Lecture TTh 2:00-3:15 PM. 3026 SC

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(please allow 24 hours for a response)

With Prof. Greg Carmichael,
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Teaching Assistants:
None

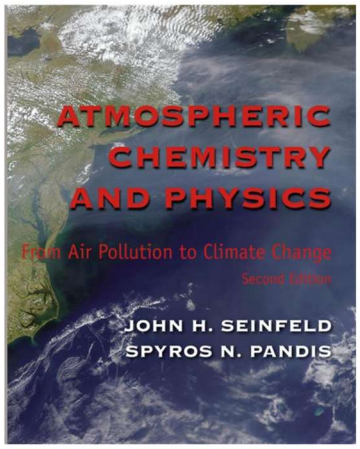
Walk-in Hours:
To be determined and posted on ICON

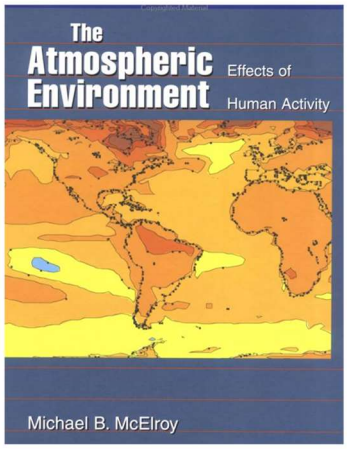
CBE:5425/CEE:5115 – Atmospheric Chemistry and Physics

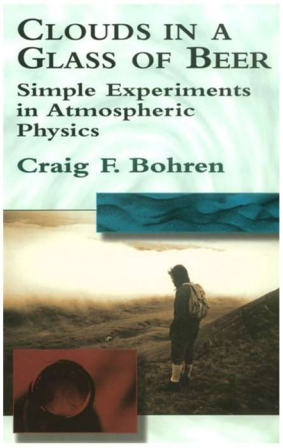
The University of Iowa
Spring 2022

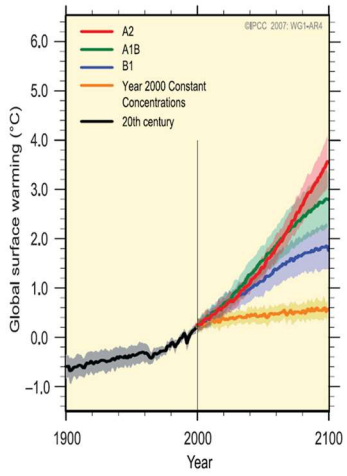
Course Description

Principal chemical and physical processes affecting atmospheric trace gas and pollutant cycles; emphasis on atmospheric photochemistry, aerosol science, major sources, and removal processes. Open to upper level undergraduate students and to graduate students. A prior course with some chemical kinetics (can be a corequisite) is recommended.









Target Audience and Prerequisites

a) The class is aimed at a wide range of student levels – from seniors and beginning graduate students to advance graduate students.
b) Assignments and projects will be tailored to the student's level. Graduate students will be expected to do more comprehensive and fundamental projects. Undergraduates can use models as "black boxes" without exploring their inner workings. Problem sets may have two levels of questions (grad vs. undergrad) or questions that are optional for undergraduate students but required for graduate students.
c) A course in reaction kinetics is highly recommended as a co-requisite. The ideal course for this is CBE:3120 Chemical Reaction Engineering or an equivalent course. Contact instructor for permission to waive this co-requisite requirement.
d) Exposure to environmental chemistry, environmental science, aerosol technology, meteorology, numerical methods, computer programming, and/or environmental engineering is helpful, but not required.

Course Learning Goals

By the end of the course it is expected you will:
a) By the end of this class, students should be able to take current research in atmospheric chemistry and physics – including field, laboratory, and computational research – and interpret it and place it in scientific context.
b) By the end of this class, students will be able to run and interpret output from selected research grade atmospheric simulations.
d) By the end of this class, students will be able to answer basic questions regarding global circulation, global biogeochemical cycles, synoptic meteorology, vertical transport of pollutants, aqueous phase reactions, deposition, gas-particle partitioning, photolysis, and atmospheric residence time.
e) By the end of this class, students will be able to answer detailed questions regarding the HOx cycle and photochemical smog and ozone formation, including identifying NOx and VOC limited oxidation regimes. They will also be able to present model simulations regarding ozone, NOx and VOC orally and graphically.
f) By the end of this class, students will be answer basic questions regarding aerosol size distributions, dynamics of aerosol particles, dynamics of aerosol populations, radiative transfer involving aerosols, cloud formation, aerosol thermodynamics, secondary organic aerosols.

Time permitting, the additional course goals will be pursued:

g) By the end of this class, students will have exposure to global climate change, including the issues of radiative balance, carbon cycle, and recent IPCC summary reports.
h) By the end of this class, students will have exposure to the design and classification of major photochemical grid modeling systems.
u) By the end of this class, students will be able to identify key atmospheric (gases, aerosols, and radiation) processes and issues relevant to current research priorities – polluted cities, transboundary pollution, wildfire and air quality

Teaching Philosophy for Process Control and Dynamics

The teaching philosophy for the course is (a) to expose students to key concepts, ideas, and techniques in the field through a combined exposure of (a) lecture, (b) reading, and (c) practice on problem sets. Students can practice in more depth on some specific concepts in group and individual projects.

Finally, problem sets are graded with a focus on effort, readability, and following good problem solving practices – rather than solely on achieving the accepted answer. This is meant to encourage thoughtful and thorough problem-solving techniques and discourage the use of solutions obtained from other students, solution manuals, or internet cheat sites such as Chegg.com.

Walk-in Hours

Walk-in hours (often referred to as office hours) are times which have been set aside by the professor to help you with material that is not clear, to answer any questions you have about course material or requirements, and to review your progress. Please feel free to use them to help you with this class! Most walk-in hours this semester will be via zoom. We will make every effort to guide you toward completion of all requirements, but the ultimate responsibility for satisfying these requirements is yours.

Course Materials

Required

- Seinfeld, J.H. and Pandis, S.N. "Atmospheric Chemistry and Physics," 3rd ed., 2016. – on 4h reserve in the engineering library.
- This is an ICON direct book and you will be automatically charged $80 for access to it unless you opt out following instructions at https://teach.uiowa.edu/icon-direct/opt-out

Optional / Supplemental

- Lutgens, Tarbuck, Herman, Tasa. The Atmosphere: An Introduction to Meteorology, 14th edition. Pearson. 2018 – on 4h reserve in the engineering library.
- Jacob, Daniel. "Introduction to Atmospheric Chemistry" Princeton University Press, 1999.
- Available online free: https://acmg.seas.harvard.edu/education/introduction-atmospheric-chemistry
- McElroy, Michael. "The Atmospheric Environment" Princeton University Press, 2002.
- Stull, Roland B. "An Introduction to Boundary Layer Meteorology (Paperback)" Springer, 2004.
- Numerical Recipes. Cambridge University Press; 3 edition (September 10, 2007). www.nr.com

- Finlayson-Pitts, B., and Pitts, W. “Chemistry of the Upper and Lower Atmosphere: Theory, Experiments, and Applications” Academic Press, 1999.
- And the slides from Jose Jimenez’s course at Colorado are good:
- CHEM-5151 / ATOC-5151 - Atmospheric Chemistry Graduate Course
- http://cires1.colorado.edu/jimenez-group/wiki/index.php/AtmChem-5151

Used in some semesters, but not used this year. Consider as useful for project selection, or for the library of graduate students doing research in these fields:

- Jacobson, Mark Z. Fundamentals of Atmospheric Modeling. 2nd Ed. Cambridge Univ Press. 2005.
- Pielke, Roger A. “Mesoscale Meteorlogical Modeling, 3rd Ed.” Academic Press, 2013.
- Bohren, Craig, Clouds in a Glass of Beer. Dover Publications (July 10, 2001)
- Bohren, Craig. “What Light Through Yonder Window Breaks,” John Wiley and Sons, 1991.

Delivery Format, Distance (Zoom) Options, and COVID-19 protocols

ACP for S2022 is designed to be an in-person lecture-based learning experience. A synchronous zoom attendance option will be added during periods of high COVID-19 transmission. It can be difficult to optimize the in-person and zoom experience simultaneously, and I will be more focused on the in-class attendees. A partial library of recording lectures (from S2020) will be made available.

University COVID-19 protocols may change over the course of the semester, and the latest protocols can always be found at https://coronavirus.uiowa.edu/ These cover the free vaccination options for students, masking, social distancing, what do to if you are sick or may have been exposed, and self-reporting tools.

Professor Stanier and the University of Iowa strongly encourage students, faculty, and staff to be vaccinated against COVID-19. The university also encourages students, faculty, and staff to wear a face mask while on campus, and strongly encourages the use of face masks in all classroom settings and during in-person office hours. However, face mask usage is not required except on CAMBUS and in specified research and healthcare settings. You should feel comfortable wearing a mask if you choose. Professor Stanier will be wearing a mask during in-person classes and/or during in-person office hours and labs as a protective measure. The mask is a significant risk reduction that helps our community, our K-12 schools, and our small businesses. Finally, Professor Stanier lives with an immunocompromised family member.

Attendance and Absences

Please be here and engaged when you are here. This class works best when all of us are involved in discussing and learning the material, and it is more interesting and meaningful for all when that occurs. Attendance will be graded, although attendance via Zoom (if Zoom is offered, depends on level of community transmission) will count as attendance.

Discussion Board

A best practice in inclusive teaching is having a discussion board where students can post anonymous questions. This year, we will be using a google doc where the instructional team has “edit” privileges and the class has “comment” privileges. This is necessary as ICON does not support anonymous discussion boards. The link to the discussion board is
https://docs.google.com/document/d/1XOplBcoPjOeUn4cBJ26tolQnn1B5DRi18xpObeMIpi0/edit?usp=sharing

On Your Own Outside of Class

You have probably heard that you should be spending 2-3 hrs studying for every hour spend in the classroom. I'm less concerned about the exact amount of time you spend outside class than how you are using that time and if you are successfully learning the course material. So, what should you be doing with time outside of class?

- Read the textbook. You can choose to read chapters before or after they are presented in class. The Seinfeld and Pandis book can be a little dry and mathematical at times, so take it in small bits, and ask questions.
- Complete assignments – either on your own, or through the use of a study group. You may struggle with some of the problems, but treat each problem as a learning opportunity and ask questions (in class, walk-in hours, discussion board).
- Take notes on the textbook material and tab the location of key information – we will keep referring back to material in the text, so tabbing your book can save you time (I like to use sticky tabs that I can write on).
- Read ahead, or at least look over the material that we will be covering next – this can help you better understand what we are covering in class and help see the relationship between the material.
- Check out the alternate learning resources (other textbooks, websites) if a concept is confusing to you.
- Review the discussion board from time to time (see above).
- Get to know your way around the ICON site, and understand the different sections where Professor Stanier is posting handouts, optional reference material, supporting information for the lab.

Assignments & Grading

Assignments

- Homework assignments (~8 in number)
- Group projects (1 in number)
- Individual projects / presentations (1 in number)

Note: grading checklists will be provided for group and individual projects. These will be used by the instructor for grading and for peer assessment of oral presentations. Students will be asked to prepare questions for discussion sessions and will be asked to grade their own participation.

Quizzes

There will be between 4-8 quizzes in the course; some announced, some unannounced.

Exams One final exam.

Grading

Portions of the class will be weighted using the following percentages

Problem Sets:	25%
Group Project	15%
Quizzes:	15%
Individual Project:	20%
Participation/attendance:	10%
Final exam:	15%

For homework and attendance, the following scale will be used to convert percentage scores to letter grades:

> 90 = A 77-89 = B 63-76 = C 45-62 = D

For other portions of the class, instructor discretion will be used for the conversion.

In part due to the ubiquity of online solutions, and in part due to research that the grading method described below leads to better student outcomes. Homework grading is done as follows.

Item	Points first time the work is turned in	Points	Notes
Effort	50%	25%	Were problems attempted? Were all parts of all problems attempted? Were best practices followed, such as including a diagram if appropriate, defining assumptions, clarifying problem boundary, explaining the solution methodology or "theory" before writing the solution, showing unit conversions clearly, documenting sources of values taken from websites and literature, managing significant digits, and providing appropriate checks of assumptions, units, and numerical values. Were good data sources selected and documented? such as textbooks or technical manuals. If using a web or internet resource, some signs that it is reputable: (1) a listed publisher; (2) a listed editor; (3) evidence of peer review; (4) multiple editions or evidence of revisions; (5) evidence that a review has been published (e.g. of the book); (6) report or website by or affiliated with a governmental organization (e.g. NIST, EPA, DOE), a private standards organization (e.g. ISO, ASTM), or a professional organization (AICHE, ACS). Documentation of a web resource would include a description or title of the site, the URL, the date accessed, and the publisher or creator.
Neatness and legibility	50%	25%	25% will be for neatness, legibility, boxing final answers, turning in stapled problem sets, avoiding ragged edges, and for formatting problems so that graders can follow the solution logic. Separate guidelines for code (e.g. python) and spreadsheet solutions will be provided.
Checking your solution and making corrections		50%	You are responsible for checking your work against the solution manual, and then explaining whether you got it correct. If you missed aspects of the problem, you need to explain why you missed it (lack of effort, lack of knowledge, calculation error, unit error, bad assumption, etc.), how it would be fixed, and then do the actual correction

Expectations:

A

- Completion of all or nearly all homework with attention to detail and honest effort
- "Pulling one's weight" on group project with evidence of good teamwork; completion of group project with attention to detail, honest effort, neat & logical writeup, and plausible physical results
- Meeting of all milestone dates in the individual project; completion of individual project with attention to detail, honest effort, neat & logical writeup, and plausible physical results
- Demonstration in quizzes and take home exam that a majority of the material has been comprehended, that most of the basic computations and problem solving techniques discussed in the class can be done by the student, that all readings have been done, that appropriate units and physical plausibility of answers is discussed.
- High quality presentations and supporting analysis/calculations for projects OR significant improvement in presentations throughout semester. Specifically – want to see good slides, understanding of chemical and physical fundamentals, good delivery, and interest in subject material
- 100% attendance unless discussed prior to class with instructor
- Active participation in class

B

- Severe deficiency in one area above
- Major deficiency in two areas above
- Minor deficiency in three or more areas above

C

- Severe deficiency in two or more areas above
- Major deficiency in three or more areas above
- Major deficiency in two areas above, and minor deficiency in more than two additional areas

TOPIC COVERAGE and SCHEDULE

Class	Date	Topic	Read Before Class	Comments, Assignments, Quizzes
1	Tue, Jan 18	Introduction		
2	Thu, Jan 20	Atmospheric Structure & Constituents	S&P Chapter 1	
3	Tue, Jan 25	Atmospheric Structure & Constituents	S&P Chapter 2	
4	Thu, Jan 27	Residence time, compartement models	S&P Chapter 2	
5	Tue, Feb 01	General circulation / cyclonic and anticyclonic flow / geostrophy	Lutgens "The Atmosphere" chapter 7. General Circulation / Horizontal Atmospheric Motion / Synoptic Meteorology (pages 204-217) on reserve in library, or PDF of older edition on ICON	
6	Thu, Feb 03	Global Biogeochemical Cycles	Sections 2.3 (N), 2.8 & 6.15 (Hg), 22.1 (S), 22.2 (C), Jacobs 6.4 (Oxygen)	PS1 Due, First Attempt (chapters 1 and 2)
7	Tue, Feb 08	Chemical Kinetics of Atmos. Chem.	S&P Chapter 3	
8	Thu, Feb 10	Worked Examples / Catch-up		PS 2 Due, First Attempt, covering general circulation and global biogeochemical cycles
9	Tue, Feb 15	Atmospheric Radiation & Photochemistry	S&P Chapter 4	Final Project Milestone I (Topic Selection) Due
10	Thu, Feb 17	Brief coverage of stratospheric ozone	Q&A booklet, Q1,2,3, 6, 7	PS1, Reworked, Due
11	Tue, Feb 22	Topospheric Gas Phase Chemistry: Part 1 (HOx Cycle)	Jacob, Intro to Atmospheric Chemistry, Chapter 11, Oxidizing Power of the Troposphere	
12	Thu, Feb 24	Topospheric Gas Phase Chemistry: Part 2 (CH4 oxidation)		PS 3 Due, First Attempt, covering chapter 3 and some basic radiation
13	Tue, Mar 01	Topospheric Gas Phase Chemistry: Part 3 (smog and ozone pollution)	Jacob, Intro to Atmospheric Chemistry, Chapter 12, Ozone Air Pollution	Final Project Milestone II (One paragraph description Due)
14	Thu, Mar 03	Radiative Forcing (CH4, H2O feedback, IPCC forcings)	Jacobs Chapter 7, or AR6 portions of chapter 7	PS2, Reworked, Due
15	Tue, Mar 08	Henry's law partitioning in cloud droplets	Chapter 7 - sections 7.1-7.3	Carmichael
16	Thu, Mar 10	Aqueous Phase Kinetics - Sulfur Oxidation	Chapter 7 - sections 7.4-7.6; update with papers for grad students	Carmichael, PS4 Due, First Attempt, Tropospheric Chemistry & Radiative Forcing

Class	Date	Topic	Read Before Class	Assignments and Quizzes
	SPRING BREAK (Mar 14-18)			
17	Tue, Mar 22	Overview of Atmospheric Aerosols	S&P Chapter 8	
18	Thu, Mar 24	Aerosol size distributions		PS3, Rework, Due
19	Tue, Mar 29	Inorganic aerosol thermo	S&P Chapter 10	Final Project Mileston III (2 page detailed proposal)
20	Thu, Mar 31	Inorganic aerosol thermo		PS5, First Attempt, Due -- Aqueous Chem.
21	Tue, Apr 05	Organic aerosols	Chapter 14 (Grad students should read additional aerosol chapters depending on research) 14.1 - 14.3	
22	Thu, Apr 07	Examples / catchup day		PS4, Rework, Due
23	Tue, Apr 12	Organic aerosols	14.4.-14.6	
24	Thu, Apr 14	Emissions, Black and Brown Carbon	Reading to be assigned	Carmichael, PS6 Due, First Attempt, Aerosol Size Distributions, Inorganic Aerosol Thermo
25	Tue, Apr 19	Health Effects of Aerosols	Reading to be assigned	Carmichael
26	Thu, Apr 21	isoprene oxidation and isoprene SOA	6.11, 7.10, 14.9	PS5, Rework, Due
27	Tue, Apr 26	Air pollution & PBL meteorology	S&P 16.1 - 16.4	Carmichael
28	Thu, Apr 28	Air pollution & PBL meteorology	S&P Chapter 18	Carmichael, PS7, First Attempt, Due, Organic Aerosols, Black and Brown Aerosols, Aerosols and Health, Isoprene SOA
29	Tue, May 03	Individual Project Presentations		
30	Thu, May 05	Individual Project Presentations		PS6, Rework, Due
				PS7, Rework, Due during finals week

Course, College, and University Policies

This course is given by the College of Engineering but may be taken by students enrolled in colleges such as the Graduate College and the College of Public Health. The following document describes the applicability of policies from Engineering versus those from other colleges. Details of the University policy of cross enrollments may be found at: http://www.uiowa.edu/~provost/deos/crossenroll.doc).

Classroom Expectations

Students are expected to comply with University policies regarding appropriate classroom behavior as outlined in the Code of Student Life. While students have the right to express themselves and participate freely in class, it is expected that students will behave with the same level of courtesy and respect in the virtual class setting (whether asynchronous or synchronous) as they would in an in-person classroom. Failure to follow behavior expectations as outlined in the Code of Student Life may be addressed by the instructor and may also result in discipline under the Code of Student Life policies governing E.5 Disruptive Behavior or E.6 Failure to Comply with University Directive.

Mental Health

Students are encouraged to be mindful of their mental health and seek help as a preventive measure or if feeling overwhelmed and/or struggling to meet course expectations. Students are encouraged to talk to their instructor for assistance with specific class-related concerns. For additional support and counseling, students are encouraged to contact University Counseling Service (UCS). Information about UCS, including resources and how to schedule an appointment, can be found at http://counseling.uiowa.edu. Find out more about UI mental health services at: http://mentalhealth.uiowa.edu.

Basic Needs and Support for Students

Student Care & Assistance provides assistance to University of Iowa students experiencing a variety of crisis and emergency situations, including but not limited to medical issues, family emergencies, unexpected challenges, and sourcing basic needs such as food and shelter. More information on the resources related to basic needs can be found at: https://basicneeds.uiowa.edu/resources/. Students are encouraged to contact Student Care & Assistance in the Office of the Dean of Students (Room 135 IMU, dos-assistance@uiowa.edu, or 319-335-1162) for support and assistance with resources.

Non-discrimination Statement

The University of Iowa prohibits discrimination and harassment on the basis of race, creed, color, religion, national origin, age, sex, pregnancy, disability, genetic information, status as a U.S. veteran, service in the U.S. military, sexual orientation, gender identity, associational preferences, or any other classification that deprives a person of consideration as an individual (https://opsmanual.uiowa.edu/community-policies/human-rights). For more information, contact the Office of Equal Opportunity and Diversity (https://diversity.uiowa.edu/eod, or 319-335-0705, or diversity@uiowa.edu). Students may share their pronouns and chosen/preferred names in MyUI, which is accessible to instructors and advisors.

Sexual Harassment /Sexual Misconduct and Supportive Measures

The University of Iowa prohibits all forms of sexual harassment, sexual misconduct, and related retaliation. The Policy on Sexual Harassment and Sexual Misconduct governs actions by students, faculty, staff and visitors. Incidents of sexual harassment or sexual misconduct can be reported to the Title IX and Gender Equity Office or to the Department of Public Safety. Students impacted by sexual harassment or sexual misconduct may be eligible for academic supportive measures and can learn more by contacting the Title IX and Gender Equity Office. Information about confidential resources can be found here. Watch the video for an explanation of these resources.

Accommodations for Students with Disabilities

The University is committed to providing an educational experience that is accessible to all students. If a student has a diagnosed disability or other disabling condition that may impact the student's ability to complete the course requirements as stated in the syllabus, the student may seek accommodations through Student Disability Services (SDS). SDS is responsible for making Letters of Accommodation (LOA) available to the student. The student must provide a LOA to the instructor as early in the semester as possible, but requests not made at least two weeks prior to the scheduled activity for which an accommodation is sought may not be accommodated. The LOA will specify what reasonable course accommodations the student is eligible for and those the instructor should provide. Additional information can be found on the SDS website.

Absences for Religious Holy Days
The University is prepared to make reasonable accommodations for students whose religious holy days coincide with their classroom assignments, test schedules, and classroom attendance expectations. Students must notify their instructors in writing of any such Religious Holy Day conflicts or absences within the first few days of the semester or session, and no later than the third week of the semester. If the conflict or absence will occur within the first three weeks of the semester, the student should notify the instructor as soon as possible. See Operations Manual 8.2 Absences for Religious Holy Days for additional information.

Free Speech and Expression
The University of Iowa supports and upholds the First Amendment protection of freedom of speech and the principles of academic and artistic freedom. We are committed to open inquiry, vigorous debate, and creative expression inside and outside of the classroom. For information on the university's policies on free speech and academic freedom, see https://freespeech.uiowa.edu

Final Examination Policies
The final exam schedule is announced around the fifth week of classes; students are responsible for knowing the date, time, and place of a final exam. Students should not make travel plans until knowing this information. Visit https://registrar.uiowa.edu/final-examination-scheduling-policies.

Academic Integrity
Academic Integrity, based on the values of honesty, trust, fairness, respect, and responsibility, is a fundamental principle of scholarship in higher education. You are expected adhere to the University's Code of Student Life, the College of Engineering policy of academic misconduct, and course-specific policies outlined on the following websites and at the end of this syllabus:

Code of Student Life (2019-2020): https://dos.uiowa.edu/policies/code-of-student-life/

College of Engineering Academic Policies and Procedures: https://www.engineering.uiowa.edu/current-students/undergradute-students/academic-advising/academic-policies-and-procedures/academic

Students who engage in academic misconduct are subject to university and college disciplinary procedures, as well as other consequences with regard to this course.

Some Notes on Academic Integrity and Misconduct

In this course, I will hold you to the high standard of academic integrity expected of all students at the university. I do this for two reasons. First, it is essential to the learning process that you are the one doing the work. I have structured the assignments in this course to enable you to gain a mastery of the course material. Failing to do the work yourself will result in a lesser understanding of the content, and therefore a less meaningful education for you. Second, it is important that there be a level playing field for all students in this course and at the university so that the rigor and integrity of the university's educational program is maintained. Some guidelines are provided below to explain various aspects of academic misconduct and sanctions that will be used in this course, as well as how you can still collaborate together on homework assignments.

What is considered academic misconduct? (this list is not exhaustive, but provides you some common examples)

- Looking at the exam or quizzes of others, even if nothing is copied from them.
- Any communication with others during exams or quizzes (verbal, electronic, gestures, etc.).
- Copying answers from another exam paper or someone else's assignment.
- Using unapproved resources during an exam.
- Any use of unapproved resources to complete homework or in-class assignments, including any solution manual for the textbooks used in this course, previous year's homework solutions, completed assignments or exams from previous years, Chegg or similar online "services".

What is acceptable collaboration?

- Acceptable collaboration on homework is defined as working on problems together. However, each student should write out the final calculation for themselves, and calculate any quantities using their own calculator or spreadsheet.
- Acceptable collaboration in developing code is similar. It is extremely useful to sit at neighboring computers and to talk to one another about lines of code, syntax, errors, and results, each student should create, run, edit, and comment their own code on their own college computing account. Working on a program "together" (with one person typing and another looking over their shoulder) and then turning in two copies of the same program is not acceptable because the learning and preparation for quizzes and exams is not equal.

What is plagiarism?

Plagiarism includes the following. Please refer to specific materials on plagiarism that will be on ICON with respect to lab reports.

- presentation of the ideas of others without credit to the source;
- use of direct quotations without quotation marks and without credit to the source;
- paraphrasing without credit to the source;
- participation in a group project which presents plagiarized materials;
- failure to provide adequate citations for material obtained through electronic research;
- downloading and submitting work from electronic databases without citation;
- submitting material created/written by someone else as one's own, including purchased term/research papers;
- copying from someone else's exam, homework, or laboratory work;
- allowing someone to copy or submit one's work as his/her own;
- accepting credit for a group project without doing one's share;
- submitting the same paper in more than one course without the knowledge and approval of the instructors involved;
- using notes or other materials during a test or exam without authorization;
- not following the guidelines specified by the instructor for a "take home" test or exam.

Students unclear about the proper use and citation of sources, or the details and guidelines for any assignment, should discuss their questions with the instructor.

What are the consequences for academic misconduct in this course?

- Cheating on a midterm or final exam will result in an F in the course.
- Homework or in-class activities that have been copied from another student, a solution set, Chegg, etc. will be assigned a zero and a report of academic misconduct will be filed with the Associate Dean for Academic Programs in the College of Engineering. A repeat offense will result in a zero for this portion of the class (e.g. a zero for all homework and in-class activities).

- Plagiarism on a lab report may result in penalties up to 0 in the quiz portion of the class (e.g. a zero for all lab reports) for all members in the lab group. Lesser penalties may be used at the instructor discretion
- The instructor reserves the right to verify that students have not copied work and represented it as their own through oral questioning.
- If academic misconduct is suspected by the instructor, College of Engineering policies will be used to investigate and (if needed) take action in terms of repercussions against the student.
    - A discussion with the suspected student will be held. If the suspicion of academic misconduct cannot be cleared by the discussion, it will be documented in writing, a zero will be assigned to the appropriate portion of the class, and the documentation will be submitted to the Associate Dean for Academic Programs. The student may appeal to the Dean's office. For 2nd offenses, the Dean's office may take additional actions against the student (cancellation of the student's registration, disciplinary probation, suspension from the College, or recommendation of expulsion from the University).

Cheating lowers the morale of all students and makes grading less fair. If you are aware of cheating, use of solution manuals, or academic misconduct, please report it to the instructor.