



STA 3032

Fall 2017

Engineering Statistics

Section 4437 MWF 3rd period 9:35-10:25 WEIL 270

Instructor/TA:

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Grading:	Exams	Quizzes (odd modules)	Quizzes (even modules)

Course Website: e-Learning

Course Notes: http://www.stat.ufl.edu/~athienit/IntroStat/class_notes.pdf

Lecture videos are under development and may be provided but are only meant, as a review and are not meant, replace the live in class lectures.

Course Communication:

- Piazza Q&A discussion forum. (Link available “Pages”.)
- Office hours (posted under “Pages”).
- E-mail for questions regarding course policies. (Ensure that 3032 is in the subject line. Failure to do so may result in a non-response. If you are emailing about, something that requires access to your record please include your LTFID)

All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussion and chats. Please refer to expected class netiquette.

The instructor reserves the right, to update any parts of this syllabus as necessary. Students will promptly be notified of any changes.

Required Text(s): *Statistics for Engineers and Scientists*, 4th Edition (Companion site)

Author(s): William Navidi; **ISBN-13:** 978-0073401331

Course Description: A survey of the basic concepts in probability and statistics with engineering applications. Topics include probability, discrete and continuous random variables, confidence interval estimation, hypothesis testing, correlation, regression, and analysis of variance.

Prerequisite(s): MAC 2311. The use of integrals will be used greatly throughout, the class.

Credit Hours: 3

Software: You will need a computer for the homework assignments and practice. There will not be any lessons on how to use software, but questions are welcomed especially in office hours. The main software used in class will be R. You will be required to complete a short introductory course on R and submit your certificate. You can use other software if you wish as long as you yield similar results; Minitab is a user-friendly alternative, SPSS, SAS, JMP, Matlab, etc. For more help, visit <http://www.stat.ufl.edu/athienit/software.html>

Purpose of Course: To comprehend basic concepts of probability and statistics, and to make meaningful inferences on relevant datasets.

Course Goals and Objectives:

At the completion of this course, students will be able to:

1. Access, manipulate and analyse data using statistical software.
2. Produce appropriate graphs and descriptive statistics for one and two variables, for both categorical and continuous data.
3. Interpret graphs and descriptive statistics for one and two variables.
4. Know and apply the basic probability rules, the concepts of expected value and variance for discrete and continuous variables.
5. Know and apply the Central Limit Theorem, which is crucial for inference.
6. Understand confidence intervals and hypothesis tests.
7. Carry out and interpret one-sample and two-sample analyses for means and proportions.
8. Carry out and interpret statistical modeling using multiple regression and analysis of variance.
9. Know and apply basic quality control procedures.

Course Policies

Assignments

- Students are expected to work independently, unless otherwise specified in writing. **Offering and accepting** solutions from others is an **act of plagiarism**, which is a serious offense and **all involved parties will be penalized according to the Academic Honesty Policy**. Discussion amongst students is encouraged, but when in doubt, direct your questions to the instructor or teaching assistant.
- **No late assignments will be accepted under any circumstances.**
- Students are expected to show and explain how the answers were obtained. When asked to submit textbook problems/exercises, simply copying the solution manual without performing, showing, and explaining your work is not sufficient for a grade and may be considered an act of plagiarism. (We have software that tests for plagiarism).
- **All electronically submitted work must be in pdf format** or a standard file format such as doc, jpeg, etc.

Homework/Quizzes

There will be homework assigned on a regular basis as *suggested homework* (not to be turned in) containing data analysis problems and/or book exercises. Suggested homework will be posted under “Assignments”. A *timed* quiz assignment (based on the suggested homework) will be administered either as

- In-class (closed notes).
- Online (Only 1 attempt. It is highly encouraged to use a **reliable device** with a **reliable wired ethernet internet connection**. As soon as work is submitted a grade of 0 will show up as a placeholder until the assignment is graded.)

but which format will not be announced prior. For the best preparation students are encouraged to complete the full suggested homework set by the deadline posted on the suggested homework, indicating when you should be ready to take the quiz.

Solutions to suggested homework will not be posted, but solutions to the quizzes will be.

Exams

With every completion of 2 modules, exams will be administered that will comprise of multiple choice questions and possibly open-ended questions. Exams will emphasise more on conceptual questions while HW/Quizzes will be more computational (not always).

Important dates:

Exam #1..... September 27, 2017
Exam #2 October 25, 2017
Exam #3..... December 13, 2017 at 3:00 PM

Allowed material:

- Instructor provided formula sheet. (Provided ahead of time.)
- Scientific/Graphing Calculator.

Grading

Change of grade: Grades will be changed only when an error has been made by the instructor.

Grade distribution:

Exams 1, 2 and 3 75% (12.5% lowest, 27.5% second best 30% highest)
Homework/Quizzes 25% (lowest score will be dropped)

Letter grade distribution:

B+	84 to < 87	A	91 to 100	A-	87 to < 91
c+	74 to < 77	B	80 to < 84	B-	77 to < 80
D+	64 to < 67	C	70 to < 74	C-	67 to < 70
E	< 55	D	60 to < 64	D-	55 to < 60

Final grades shown on Canvas are not accurate because they do not account for the conditional weighing of exams and quizzes.

Final grade can be calculated with exams as a % (out of 100) and quizzes out of 10 points

$$0.125(\text{worst.}) + 0.275(\text{second best}) + 0.35(\text{best.}) + 0.25(100) \frac{\text{exams}}{\text{quizzes}}$$

There will be *no rounding up* of scores. Students who actively participate in the discussion forum will be awarded **extra credit** (to the discretion of the instructor). To view the result of the letter grades to your GPA please visit

<http://www.registrar.ufl.edu/catalogO11/policies/regulationgrades.html>

Make-up policy: Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: <https://catalog.ufl.edu/ugrad/currei>

(Additional) Make-up policy requirements:

- Every effort should be made to complete the assignment/exam during the open period. Only extreme situations will warrant a makeup. Contact the instructor prior to the exam - as soon as you realize you will be unable to take the assignment/exam at the scheduled time. Each case will be reviewed individually. Valid and detailed documentation is a prerequisite for scheduling a makeup under such extenuating circumstances.
- If you have an emergency on the day of the assignment/exam, the instructor must be contacted by midnight of the day of the assignment/exam.
- Additional Note: Being on vacation or booking a trip prior to the completion of the semester is not a valid reason to request a makeup. Please reference the Academic Calendar.

Incomplete: An incomplete grade may be assigned at the discretion of the instructor as an interim grade for a course in which the student has completed a major portion of the course with a passing grade, been unable to complete course requirements before the end of the term because of extenuating circumstances, and obtained agreement from the instructor and arranged for resolution of the incomplete grade in the next term. Instructors are not required to assign incomplete grades. For complete details please visit the registrar's course policies.

Getting help

For issues with technical difficulties for e-learning in Canvas, please contact the UF Help desk at

- <https://iss.at.ufl.edu/help.shtml> or <http://helpdesk.ufl.edu/>
- 352-392-4357 - select option 2
- e-mail at helpdeslPSufl.edu.

Any requests for make-ups due to technical issues **MUST** be accompanied by the **ticket number** received from e-Learning when the problem is reported to them. The ticket number will document the time and date of the problem. You **MUST** contact your instructor within 24 hours of the technical difficulty if you wish to request a make-up.

Complaints/Praises: Should you have any complaints/praises with your experience in this course you can always address them to the instructor at davibfl@ufl.edu, or you may contact the Department of Statistics to submit a complaint. You may submit anonymous e-mail.

For complaints that are not satisfactorily resolved at the department level or which seem to be broader than one department, students are encouraged to review the UF Complaints Policy.

UF Policies

Accommodating Students with Disabilities: Students requesting accommodation for disabilities must first register with the Dean of Students Office. The Dean of Students will provide documentation to the students who must then provide this documentation to the instructor when requesting information. You must submit this documentation prior to submitting any assignments for which you are requesting accommodation.

Academic Misconduct: Students are held accountable to the UF Honor Code.

Evaluations: Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

Tentative Course Outline

* Additional topics included

Modules	Content	Class notes	Video	Textbook	Suggested HW
1	Summary Statistics	5-7	1	1.1-1.2	1
	Graphical Summaries	8-13	2	1.3	
2	Sample Space, Events and Probability	14-18	3	2.1	2.1
	Counting Methods	19-21	4	2.2	
	Conditional Probabilities and Independence	22-26	5	2.3	
	Random Variables: Properties (I)	27-30	6	2.4	
	Random Variables: Properties (II)	31-34	7	2.4	
	Random Variables: Properties (III)	35-38	8	2.4, 2.6	
	Random Variables: Properties (IV)	39-43	9	2.5, 2.6	2.2
	Random Variables: Common discrete distributions	44-48	10	4.1-4.4	
	Random Variables: Common continuous distributions	48-51	11	4.5, 4.8	
	Central Limit Theorem	52-53	12	4.11	
	Normal Probability/Quantile Plot	54-55	13	4.10*	
Exam 1					
3	Inference for Population Mean (I)	57-61	14	5.1, 5.3	3.1
	Inference for Population Mean (II)	62-67	15	6.1-6.2, 6.4	
	Inference for Population Proportion	68-69	16	5.2, 6.3	
	Inference for Population Variance	70-73	17	5.8, 6.11	3.2
	Distribution Free Inference (I)	74-79	18	6.9*	
4	Inference for Population Means: Confidence Intervals	80-84	19	5.4-5.7	4
	Inference for Population Means: Hypothesis Tests	85-87	20	6.4-6.8	
	Inference for Population Variances	88-90	21	6.11*	
	Distribution Free Inference (II)	91-95	22	6.9*	
	Contingency Tables: Tests of Independence	96-98	23	6.10	
Exam 2					
5	Simple Linear Regression (I)	100-105	24	7.1-7.2	5.1
	Simple Linear Regression (II)	105-108	25	7.3	
	Checking Assumptions and Transforming Data	109-115	26	7.4*	
	Multiple Regression (I)	116-120	27	8.1-8.2	5.2
	Multiple Regression (II)	121-124	28	8.3	
	Qualitative Predictors	125-129	29	*	
6	Completely Randomized Design (I)	130-133	30	9.1	6
	Completely Randomized Design (II)	134-137	31	9.2	
	Randomized Block Design	140-143	33	9.4	
Exam 3					
Supplemental	Completely Randomized Design: Nonparametric	138-139	32	*	
	Randomized Block Design: Nonparametric	144-145	34	*	