


# Course Syllabus

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 Edit

## CBE 5779 - Design and Analysis of Experiments | Autumn 2022

MWF 12:40-1:35 pm, Stillman Hall 100

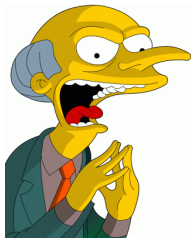
### Contact Information

#### Instructor

Professor Jim Rathman

CBEC 516

[rathman.1@osu.edu](mailto:rathman.1@osu.edu) (<mailto:rathman.1@osu.edu>)



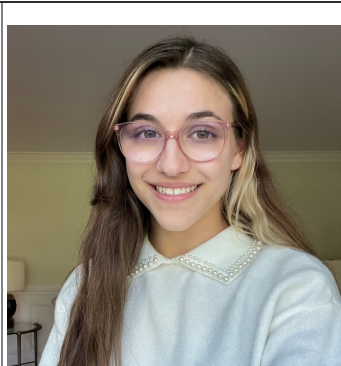
#### Teaching Assistants



Alisyn Greenfield



Ryan Edelbach



Alyssa Gammariello



Dylan Fulco

#### Office Hours

To be determined...

### Textbook

"*Design and Analysis of Experiments*", Douglas C. Montgomery (6th or 7th or 8th or 9th or 10th edition)

Wiley has an e-text version of the full book (10th ed) available for \$42 (rental) or to purchase for \$120. Hard (print) copies are also available. Wiley site for 10th edition: <https://www.wiley.com/en-us/Design+and+Analysis+of+Experiments%2C+10th+Edition-p-9781119492443> .(<https://www.wiley.com/en-us/Design+and+Analysis+of+Experiments%2C+10th+Edition-p-9781119492443>)

As noted above, older versions of this textbook are also generally adequate. Most of the changes in recent additions are on advanced topics that we do not cover. Problem statements for homework problems will be written out on the assignment sheet so you don't need to worry about differences in the problem statements between versions.

## Course Description & Objectives

### Course Description

Industrial and research experiments designed with special emphasis on reducing the number of experiments, interpreting final results, and ensuring against unknown factors.

### Objectives

The goals of this course are to learn how to properly design experiments, analyze the data collected from an experimental study, draw statistically valid conclusions from these analyses, and know how to develop and apply predictive models. These skills can be applied in almost every area of science and engineering, and are especially important in many "real world" situations where problems are too complex to be solved by a purely fundamental approach. In my own experience working in industry, I discovered experimental design and statistical analysis of data to be extremely important - I also found that my education hadn't prepared me very well in these areas. In a single semester we will not be able to cover advanced topics, but learning the basics will help you become a much better researcher and engineer.

By the end of the semester, you should be able to understand and apply the following basic concepts:

- types of data and data distributions
- formation and testing of statistical hypotheses
- confidence intervals
- replication, randomization, and blocking in experimental design
- performing and analyzing results from simple comparative experiments
- analysis of variance (ANOVA)
- screening experiments, full factorial designs, fractional factorial designs
- least squares regression models for experimental data
- augmented designs
- response surface designs for process or product optimization
- optimal experimental designs
- analysis of covariance (ANCOVA)
- working with multiple response variables

- split-plot designs

I also expect that you will become adept at using certain features of JMP, an extremely powerful statistical discovery software program that is becoming popular in both academic and industrial settings for use by scientists and engineers.

## How your grade will be determined

Final grades will be based on the following components:

- Homework: 25%
- Quizzes: 10%
- Participation (Top Hat, ...): 10%
- Midterm Exams (2): 35%
- Final Project: 20%

Top Hat responses (including both in-class questions and homework questions) are graded based on completion, not correctness. You will receive the maximum possible for participation points if you submit answers to at least 85% of the Top Hat questions.

**Important:** The 85% policy for TopHat allows you to miss up to 15% of the TopHat questions without penalty. You therefore do not need to worry (or contact Prof R...) if you miss class for any reason (illness, job interview, faulty alarm clock, ...) or if your phone or laptop battery dies during class or if your TopHat connection fails or if you are late getting to class or etc.

To insure confidentiality, I will never publicly post grades or scores - instead, you should regularly check your scores on Carmen. This will make sure we catch any mistakes early, and will help you know how you're doing as the semester progresses. Please contact me with any questions - there should never be any mysteries or surprises when you receive your final grade at the end of the semester.

The tentative distribution used to determine final grades based on your final overall total will be: A- ( $\geq 90\%$ ), B- ( $\geq 80\%$ ), C- ( $\geq 70\%$ ), D ( $\geq 60\%$ ). These ranges may be relaxed somewhat at the end of the semester, but you are guaranteed of receiving at least the grade as listed here.

**Make-up Exam Policy: No makeup exams will be given.** A student with a documented excuse for missing an exam will be given a score for the missed exam equal to the average of the remaining exams and final exam or project. The score assigned for the missing exam will be weighted to account for differences in the overall class average on different exams and projects.

## Schedule of Topics and Exams

This schedule may shrink, expand, or evolve as we go along so please check back often. Dates given for homework assignments and exams are my current best guess - these could also change but if they do you will

hear about it at least one week beforehand.

Last updated: Aug 20, 2022

### **Week of Aug 22 (First class on Aug 24)**

**Chapter sections:** 1-1 to 1-6, 2-1, 2-2

**Topics:** overview, motivation, objectives; data types and different ways of classifying variables; basic statistical concepts and terminology: sampling a population and sampling distributions; graphical representation of distributions (histograms); random sampling

**Videos to view and study outside of class:**

*Fundamentals of Statistics: Probability distribution functions for continuous variables*

These videos cover concepts presented in sections 2-3 of the textbook.

**Topics:** different types of probability distributions (uniform, normal, standard normal,  $\chi^2$ ,  $t$ , and  $F$ ); standardization and normalization; the Central Limit Theorem; extreme values in a distribution

Links to the videos can be found on the "Videos" page. I will expect you to have viewed and studied these videos by the time we meet for class on Monday, Aug 29.

### **Week of Aug 29**

**Chapter sections:** 2-4, 2-5

**Topics:** constructing and testing statistical hypotheses; the null and alternative hypotheses; type I and type II errors;

### **Week of Sep 5 (no class on Monday due to Labor Day holiday)**

**Chapter sections:** 2-4, 2-5, 2-6

**Topics:** one- and two-sample means and variance tests; p-values

[Homework #1 \(due Fri, Sep 9 at 11:59 PM\)](#)

### **Week of Sep 12**

**Chapter sections:** 3-1 to 3-3

**Topics:** means tests examples, confidence intervals

### **Week of Sep 19**

**Chapter sections:** 3-5

**Topics:** Publication bias and p-hacking; discrete factor effects models, the analysis of variance approach (ANOVA)

[Homework #2 \(due Fri, Sep 23 at 11:59 PM\)](#)

### **Week of Sep 26**

**Chapter sections:** 3-4

**Topics:** ANOVA (continued); multiple comparisons of means, experiments with a control level, residuals

### **Week of Oct 3**

**Chapter sections:** 3-7

**Topics:** residuals analysis and evaluating model adequacy; power and sample size; retrospective & prospective

power analysis

[Homework #3 \(due Fri, Oct 7 at 11:59 PM\)](#)

**Week of Oct 10 (no class Friday the 14 due to OSU Autumn Break)**

**Oct 10 (Mon): Exam #1**

**Chapter sections:** 3-10

**Topics:** power analysis (continued)

**Week of Oct 17**

**Chapter sections:** 4-1 to 4-4

**Topics:** thinking about highly overlapped distributions and statistical vs. practical differences; regression models for continuous-factor models

[Homework #4 \(due Fri, Oct 21 at 11:59 PM\)](#)

**Week of Oct 24**

**Chapter sections:** 5-1 to 5-6

**Topics:** regression models for continuous-factor models (continued)

[Homework #5 \(due Fri, Oct 28 at 11:59 PM\)](#)

**Week of Oct 31**

**Chapter sections:** 6-1 to 6-9, 7-1 to 7-3

**Topics:** blocking: matched pairs, RCBD, RIBD, Latin squares, and other experimental designs for handling controllable nuisance variables

[Homework #6 \(due Fri, Nov 4 at 11:59 PM\)](#)

**Week of Nov 7**

**Chapter sections:** 8-1 to 8-2, 11-1

**Topics:** understanding the *design space*; full factorial designs; analyzing data from a factorial experiment; coded factors

[Homework #7 \(due Fri, Nov 11 at 11:59 PM\)](#)

**Week of Nov 14**

**Nov 14 (Mon): Exam #2**

**Chapter sections:** 11-2 to 11-6

**Topics:** the lack-of-fit test; mixed-factor (continuous/discrete) models; optimal designs (with emphasis on *D*-optimal and *I*-optimal)

**Week of Nov 21 (no class Nov 23 and 25)**

**Chapter sections:**

Topics: optimal designs for factor screening, including blocked designs; confounding (aliasing) of effects

**Week of Nov 28**

**Topics:** optimal designs for model building and augmenting a design to perform additional runs

[Homework #8 \(due Mon, Nov 28 at 11:59 PM\)](#)

## **Week of Dec 5**

**Topics:** overview of response surface methodology and analysis of covariance (ANCOVA); ethics and experimental design; course wrap up

Homework #9 (due Wed, Dec 7 at 11:59 PM)

**Dec 14 (Wed): Final Project due, 11:59 PM**

## Course Policies and Procedures

### **Mode of delivery**

This course will be taught primarily in person (Stillman Hall 100), with several lectures delivered online (Zoom) when Professor Rathman is traveling to attend research conferences. Live sessions in the classroom will be recorded but not streamed live; links to these videos will be provided on a separate page in our Carmen course site. Class sessions will include lecture, Q&A and active learning: e.g., worksheets and discussing strategies for solving homework problems.

### **Attendance**

Due to the large amount of material covered in this course, attending class is essential to your success. If you need to miss class then you should view the recorded lecture as soon as possible so that you don't fall behind. You do not need to inform me if you miss a class session. It might be tempting to skip the live sessions and rely on the recordings, but I really hope you won't do this. I believe the live sessions provide a more interactive, interesting, and engaging learning experience.

If you need to be absent for an extended period of time due to illness, or other reasons, please contact me as soon as possible to arrange for accommodation. For situations requiring specific, long-term or other accommodation you should seek support from appropriate university offices including [Student Advocacy](https://advocacy.osu.edu/), [Student Life Disability Services](https://slds.osu.edu/) and the [Office of Institutional Equity](https://equity.osu.edu/).

### **Missed deadlines**

Situations may arise when, due to sickness or emergency, you can't submit a homework assignment on time or have to miss an exam. It is your responsibility to contact me as early as possible when this happens. You are not required to provide medical documentation to support an absence related to COVID-19 or other illnesses. If you are dealing with a health problem, I won't ask you for any details and you are under no obligation to disclose anything about your situation. However, it is important that you inform me about missed exams or homework assignments beforehand, if at all possible. Be aware that if you miss a deadline for a legitimate reason but wait until the end of the semester to tell me about it, then there is usually very little we can do about it at that point.

### **Workload expectations**

CBE 5779 is a 3-credit-hour course. According to Ohio State policy, students should expect

approximately 3 hours per week of direct instruction (class sessions and Carmen activities, for example) in addition to 6 hours of outside work (readings, homework, and projects, for example) to earn an average grade (C) in this course. Note these are rough weekly averages - you'll spend more time some weeks and less time in others.

## Homework

Solving homework problems is probably the single most valuable activity for really learning the material and understanding the concepts. Late homework can still be completed and submitted within one week of the due date, but with a 50% penalty for being late. Failure to submit a homework will result in a score of 0 for that assignment. Discussing and solving problems with other students can be a great way to learn; however, unless instructed otherwise each student is expected to prepare and submit his/her own solution for each problem. Be sure to read the academic misconduct policy section of this syllabus.

## Exams and quizzes

Exams will be held in person. Detailed instructions and expectations will be given prior to each exam. Some homework assignments will also have a quiz that can be completed online in Carmen. Course policies on academic integrity are described in more detail below.

## Participation

During the semester there will be numerous opportunities to participate in various ways, including in-class experiments, surveys and discussions in Carmen, and responses to Top Hat questions both in and out of class. In some cases, we'll use these activities to collect some "real world" data to be analyzed using the methods discussed in class.

## Office hours

The teaching assistants and I will keep regularly scheduled office hours. We try to set times that are convenient for as many students as possible. Some office hours will be in person while others will be online (Zoom).

## Check your email and Carmen every day

I will assume that you check your osu.edu email and Carmen at least once per day. **You are responsible for all information posted on the Carmen discussion board or sent to you by email.** "I didn't know because I forgot to check." or "I never read my email" or "Following discussions in Carmen just isn't my thing" are not acceptable excuses.

## Regrade requests

Regrade requests will be considered within one week after the assignment in question is returned. Assignments resubmitted after one week will not be considered for correction. Regrade requests must include a written statement explaining what you wish to have reevaluated and must be emailed directly to Professor Rathman. Please use a descriptive subject line in your email (e.g., "Regrade request for Exam 1, CBE 5779"). **Do not discuss grading issues with the teaching assistants or expect them to change your score. Regrade requests sent to TAs will be automatically denied.**

## Course technology

### Required software

**JMP:** Our primary computational tool in this course will be JMP, a powerful software package for statistical data analysis and design of experiments. JMP is widely used in many companies and is quite easy to learn. You will NOT need to do any programming this semester - all of the computational techniques and routines we need are available in JMP. A tutorial video will be available to help get you up and running on JMP. In previous years I've found that students learn JMP very quickly. Calculators these days have many basic statistical functions built-in, so your calculator can be another useful tool. JMP is site-licensed by OSU and therefore available to you free of charge to install and use on your own computer. Get JMP here: [it.osu.edu/software](https://it.osu.edu/software) [\\_\(https://it.osu.edu/software\)](https://it.osu.edu/software)

**Top Hat:** The student-response platform is site-licensed by OSU and therefore free for students. Click [here](https://resourcecenter.odee.osu.edu/top-hat) [\\_\(https://resourcecenter.odee.osu.edu/top-hat\)](https://resourcecenter.odee.osu.edu/top-hat) for help getting started if you haven't used Top Hat before.

**Microsoft Office 365:** All Ohio State students are now eligible for free Microsoft Office 365 ProPlus through Microsoft's Student Advantage program. Full instructions for downloading and installation can be found at [go.osu.edu/office365help](http://go.osu.edu/office365help) [\\_\(http://go.osu.edu/office365help\)](http://go.osu.edu/office365help).

### Required equipment

To do the computational work and participate in online activities (e.g., class sessions or office hours on Zoom), you will need:

- computer: current Mac (OS X) or PC (Windows 7+ or higher) with high-speed internet connection
- webcam: built-in or external webcam, fully installed and tested
- microphone: built-in laptop or tablet mic or external microphone
- other: a mobile device (smartphone or tablet) or landline to use for BuckeyePass authentication

### Getting help

For help with your password, university email, Carmen, or any other technology issues, questions, or requests, contact the Ohio State IT Service Desk. Standard support hours are available at [ocio.osu.edu/help/hours](https://ocio.osu.edu/help/hours) [\\_\(https://ocio.osu.edu/help/hours\)](https://ocio.osu.edu/help/hours), and support for urgent issues is available 24/7.

- Self-Service and Chat support: [ocio.osu.edu/help](http://ocio.osu.edu/help) [\\_\(http://ocio.osu.edu/help\)](http://ocio.osu.edu/help)
- Phone: 614-688-4357(HELP)
- Email: [servicedesk@osu.edu](mailto:servicedesk@osu.edu) (<mailto:8help@osu.edu>)
- TDD: 614-688-8743
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## Accessibility of course technology

This course requires use of Carmen (Ohio State's learning management system) and other online communication and multimedia tools. If you need additional services to use these technologies, please review information available via the links below and also discuss with Professor Rathman.



- [CarmenCanvas accessibility](https://community.canvaslms.com/docs/DOC-2061) [\\_ \(https://community.canvaslms.com/docs/DOC-2061\)](https://community.canvaslms.com/docs/DOC-2061)
- [CarmenZoom accessibility](https://go.osu.edu/Bqd4) [\\_ \(https://go.osu.edu/Bqd4\)](https://go.osu.edu/Bqd4)

## Academic Integrity Policies and Procedures

Academic integrity is absolutely essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. The Ohio State University presumes that all students have read and understand the [University's Code of Student Conduct](http://studentaffairs.osu.edu/resource_csc.asp) ([http://studentaffairs.osu.edu/resource\\_csc.asp](http://studentaffairs.osu.edu/resource_csc.asp)) and that all students will complete all academic and scholarly assignments with fairness and honesty. Unawareness of this code is never considered an excuse for academic misconduct.

How can you avoid problems? Here are some good ideas: [Ten Suggestions for Preserving Academic Integrity](http://oaa.osu.edu/coamtensuggestions.html) (<http://oaa.osu.edu/coamtensuggestions.html>)

### ***What is academic misconduct?***

The Code of Student Conduct defines academic misconduct as "any activity that tends to compromise the academic integrity of the University, or subvert the educational process." While many people associate academic misconduct with "cheating," the term encompasses a wider scope of behaviors which include, but are not limited to, the following:

- Violation of course rules;
- Violation of program regulations;
- Knowingly providing or receiving information during a course exam or program assignment;
- Possession and/or use of unauthorized materials during a course exam or program assignment;
- Knowingly providing or using assistance in the laboratory, on field work, or on a course assignment, unless such assistance has been authorized specifically by the course instructor or, where appropriate, a project/research supervisor;
- Submission of work not performed in a course: This includes (but is not limited to) instances where a student fabricates and/or falsifies data or information for a laboratory experiment (i.e., a "dry lab") or other academic assignment. It also includes instances where a student submits data or information (such as a lab report or term paper) from one course to satisfy the requirements of another course, unless submission of such work is permitted by the instructor of the course or supervisor of the research for which the work is being submitted;
- Submitting plagiarized work for a course/program assignment;
- Falsification, fabrication, or dishonesty in conducting or reporting laboratory (research) results;
- Serving as or asking another student to serve as a substitute (a "ringer") while taking an exam;
- Alteration of grades in an effort to change earned credit or a grade;
- Alteration and/or unauthorized use of university forms or records.

### ***Homework solutions***

If you have access to homework solutions prepared by students who took this course in previous years, my suggestion is to throw them away - if you rely on these to prepare your own solution, that is plagiarism. The same obviously is true for students who manage to obtain a copy of the solutions manual for a textbook.

Collaboration on homework assignments is encouraged in this class - discussing problems with classmates can be a great way to learn. However, unless instructed otherwise, each student must submit their own individual solution. If you receive a significant amount of help from classmates, you must explicitly report this in your homework submission; e.g., *"I worked extensively on this assignment with Waylon Smithers and Lisa Simpson."* If you have any questions about how to properly collaborate on homework, please contact the professor for clarification.

### **Homework self-assessments**

For some homework assignments you will be required to grade your own work by comparing your submitted solution with the solution key. You will perform this self-assessment by completing a quiz in Carmen. You are expected to evaluate your solutions honestly and fairly. Intentionally giving yourself credit for work that was not actually done, or that is wrong, is cheating and will be considered academic misconduct.

### **Academic misconduct procedures**

A faculty member who believes a student has committed academic misconduct is obligated by University Rules to report the student to the [Committee on Academic Misconduct](http://oaa.osu.edu/coam.html) (<http://oaa.osu.edu/coam.html>) (COAM), a standing committee of the University Senate. Any student observing misconduct should report such to the course instructor. If COAM finds that the student has violated the code, then sanctions in the most serious cases could include a failing grade and suspension or dismissal from the University.

## Copyrighted materials

Many of the materials used in this course are subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. You are welcome to keep copies of these materials for your own use after the class ends; however, you may not disseminate these materials to others. Contact Professor Rathman if you wish to request permission to do so.

## Disability Services

The OSU [Office for Student Life Disability Services](https://slds.osu.edu/) (SLDS) collaborates with and empowers students who have disabilities in order to coordinate support services and programs that enable equal access to an education and university life. SLDS offers a wide variety of services to students with documented permanent or temporary disabilities. All types of disabilities are covered, including physical (mobility, dexterity, endurance, etc.), psychiatric (depression, anxiety, etc.), perceptual, cognitive (attention, distractibility, communication, etc), and behavioral. Students with disabilities that have been certified by SLDS will be appropriately accommodated. For example, with proper certification a student may be given additional time for exams.

**Important:** If you have not registered with the SLDS but are dealing with any form of disability, please contact SLDS immediately. The University has tremendous support services available and identifying those in need is the key first step. Once registered with SLDS, all information is held in strict confidentiality so do not assume that

your instructors already know about your situation. Talk to your instructor in each class to make arrangements for exams and other activities.

### Contacting SLDS:

<https://slds.osu.edu/> [\(https://slds.osu.edu/\)](https://slds.osu.edu/)

Address: 098 Baker Hall, 113 W. 12th Avenue

Telephone (614) 292-3307

Email: [slds@osu.edu](mailto:slds@osu.edu) [\(mailto:slds@osu.edu\)](mailto:slds@osu.edu)

## Mental health services

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may affect academic performance or reduce your ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of these conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting [ccs.osu.edu](https://ccs.osu.edu) [\(http://ccs.osu.edu/\)](http://ccs.osu.edu/) or calling [614-292-5766](tel:614-292-5766). CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on-call counselor when CCS is closed at [614-292-5766](tel:614-292-5766) and 24 hour emergency help is also available through the 24/7 National Suicide Prevention Hotline at 1-800-273-TALK or at [suicidepreventionlifeline.org](http://suicidepreventionlifeline.org) [\(http://suicidepreventionlifeline.org/\)](http://suicidepreventionlifeline.org/). The Ohio State Wellness app is also a great resource available at [go.osu.edu/wellnessapp](http://go.osu.edu/wellnessapp) [\(http://go.osu.edu/wellnessapp/\)](http://go.osu.edu/wellnessapp/).

## Emergency financial support resources

The **Student Advocacy Center** staff members are continuing to serve students during normal business hours and are accepting online appointments.

The **Student Emergency Fund** is available to students who may otherwise be at risk of dropping out of college due to an unexpected financial emergency. If you, or a student you know, are experiencing an unplanned expense, the Student Emergency Fund may be an option. Their office is accepting applications and may be able to award up to \$1,000 to eligible students. **Learn more and apply.** [\(https://advocacy.osu.edu/emergency-financial-assistance/\)](https://advocacy.osu.edu/emergency-financial-assistance/)

The **Student Wellness Center** offers financial coaching through the Scarlet and Gray Financial nationally recognized peer financial coaching program. Through the program, students will learn about financial goal setting, banking basics, budgeting, credit education, debt repayment education and saving and retirement education. **Learn more** [\(https://swc.osu.edu/services/financial-education/financial-coaching/\)](https://swc.osu.edu/services/financial-education/financial-coaching/).

## Food pantries

15% of OSU students self-report being food insecure. Please take advantage of resources available below for yourself or a friend in need. Please also contact these organizations if you are able donate or are interested in volunteering.

Buckeye Food Alliance: <https://www.buckeyefoodalliance.org/> [\(https://www.buckeyefoodalliance.org/\)](https://www.buckeyefoodalliance.org/)

HandsOn, Central Ohio (A network of pantries and emergency food delivery):

<https://handsoncentralohio.org/locate-services/food-security/> [\(https://handsoncentralohio.org/locate-services/food-security/\)](https://handsoncentralohio.org/locate-services/food-security/)

Mid Ohio Food Bank: <https://www.midohiofoodbank.org/get-help/get-food/> [\(https://www.midohiofoodbank.org/get-help/get-food/\)](https://www.midohiofoodbank.org/get-help/get-food/)

Kroger Community Pantry: <https://www.midohiofoodbank.org/get-help/kroger-pantry/> [\(https://www.midohiofoodbank.org/get-help/kroger-pantry/\)](https://www.midohiofoodbank.org/get-help/kroger-pantry/)

Food Pantries.org (This gives you a list of food banks to find one near you): <https://www.foodpantries.org/ci/oh-columbus> [\(https://www.foodpantries.org/ci/oh-columbus\)](https://www.foodpantries.org/ci/oh-columbus)

On campus: The OSU College of Education and Human Ecology's UGSS and ACES food pantry: PAES Building A100. You can pick up a grocery bag of food and/or a hygiene pack if you are in need of assistance. Office hours are Monday-Friday 8am-5pm, no appointment necessary.

You can schedule a special appointment by contacting Nick Fowler at [fowler.318@osu.edu](mailto:fowler.318@osu.edu) [\(mailto:fowler.318@osu.edu\)](mailto:fowler.318@osu.edu).

## Diversity and Title IX

Diversity is a fundamental part of our profession, valued by our university, college, department, professional organizations, and industry members that hire our students. Many academic studies highlight the importance of diversity in the engineering profession. This research supports the value of working with individuals whose viewpoints are formed by their unique perspective on the world. I strongly encourage you to participate in a diverse peer network of classmates - you can be great resources to each other in learning material in this course. And it's good practice for the real world, where solving problems benefits from considering many different ideas and perspectives.

The Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined as age,

color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.

<https://odi.osu.edu/> [\(https://odi.osu.edu/\)](https://odi.osu.edu/)

<https://engineering.osu.edu/diversity> [\\_ \(https://engineering.osu.edu/diversity\)](https://engineering.osu.edu/diversity)

**Title IX.** All students and employees at Ohio State have the right to work and learn in an environment free from harassment and discrimination based on sex or gender, and the university can arrange interim measures, provide support resources, and explain investigation options, including referral to confidential resources.





Violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at <http://titleix.osu.edu> or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at [titleix@osu.edu](mailto:titleix@osu.edu) [\\_ \(mailto:titleix@osu.edu\)](mailto:titleix@osu.edu)








**Reporting.** To report an issue with Title IX or any other form of discrimination (e.g., racial, gender, sexuality, religion), please reach out to me or the department chair Umit Ozkan ([ozkan.1@osu.edu](mailto:ozkan.1@osu.edu) [\\_ \(mailto:ozkan.1@osu.edu\)](mailto:ozkan.1@osu.edu)). We are committed to an equitable, supportive, and nurturing educational environment.

## Health and safety

All students, faculty and staff are required to comply with and stay up to date on all university safety and health guidance (<https://safeandhealthy.osu.edu> [\\_ \(https://safeandhealthy.osu.edu\)](https://safeandhealthy.osu.edu)). This includes wearing a face mask in any indoor space and maintaining a safe physical distance at all times. Non-compliance will be warned first and disciplinary actions will be taken for repeated offenses.

## Course Summary:

Date	Details	Due
Fri Sep 3, 2021	 <b>Quiz 1 (Videos 1 &amp; 2)</b> <a href="https://osu.instructure.com/courses/130828/assignments/3007439">https://osu.instructure.com/courses/130828/assignments/3007439</a>	due by 11:59pm
Mon Sep 6, 2021	 <b>Quiz 2 (Videos 3, 4 &amp; 5)</b> <a href="https://osu.instructure.com/courses/130828/assignments/3007436">https://osu.instructure.com/courses/130828/assignments/3007436</a>	due by 11:59pm
Fri Sep 10, 2021	 <b>Homework 1 Quiz</b> <a href="https://osu.instructure.com/courses/130828/assignments/3007432">https://osu.instructure.com/courses/130828/assignments/3007432</a>	due by 11:59pm
Mon Sep 13, 2021	 <b>Survey I - All about you</b> <a href="https://osu.instructure.com/courses/130828/assignments/3007431">https://osu.instructure.com/courses/130828/assignments/3007431</a>	due by 11:59pm

Date	Details	Due
Wed Sep 29, 2021	 Homework 2 Quiz ( <a href="https://osu.instructure.com/courses/130828/assignments/3007434">https://osu.instructure.com/courses/130828/assignments/3007434</a> )	due by 11:59pm
Fri Oct 22, 2021	 Homework 4 Quiz ( <a href="https://osu.instructure.com/courses/130828/assignments/3007435">https://osu.instructure.com/courses/130828/assignments/3007435</a> )	due by 11:59pm
Fri Oct 29, 2021	 Homework 5 Quiz ( <a href="https://osu.instructure.com/courses/130828/assignments/3007430">https://osu.instructure.com/courses/130828/assignments/3007430</a> )	due by 11:59pm
Wed Nov 3, 2021	 Survey about Exam 2 ( <a href="https://osu.instructure.com/courses/130828/assignments/3007438">https://osu.instructure.com/courses/130828/assignments/3007438</a> )	due by 11:59pm
Fri Nov 5, 2021	 Homework 6 Quiz ( <a href="https://osu.instructure.com/courses/130828/assignments/3007437">https://osu.instructure.com/courses/130828/assignments/3007437</a> )	due by 11:59pm
Fri Nov 12, 2021	 Homework 7 Quiz ( <a href="https://osu.instructure.com/courses/130828/assignments/3007440">https://osu.instructure.com/courses/130828/assignments/3007440</a> )	due by 11:59pm
Mon Nov 29, 2021	 Homework 8 Quiz ( <a href="https://osu.instructure.com/courses/130828/assignments/3007433">https://osu.instructure.com/courses/130828/assignments/3007433</a> )	due by 11:59pm