

STAT 3450: Basic Statistics for Engineers

Fall 2016

Instructor: Justin Strait

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Office Hours: TBD in Cockins Hall (CH) 134

Class Time/Location: TuTh 11:30-12:25 in Eighteenth Avenue (EA) 170

Course Website: Canvas (access through <https://carmen.osu.edu/>)

Course Description: STAT 3450 provides an introduction to probability and statistics targeted toward students studying mechanical engineering. Topics covered include probability, random variables, the normal and binomial distributions, confidence intervals for means, hypothesis tests for means, multi-factor experiments and experiments with blocking.

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. STAT 3450 helps students achieve these ELOs by teaching students the basic concepts and techniques of statistics, including populations and samples, probability, expectations and variances, the binomial and Normal distribution, the Central Limit Theorem, confidence intervals and hypothesis testing, type I and II errors and power, experiments and numerical summaries and graphical summaries of data.

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

Textbook: *Principles of Statistics for Engineers and Scientists* by William Navidi

- The book is available on reserve in the 18th Avenue Library.

Homework Assignments

There will be approximately 9 homework assignments throughout the semester. Assignments along with due dates will be announced in class and posted on Canvas.

Important things to know about homework:

- You are encouraged to discuss problems with each other in general terms, but you must write your own homework solutions.
- Homework must be submitted in hardcopy (NO e-mailed copies).
- You must show your work for all homework problems; do NOT just write the final answer.
- **Late submissions will NOT be accepted.** I understand that illness and other unplanned emergencies often come up during the semester, and so I will drop your lowest homework score.
- I will select a subset of assigned problems to grade and check the others to make sure you attempted a solution. Solutions to all problems will be posted on Canvas, so it is your responsibility to check the solutions and make sure you understand them for all problems.
- Homework will be collected at the **start of class** on the due date. Once class starts, homework will not be accepted.

Exams

Two midterm exams will be given in class: the first is on **Thursday, September 29** and the second is on **Thursday, November 3**. The final exam is scheduled for **Monday, December 12** from 2:00-3:45 pm.

Important things to know about exams:

- For each midterm, you may bring one 8.5" x 11" sheet of paper (both sides) with whatever handwritten facts, formulas or explanations you find helpful; for the final exam, you may bring two 8.5" x 11" sheets of paper.
- The final exam will be cumulative, with a slight emphasis on those topics covered after the second midterm.
- A basic calculator will be necessary for all exams (no cell phone calculators or PDAs).
- Cellphones must be silenced during class and are not allowed to be on the desk or otherwise accessible during exams.
- **No make-up exams will be given unless extenuating circumstances exist.**

Grading: Your final grade will be based on the following weighting structure:

Component	Percentage
Homework	20%
Exam 1	25%
Exam 2	25%
Final Exam	30%

Final course grades will be assigned based on the standard grading scale:

A: 93-100; A-: 90-92; B+: 87-89; B: 83-86; B-: 80-82;
C+: 77-79; C: 73-76; C-: 70-72; D: 60-69; F: below 60

This grading scale is subject to adjustment if it appears necessary due to overall class performance. These adjustments will only raise a student's grade, not lower it.

Tutor Room and Help Hours

Our TAs hold office hours every day of the week in the Mathematics and Statistics Learning Center in Cockins Hall 134 starting on Monday, August 29. The hours during which Stat TAs will be available is posted at <http://mslc.osu.edu/courses/stat/3450>.

Academic Misconduct

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/>.

Special Accommodations

Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue, telephone 292-3307, TDD 292-0901 (or see <http://www.ods.ohio-state.edu/>).

Tentative Course Schedule

Date	Section(s) of Book	Topic
Aug 23	1.1-1.3	Sampling, numerical, and graphical summaries
Aug 25	3.1	Probability rules, equally likely outcomes
Aug 30	3.2	Conditional probability, independence
Sep 1	3.3	Discrete RVs, probability mass functions
Sep 6	3.3	Expected values, variances
Sep 8	3.3	Continuous RVs, density and distribution functions
Sep 13	3.3	Means and variances of continuous RVs
Sep 15	3.4	Random sample, sample mean, propagation of error
Sep 20	4.1	Binomial distribution
Sep 22	4.3	Normal distribution
Sep 27	4.3, 4.7	Linear comb. of normal RVs, normal probability plots
Sep 29	EXAM 1	In class
Oct 4	4.8	Central Limit Theorem
Oct 6	5.1-5.2	CI for mean (known variance)
Oct 11	5.2	Sample size calculation
Oct 13	NO CLASS	Fall Break
Oct 18	5.4	t-intervals for mean (unknown variance)
Oct 20	6.1	Hypothesis tests for population means
Oct 25	6.2, 6.6	Significance levels, p-values
Oct 27	6.4	t-tests
Nov 1	6.7	Power
Nov 3	EXAM 2	In class
Nov 8	7.1, 7.3	Two sample t-tests
Nov 10	9.1	Experiments, randomization, F-tests, ANOVA
Nov 15	9.3	Two factor experiments, balanced vs. unbalanced
Nov 17	9.4	Blocking
Nov 22	9.5	2 ^p factorial experiments
Nov 24	NO CLASS	Thanksgiving
Nov 29	Notes	Fractional factorial designs
Dec 1	Notes	Fractional factorial designs
Dec 6		Review for Final Exam
Dec 12	FINAL EXAM	2:00 pm-3:45 pm

I reserve the right to change items on this syllabus – any changes as well as official due dates and exam dates will be announced in class!