml>.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling; <https://career.ufl.edu>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.
<https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
<https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>; <https://care.dso.ufl.edu>.

On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaint-process>.