

# IE 6200: Engineering Probability and Statistics

## Fall 2020

### Instructor Information

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**Office Hours:** Wednesdays 3:30-5:00 PM or by appointment

**NOTE:** Please ensure that you are using the correct email provided above when you contact the professor.

### Textbook and software packages

**Main Textbook:** Probability and Statistics for Engineers and Scientists (9th Edition) Authors: Ronald E. Walpole, Myers, Myers, YE ([Link](#))

#### Additional sources:

- Introduction to Probability and Statistics Using R, by G. Jay Kerns, 3rd Edition, 2018 ([Link](#))
- Discovering Statistics Using R, 1st Edition, by Andy Field, Jeremy Miles, Zoe Field ([Link](#))
- An Introduction to R, Notes on R: A Programming Environment for Data Analysis and Graphics. W. N. Venables, D.M. Smith and the R Development Core Team. Version 3.5.2 (2018-12-20) ([Link](#))
- There are also plenty of online resources for R. Here is a Twitter feed of posts by Rbloggers: <https://twitter.com/Rbloggers>

**Software:** Software R is required software for this course. R is a freely available language and environment for statistical computing and graphics. You must have access to a computer with R to be able to complete this course. Installing both R and RStudio on your own computer is the best option. RStudio is not strictly required, but several R concepts will be introduced with RStudio in mind, thus it is highly recommended. To complete the course without using RStudio would require additional effort to learn alternative techniques.

### Course Objectives

- Determine measures of central tendency and variation from a data set, and estimate population parameters.
- Identify the distribution of a random variable (discrete or continuous) of interest in an experiment, and calculate the probability that the random variable can take on certain values.
- Construct confidence intervals and conduct hypothesis testing for the population mean, variance, or proportion (one sample and two samples).
- Interpret modeling results in the context of real-world problems.

- Interact with data using R and RStudio.

## Grading

Your grades are posted on CANVAS – you can check your running grade at any time, so there are no surprises. In fact, you should audit the correct entry of your grades. No grade corrections will be made after the last week of the semester. Final Grades and Course Letter Grades are not curved and are assigned as follows:

Components	Percentage	Description
Assignments	15%	Assignments will be released after each session
Presentation	10%	Presentation topics will be assigned to students every week
Labs	20%	In-depth lessons are followed by Labs to cover the theory and application of R
Exams	35%	Exams including: <i>MidtermExam</i> and <i>Final Exam</i>
Case Study	20%	The Case Study requirements and deliverable will be posted on CANVAS

Final grades will be assigned according to the following scale:

A	93 – 100	C+	77 – 79
A–	90 – 92	C	73 – 76
B+	87 – 89	C–	70 – 72
B	83 – 86	F	Below 70
B–	80 – 82		

- **Assignments**

- You will be asked to write up and hand in homework problems every week.
- Follow the attached Guidelines for Written Assignments.

- **Labs**

- A lab will be given to students at the end of each chapter.

- **Exams**

- Midterm Exam will be given after covering the first 6 chapters.
- Both exams are equally weighted.

- **Presentation**

- Students will be assigned to different groups.
- A presentation topic will get assigned to each group which they have to present in class.

## Guidelines for Exams

- All exams will be closed book, closed notes, open formula sheet and tables.

- Your personally-created formula sheet is intended to eliminate the need to memorize formulas, but may contain anything.
- The “personal formulas sheets” will be collected at the end of each exam/quiz.
- Exam questions will be generally drawn from textbook’s questions, homework problems or examples from the lectures.
- There is no “extra credit” or forgiven grades – you are responsible for all of your work done (or left undone).
- The last but not the least: **SHOW YOUR WORK** : This means showing your steps, not just copying the question from the assignment, and then the answer from the back of the book. Show everything in between the question and the answer. Use complete English sentences if the meaning of the mathematical sentences is not otherwise clear. For your work to be complete, you need to **explain your reasoning** and make your computations clear

### Due Date Policy

All assignments are due on the due date and cannot be handed in late. No make-up assignments and exams will be given. Please note that all due dates and times are specified according to the Eastern Time Zone

### Email subject line

Please use the following format for the subject line of your email to avoid miss communication. This subject line will reduce the confusion.

**<IE6200 Sec 09 - Subject Line>**

### Class Policies

- **Laptops:** You may need to use your laptop during the class upon the instructor’s notes.
- **Phones/tablets/smart watches:** Electronic devices **may not be used during the class**. If you have class work, social networking or sports-score browsing, that is more important to do, then please skip class. *Life is full of such choices*.
- **Attendance:** Students are expected to attend all class sessions and are responsible for all materials presented in class. While attendance is not mandatory, past experience has shown students who attend regularly and interact with instructors/classmates tend to be better overall.

### Academic Integrity

A commitment to the principles of academic integrity is essential to the mission of Northeastern University. The promotion of independent and original scholarship ensures that students derive the most from their educational experience and their pursuit of knowledge. Academic dishonesty violates the most fundamental values of an intellectual community and undermines the achievements of the entire University.

As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, examinations of whatever kind, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Students are responsible for learning the conventions of documentation and acknowledgment of sources in their fields. Northeastern University expects students to complete all examinations, tests, papers, creative projects, and assignments of any kind according to the highest ethical standards, as set forth either explicitly or implicitly in this Code or by the direction of instructors. Go to <http://www.northeastern.edu/osccr/academic-integrity-policy/> to access the full academic integrity policy.

### **Northeastern University Copyright Statement**

This course material is copyrighted, and all rights are reserved by Northeastern University. No part of this course material may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language or computer language, in any form or by any means, electronic, mechanical, magnetic, optical, chemical, manual, or otherwise, with the express prior written permission of the University.

### **Recording of Classes**

Classes will be recorded to enable all students to review material covered in synchronous classes. Please contact me if you have any concerns.

### **Student Accommodations**

Northeastern University and the Disability Resource Center (DRC) are committed to providing disability services that enable students who qualify under Section 504 of the Rehabilitation Act and the Americans with Disabilities Act Amendments Act (ADAAA) to participate fully in the activities of the university. To receive accommodations through the DRC, students must provide appropriate documentation that demonstrates a current substantially limiting disability. For more information, visit <http://www.northeastern.edu/drc/getting-started-with-the-drc/>

### **Diversity and Inclusion**

Northeastern University is committed to equal opportunity, affirmative action, diversity and social justice while building a climate of inclusion on and beyond campus. In the classroom, members of the University community work to cultivate an inclusive environment that denounces discrimination through innovation, collaboration and an awareness of global perspectives on social justice. It is my intention that students from all backgrounds and perspectives will be well served by this course, and that the diversity that students bring to this class will be viewed as an asset. I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, socioeconomic background, family education level, ability – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class. Your suggestions are encouraged and appreciated. Please visit <http://www.northeastern.edu/oidi/> for complete information on Diversity and Inclusion.

## title IX

Title IX of the Education Amendments of 1972 protects individuals from sex or gender-based discrimination, including discrimination based on gender-identity, in educational programs and activities that receive federal financial assistance. Northeastern's Title IX Policy prohibits Prohibited Offenses, which are defined as sexual harassment, sexual assault, relationship or domestic violence, and stalking. The Title IX Policy applies to the entire community, including male, female, transgender students, faculty and staff. In case of an emergency, please call 911. Please Visit [www.northeastern.edu/titleix](http://www.northeastern.edu/titleix) for a complete list of reporting options and resources both on- and off-campus.

## Other Information

- Syllabus may be modified as deemed appropriate. All changes will be announced via CANVAS.
- **If you are teaching in the classroom**, visit the [Hybrid NUflex classroom technology page](#) and attend a 30-minute virtual demonstration, conducted by ITS staff in an outfitted classroom starting Wednesday August 26. You can schedule a time to watch a demonstration [here](#). Our teams are working hard to update the classroom technology and are on target to complete it by the start of the fall term.
- **COVID-19 Testing Requirements for Boston faculty:** Faculty members will need to receive a negative test result in the seven-day period prior to their return to the classroom—a test they can obtain on the Boston campus or elsewhere. Information about how to obtain a test on campus can be found [here](#). Faculty will then be tested twice a week, or whenever they are on campus if their visits are less frequent than twice a week. Anyone who comes to campus periodically, i.e., less than two days a week, will be required to have a test each day they come to campus. This includes brief one-time access. For example, if you are picking things up from your office or locker you would need to be tested. Please schedule your test with the [COVID-19 Test Scheduler](#). We may require more frequent testing as the semester progresses.
- Any student who is unable, because of his religious beliefs, to complete the coursework or to participate in any examination, study, or work requirement on a particular day shall be excused from any such examination or study or work requirement, and shall be provided with an opportunity to make up such examination, study, or work requirement which they may have missed because of such absence on any particular day; provided, however, that such makeup examination or work shall not create an unreasonable burden upon such school.
- Faculty evaluations will be administered at the end of the semester.

*"If you don't go after what you want, you'll never have it. If you don't ask, the answer is always no. If you don't step forward, you're always in the same place." –Nora Roberts*