

Statistics 3470
Introduction to Probability and Statistics for Engineers
Autumn 2017 Syllabus

Class Schedule: MoWeFr: 12:40 - 1:35 pm 209 W. 18th Avenue (EA) 160

Instructor: Dr. Judit Bach **Office:** Cockins Hall (CH) 212C

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Office Hours: Mo: 1:45 – 2:45 pm, We: 11:15 am - 12:15 pm, Fr: 9:15 – 10:15 pm, and by appointment

Course Description: The course provides an introduction to probability and statistics targeted toward students in several engineering disciplines. Topics covered include probability, discrete and continuous random variables, probability distributions, expected values, sampling distributions, point estimation, confidence intervals, hypothesis testing and simple linear regression models. A more detailed list of topics can be found in the tentative schedule below. **Students are responsible for all material covered in class, in the assigned readings and in homework problems, and expected to attend all classes.**

Assumed Background Knowledge and Prerequisites

Calculus, integration, exponential function, finite and infinite sums, union and intersection of sets. Prerequisite courses are Math 1152, 1161.xx, 1172, 1181H, 153, or 254.

Enrollment

ADD and SECTION CHANGES will be processed (if space is available) starting at 7:00 AM on Monday, August 28th on a first-come, first-served basis in room 408A Cockins Hall. Cockins Hall opens by 6am. The instructor does not sign any add or section change forms; these must be taken to Jean Scott in 408A Cockins Hall for a signature.

Textbook

Probability and Statistics for Engineering and the Sciences (**9th edition**), by Jay Devore **with WebAssign** access. **Alternatively**, the **ebook and WebAssign access** can be purchased through the OSU WebAssign access. A paper copy of the book is also available on reserve in the Science and Engineering Library as well as at the Mathematics & Statistics Learning Center (MSLC).

Format of Instruction

Lecture, 3 contact hours per week.

College of Arts and Sciences GEC Statement:

Statistics 3470 satisfies the General Education (GE) requirement in Data Analysis.

Goals: Students develop skills in drawing conclusions and critically evaluating results based on data.

Expected Learning Outcomes: Students understand basic concepts of statistics and probability, comprehend methods needed to analyze and critically evaluate statistical arguments, and recognize the importance of statistical ideas.

Methods: The focus of this course includes understanding of theoretical concepts, as well as problem solving applications of probability models and statistical inference. Examples include sampling, computing confidence intervals, hypothesis testing, and statistical modeling using regression.

Homework: There are 11 **online homework assignments** tentatively scheduled throughout the semester. They are specified and **need to be turned in online through Webassign**. There are turn-in (for grade) homework sets as well as suggested homework sets for additional practice. The due dates are listed in the tentative daily schedule below and are also specified on Webassign. Instead of dropping the lowest homework score, the following better option will be given: An overall 80% performance on the homework assignments will count as 100% performance for the weight of the homework portion of the final grade. (accordingly a 40% performance will count as a 50% for the homework portion etc.) **It is highly recommended that you reserve a notebook to record how you solved the homework problems!** It will be helpful when it is time to study for an exam. Solutions for homework assignments will be posted on Carmen after their due dates.

Exams

There are two exams during the semester and a final exam. The exams are **closed book exams** with about 4-7 essay questions (about 6-12 essay questions for the final exam) **similar** in style and difficulty level to the suggested and turn-in homework problem versions in the **book** and to the lecture examples. For each exam, you will be permitted one sheet of 8.5" x 11" **handwritten paper with formulas** you find helpful. (both sides of the paper may be used). The final exam is on Tuesday, December 13, 2016 from 10:00-11:45am. For the final exam, two sheets of 8.5" x 11" paper (same rules as above) may be brought. The final exam will be cumulative, with a slight emphasis on those topics covered after the second midterm. A calculator should also be brought to all exams (no cell phone calculators or PDAs).

Full credit for each exam problem can only be earned through showing your justification for or work on each problem. Answers without work will **not** receive full credit.

Grading

The final course grade will be based on:

Homework	20%
Exam 1 (Monday October 2 nd)	25%
Exam 2 (Wednesday November 15 th)	25%
Final Exam (Thursday December 14 th)	30%
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	100%

Percentage Grading Scale

93% A 90% A- 87% B+ 83% B 80% B- 77% C+ 73% C 70% C- 67% D+ 60% D

Study Rooms and Help Hours - MSLC (Mathematics and Statistics Learning Center)

Our TAs hold office hours in the Mathematics and Statistics Learning Center in Cockins Hall room 134 starting the second week of classes. More details are on the MSLC webpage at <http://mslc.osu.edu>

Communication Devices

Cell phones, PDAs and other communication devices must be either turned off or put on vibrate during class. Please refrain from texting during class as a courtesy to those sitting around you. All electronic devices other than a calculator must be shut off and put away during examinations.

E-mail Correspondence

In order to protect your privacy, all course e-mail correspondence must be done through a valid OSU name.nn account. If you have not activated your OSU email account, you can activate your account at <https://my.osu.edu/>. **All e-mail correspondence regarding the class must have "Stat 3470" in the subject field.**

Drop Date

The last day to drop the course without a 'W' appearing on your record is Friday, September 15, 2016.
The last day to drop the course without petitioning is Friday, October 27, 2016

Receiving an 'I' for the Course

You cannot receive an incomplete for the course unless 65% of the work in the course has been completed. Extenuating circumstances will be handled on a case-by-case basis.

Advice

1. A tentative lecture schedule is given in this syllabus. Please, give a first reading to scheduled text sections **before** the lecture that covers that material.
2. The course moves rather quickly. If you are having difficulty, please **get help** as soon as possible. Homework assignments can be difficult if you wait until the last minute before trying any problems.
3. It is important that you provide sufficient details in writing up solutions to the problems for grading. It is also important that your solutions be **presented neatly in a clear, easy to read and follow** format. No credit will be given for work that is too sloppy or difficult to read.
4. The material becomes more complex as it moves along. The first exam material may feel easy compared to the second exam. **Keep working along** as the semester progresses.
5. Having the opportunity to use formula sheets on the exams also means that you are not given formulas and it is **your responsibility** to create your formula sheet and gather the necessary formulas you may need on an exam. Collecting important formulas along the way as we learn them is a good organized way to prepare your formulas sheet.
6. If you have a re-grade request on an exam, the request needs to be **written** on a sheet of paper attached to your original paper, within one week of the date the paper was first returned to class. If you are absent the day a graded paper is first returned to the class, it is your responsibility to come to me to get it in less than a week if you want to have a re-grade option available to you.

Academic Misconduct

Please help maintain an academic environment of mutual respect and fair treatment. You are expected to produce original and independent work on the exams. Although students are often encouraged to work or study together; even on homework assignments, all students must finalize and submit their own work individually.

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term 'academic misconduct' includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct <http://studentlife.osu.edu/csc/>.

Sexual Misconduct/Relationship Violence Statement

Title IX makes it clear that 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.

Addressing Issues of Differing Abilities

Students with disabilities that have been certified by the Student Life Disability Services (SLDS) will be appropriately accommodated and should inform the instructor as soon as possible of their needs. SLDS is located in 098 Baker Hall, 113 W. 12th Avenue; telephone: 614-292-3307, Fax: 61-292-190, VRS 614-292-0901; <http://www.ods.ohio-state.edu/>.

Diversity Statement

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.

Note

This syllabus and the calendar listed below **ARE SUBJECT TO CHANGE**.

Tentative Class Schedule and Reading assignments

Date	Topic	Section
W-Aug 22	Course Introduction; Sample Spaces and Events	2.1
F-Aug 24	Axioms and Properties of Probability	2.2
M-Aug 28	Counting Techniques	2.3
W-Aug 30	Conditional Probability	2.4
F-Sep 1	Bayes' Theorem and Independence	2.5 Hw 1 due (2.1-3)
M-Sep 4	No class---Labor Day	
W-Sep 6	Random Variables; Discrete Distributions	3.1, 3.2
F-Sep 8	Discrete Distributions; pmf, cdf, Expected Values;	3.2, 3.3 Hw 2 due (2.4-5)
M-Sep 11	Expected Values; Binomial Distribution	3.3, 3.4
W-Sep 13	Binomial Distribution; Poisson Distribution	3.4, 3.6 Hw 3 due (3.1-3)
F-Sep 15	Probability Density Functions; cdf, Expected Values & Variances	4.1, 4.2
M-Sep 18	Probability Density Functions; cdf, Expected Values & Variances	4.1, 4.2
W-Sep 20	Normal (Gaussian) distribution	4.3 Hw 4 due (3.4,3.6,4.1)
F-Sep 22	Normal (Gaussian) distribution, Exponential and Gamma Distrs.	4.3, 4.4
M-Sep 25	Exponential and Gamma Distributions	4.4
W-Sep 27	Jointly Distributed Random Variables	5.1 Hw 5 due (4.2-4)
F-Sep 29	Jointly Distributed Random Variables, Expected Values	5.1, 5.2
M-Oct 2	EXAM 1	Ch. 2-4
W-Oct 4	Expected Values, Covariance & Correlation, Sample Mean Distr.	5.2, 5.3
F-Oct 6	Distribution of the Sample Mean; Central Limit Theorem	5.3, 5.4
M-Oct 9	Central Limit Theorem, Distribution of a Linear Combination	5.4, 5.5
W-Oct 11	General Concepts of Point Estimation	6.1 Hw 6 due (5.1-4)
F-Oct 13	No Class—Autumn Break	
M-Oct 16	General Concepts of Point Estimation	6.1
W-Oct 18	Methods of Point Estimation	6.2
F-Oct 20	Methods of Point Estimation	6.2
M-Oct 23	Basic Properties of Confidence Intervals	7.1 Hw 7 due (6.1-2)
W-Oct 25	Confidence Intervals for a Population Mean	7.2
F-Oct 27	Confidence Intervals for a Population Mean and Proportion	7.2, 7.3
M-Oct 30	Confidence Intervals for a Population Mean and Proportion	7.2, 7.3
W-Nov 1	Hypothesis and Test Procedures	8.1 Hw 8 due (7.1-3)
F-Nov 3	Tests About a Population Mean	8.2
M-Nov 6	The One Sample t Test	8.3
W-Nov 8	Tests About a Population Proportion	8.4 Hw 9 due (8.1-2)
F-Nov 10	No Class—Veteran's Day	
M-Nov 13	Goodness-of-Fit Tests	14.1 Hw 10 due (8.3-4)
W-Nov 15	EXAM 2	Ch. 5-8
F-Nov 17	Simple Linear Regression Model, Estimating Model Parameters	12.1, 12.2
M-Nov 20	Estimating Model Parameters; Inferences About the Slope	12.2, 12.3
W-Nov 22	No Class—Thanksgiving	
F-Nov 24	No Class—Thanksgiving	
M-Nov 27	Inferences About the Slope; Inferences About Estimates	12.3, 12.4
W-Nov 29	Inferences About Estimates	12.4
F-Dec 1	Assessing Model Adequacy	13.1 Hw 11 due (14.1,12.1-4)
M-Dec 4	Multiple Regression	13.4
W-Dec 6	Multiple Regression	13.4
Th-Dec 14	Thursday 2:00-3:45 pm Final Exam	Cumulative