ECE 60000-001 Random Variables and Signals
CRN 17855
3 credit hours
Fall 2022

Lectures: T-Th 1:30pm-2:45pm
PHYS 203

Course website: www.ece.purdue.edu /~comerm/600

Instructional Modality: Lectures: In-person
Exams: In-person
Office hours: Hybrid

Professor: Prof. Mary Comer
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TA: Brad Fitzgerald
email: fitzge45@purdue.edu

Office Hours:

Prof. Comer
Tuesdays 3:00pm – 4:00pm, MSEE 332
Mondays 3:30pm-4:30pm, Zoom

Brad Fitzgerald
Tuesdays: 9am-12pm (In-person, MSEE 292)
Wednesdays: 2-5pm (In-person, MSEE 292)
Thursdays: 3-5pm (In-person, MSEE 292)
Fridays: 10am-12pm (Zoom)

Prof Comer's Zoom Link:

https://purdue-edu.zoom.us/j/98571205156?pwd=bUw5SWIvVWxOMlN5cGJBVjl4OWdlZz09

Brad's Zoom Link:

https://purdue-edu.zoom.us/j/96877011685?pwd=eVVRWnV4YVBNQWs1R1l2bTVqajlGZz09

Contact Information:

- Questions or comments can be emailed to either Prof Comer or Brad at the addresses given above. If you send an email to one of us, please copy the other one on the email, unless it is a private matter for one of us only. If you want to make sure your email is seen by us, it is highly recommended that you start your subject line with "ECE600:"

- We will make every attempt to respond to each email within 24 hours of receipt. If you do not receive a response within 48 hours, do not hesitate to resend your message.

Homework

There will be eleven homework assignments. Homework will be collected but not graded.

Homework assignments will be posted on the course website. You will turn your homework in on Gradescope. **Tentative** homework due dates are as follows:

Homework 1: Thursday, September 8
Homework 2: Thursday, September 15
Homework 3: Thursday, September 22
Homework 4: Monday, October 10
Homework 5: Thursday, October 20
Homework 6: Thursday, October 27
Homework 7: Thursday, November 3
Homework 8: Thursday, November 17
Homework 9: Thursday, December 1
Homework 10: Thursday, December 8

Each homework is due by 11:59 pm EST on its due date. Note that some of these due dates may be delayed if circumstances warrant. Late homeworks will not be accepted, except under special circumstances, at the discretion of the instructor.

Although homework is not graded, it may be used at the end of the semester to determine grade cutoffs for students who are between two grades.

Exams

Two midterms and a final exam will be given. Midterms will be given in class. The final exam will be given during finals week. Dates for the Midterm 2 and the final exam are to be determined.

Midterm 1: October 6, during class
Midterm 2: November 10, during class
Final Exam: December 14, 8:00am-10:00am, PHYS 223

Final Grade

Final grades will be computed using a weighted average of homework and exam scores. Weighting will be

35% Midterm 1
35% Midterm 2
40% Final exam

If you have an unavoidable conflict with a scheduled exam, please let Professor Comer know as soon as possible, and special arrangements can be made, depending on the circumstances. Please do not make travel arrangements for the end of the semester without first ensuring you will be on campus for the final exam.

The class is graded according to a curve. Final scores will be computed based on above weighting, then ranked. Grade cutoffs will then be determined, based in part on where gaps between scores fall. More details about assignment of final grades will be discussed in class.

Textbook

A. Papoulis and S.U. Pillai, *Probability, Random Variables, and Stochastic Processes*, Fourth Edition, McGraw-Hill, 2002.

While you are not required to purchase the textbook, some students find it helpful as a supplement to the lecture notes and homework problems. Homework problems taken from the textbook are completely written out in the homework assignments, so you will not need the textbook to find the homework problems, but there are many good examples and problems in the textbook that are not assigned as homework.

Topics covered

The following topics will be covered in this course

- Modeling random experiments: the axiomatic approach
  - Set theory
  - The sample space
  - The event space
  - The probability measure
    - The axioms of probability
- Conditional probability
- Independent events
- Random variables
  - One random variable
  - Two random variables
  - *n* random variables, for finite *n*
  - Convergence of random sequences
    - The Weak Law of Large Numbers
    - The Strong Law of Large Numbers
    - The Central Limit Theorem
  - Random processes

Academic Dishonesty

All students are expected to practice honest and ethical behavior in ECE 600. Cheating will not be tolerated. Any action that might give a student an unfair advantage on homework or exams will be considered cheating. Examples of cheating include, but are not limited to:

- sharing information during an exam,
- using forbidden material or devices during an exam,
- viewing and/or working on an exam before or after the official time allowed,
- requesting a regrade of work that has been altered,
- submitting work that is not your own.

Cases of academic dishonesty may be reported to the Dean of Students office, and may result in punishment. Possible punishments include, but are not limited to, a score of zero on work related to the cheating incident, a failing grade for the course, and, in severe cases, expulsion from the university.

Campus emergencies

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. In such an event, information will be posted on Brightspace or provided through e-mail.

Non-discrimination Policy

Purdue University is committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life. Link to Purdue's nondiscrimination policy statement.

Access for treatment for mental illness

Any student who is struggling with mental illness (depression, anxiety disorder, etc.) is welcome to see Prof Comer for help. She will attempt to assist any student who is having trouble finding adequate treatment.

Disclaimer: This syllabus is subject to change. Note that any changes to the information in this syllabus will be announced in class and on Brightspace.