

**Elements of Air Pollution**  
**ENV4101 (22094) Section 6789**  
**Class Periods:** M,W,F | Period 6 (12:50 PM - 1:40 PM)  
**Location:** online  
**Academic Term:** Fall/2020

**Instructor:**

Name: Myoseon Jang

Email Address: [mjang@ufl.edu](mailto:mjang@ufl.edu)

Office Phone Number: 352-846-1744

Office Hours: 5:30PM-7:00PM on Monday

**Teaching Assistant/Peer Mentor/Supervised Teaching Student:**

Please contact through the Canvas website

- David Deacon, [bigdeac5@ufl.edu](mailto:bigdeac5@ufl.edu), online, 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<sub>x</sub> 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<sub>x</sub> 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 <b>solve</b> complex engineering problems by applying principles of engineering, science, and mathematics	Medium
2. An ability to apply engineering <b>design</b> 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 <b>communicate</b> effectively with a range of audiences	Medium
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed <b>judgments</b> , 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 <b>collaborative</b> and inclusive environment, establish goals, plan tasks, and meet objectives	Medium
6. An ability to develop and conduct appropriate <b>experimentation</b> , analyze and interpret data, and use engineering judgment to draw conclusions	
7. An ability to acquire and apply new <b>knowledge</b> 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, 5<sup>th</sup> 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

### Class Schedule 2020 Fall: ENV4101 Elements of Air Pollution

AAAR conference on October 5-9, 2020.

Wk	Mo	Date	Topics	HW and Project	Quiz
1	Aug.	31	Overview (Introduction)		HW101
	Sep	2	Fundamental Laws of Gases and Particles		
		4	Fundamental Laws of Gases and Particles	HW101 (10 pt bonus)	Question set 1
2		7	Labor day (no class)		
		9	Atmospheric Composition and Structure		Quiz 1
		11	Atmospheric Composition and Structure		
3		14	Atmospheric Composition and Structure		Question set 2
		16	Gaseous Pollutants		Quiz 2
		18	Gaseous Pollutants/ Gas Pollutants: Ozone formation		
4		21	Gas Pollutants: Ozone formation		Quiz 3
		23	Gas Pollutants: Ozone formation		Question set 3
		25	Particulate Matter		Quiz 4
5		28	Particulate Matter		Question set 4
		30	Fundamental Kinetics and Equilibrium Constants		Quiz 5
	Oct.	2	No class (Home coming day)		
6		5	<b>No Class, Exam I (in class)</b>		<b>Exam I</b>
		7	<b>No class (conference)</b>		
		9	Fundamental Kinetics and Equilibrium Constants		
7		12	Energy Sources and Combustion	Posting project topics	
		14	Energy Sources and Combustion		
		16	Energy Sources and Combustion		Question set 5
8		19	Atmospheric Motion/Atmospheric Dispersion and Transport		Quiz 6
		21	Atmospheric Dispersion and Transport		
		23	Atmospheric Dispersion and Transport		Question set 6
9		26	Air Quality Modeling	2 page proposal	Quiz 7
		28	Air Quality Modeling		
		30	Air Quality Modeling		Question set 7
10	Nov.	2	<b>No Class, Exam II (in class)</b>		<b>Exam II</b>
		4	Atmospheric Effects		
		6	Atmospheric Effects		
11		9	Health Effects		
		11	<b>No class (Veterans day)</b>		
		13	Health Effects		Question set 8
12		16	Air Monitoring		Quiz 8
		18	Air Monitoring		
		20	Air Monitoring		Question set 9
13		23	Air Regulation		Quiz 9
		25	No Class (Thanks Giving)		
		27	No Class		
14		30	Air Regulation, Guideline of Project, Review for Exam III		Question set 10
	Dec.	2	<b>No class, Exam III (in class)</b>		<b>Exam III</b>
		4	Project presentation		
15		7	Project presentation		
		9	Project presentation		
		11		Project report due	

The class ends on December 09, 2020.

### **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**

Your attendance in the class will count towards your grade. Excused absences are consistent with university policies in the graduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) Excused absences require appropriate documentation. Assignments will be accepted late only in accordance with university policies.

### **Evaluation of Grades**

<b>Assignment</b>	<b>Total Points</b>	<b>Percentage of Final Grade</b>
Homework Sets (10)	100 each	Bonus point
Quizzes (9)	100 each	20%
3 Exam	100	60%(20/20/20)
Project	100	20%
		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 15-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. Midterm Exam Policy**

There is no final. You have three exams. Exam will be open book. The exam begins at 12:50PM and ends 7PM. Each exam only covers the materials instructed prior to that exam. 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 2<sup>nd</sup> day, and 20% for that on the 3<sup>rd</sup> 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.

**ENV4101 Students** 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.

<b>Percent</b>	<b>Grade</b>	<b>Grade Points</b>
90	A	4.00
87.0 – 89.9	A-	3.67
84.0 - 86.9	B+	3.33
80.0 - 83.9	B	3.00
77.0 - 79.9	B-	2.67
74.0 - 76.9	C+	2.33
70.0 - 73.9	C	2.00
67.0 - 69.9	C-	1.67
64.0 - 66.9	D+	1.33
60.0 - 63.9	D	1.00
57.0 – 59.9	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.a.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.a.ufl.edu/public-results/>.

### ***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 Honor Code (<https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. 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
- Robin Bielling, Director of Human Resources, 352-392-0903, [rbielling@eng.ufl.edu](mailto:rbielling@eng.ufl.edu)
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, [taylor@eng.ufl.edu](mailto:taylor@eng.ufl.edu)
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, [nishida@eng.ufl.edu](mailto: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](mailto: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:** <http://www.counseling.ufl.edu/cwc>, 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](mailto: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](mailto:Learning-support@ufl.edu).  
<https://lss.at.ufl.edu/help.shtml>.

**Career Resource Center**, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.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://care.dso.ufl.edu>.

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