STAT 3450: Basic Statistics for Engineers
Autumn 2017

Instructor: Michelle Duda
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Office Hours: Tuesday and Thursday 12:30-1:30 PM in Cockins Hall (CH) 212B
Class Time/Location: Tu/Th 11:30-12:25 PM 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 11 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.
- Since solutions will be posted on Carmen shortly after the deadline, **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. Homework is due by the **beginning of lecture** on the due date.
- 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 Carmen, so it is your responsibility to check the answer key and make sure you understand the correct solution to all problems.

Exams
Two midterm exams will be given in class: the first is on **Thursday, September 28** and the second is on **Tuesday, November 7**. The final exam is scheduled for **Monday, December 11** 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 28. 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 (including mental health, chronic or temporary medical conditions) that have been certified by the Office of Student Life Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office of Student Life Disability Services is located in 098 Baker Hall, 113 W. 12th Avenue; telephone 614- 292-3307, slds@osu.edu; slds.osu.edu.

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.eduor by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at titleix@osu.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.

Tentative Course Schedule

Date	Section(s) of Book	Topic
Aug 22	1.1-1.3	Sampling, numerical, and graphical summaries
Aug 24	3.1	Probability rules, equally likely outcomes
Aug 29	3.2	Conditional probability, independence
Aug 31	3.3	Discrete RVs, probability mass functions
Sept 5	3.3	Expected values, variances
Sept 7	3.3	Continuous RVs, density and distribution functions
Sept 12	3.3	Means and variances of continuous RVs
Sept 14	3.4	Random sample, sample mean, propagation of error
Sept 19	4.1	Binomial distribution
Sept 21	4.3	Normal distribution
Sept 26	4.3, 4.7	Linear comb. of normal RVs, normal probability plots
Sept 28	**EXAM 1**	**In class**
Oct 3	4.8	Central Limit Theorem
Oct 5	5.1-5.2	CI for mean (known variance)
Oct 10	5.2	Sample size calculation
Oct 12	**NO CLASS**	**Fall Break (Oct 12-15)**
Oct 17	5.4	t-intervals for mean (unknown variance)
Oct 19	6.1	Hypothesis tests for population means
Oct 24	6.2, 6.6	Significance levels, p-values
Oct 26	6.4	t-tests
Oct 31	6.7	Power
Nov 2	7.1, 7.3	Two sample tests
Nov 7	**EXAM 2**	**In class**
Nov 9	**NO CLASS**	**NO CLASS**
Nov 14	9.1	Experiments, randomization, F-tests, ANOVA
Nov 16	9.3	Two factor experiments, balanced vs. unbalanced
Nov 21	9.4	Blocking
Nov 23	**NO CLASS**	**Thanksgiving**
Nov 28	9.5	2^p factorial experiments
Nov 30	Notes	Fractional factorial designs
Dec 5	Review	Review for Final Exam
Dec 11	**FINAL**	**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!