STA 3032 - UFO Program (Class number 29288)

Fall 2023

Engineering Statistics

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Course Website: e-Learning

Course Material and Supplies Fees: Teaching will be asynchronous except office hours and exams.

- Class notes. (Available in Canvas).
- Slides. (Available in Canvas).
- Pre-recorded videos. (Available in Canvas).
- This course will be participating in the UF All Access program. **Complete instructions will be provided in Canvas "Start Here" page**. You will instructed to go to `https://bsd.ufl.edu/allaccess` to optain an access code. Select this class that requires MyStatLab. Do not opt-in to anything else. Codes can also be purchased at the bookstore, but at a higher cost. Any code obtained outside of UF All Access will not work for the course.
- Honorlock for proctoring.

Required Text(s):

1. *Probability & Statistics for Engineers & Scientists*, 9th Edition available via UF All Access
   Author(s): Walpole, Myers, Myers, Ye; **ISBN-13:** 978-0134115856
2. *The Book of R*
   Author(s): Tilman M. Davies; **ISBN-13:** 978-1593276515

Course Communication:

- Discussion forum (link to Microsoft Teams available in course website).
- Live office hours via Zoom (available in course website).
- E-mail for questions regarding course policies. (Ensure that STA **3032** is in the subject line. Failure to do so may result in a non-response.)

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
Credit Hours: 3
Software: We will be using the statistical software `R`.

Course Goals and Objectives:

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

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

Demeanor

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

Assignments

- All **deadlines (excluding exams) are at 23:59** of the due/end date. These are ***hard* deadlines** meaning that any open or ongoing assignments will automatically be submitted at the deadline. For example you should not start an assignment at 23:58. No late assignments will be accepted under any circumstances.
- 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 UF Student Honor and Conduct Code**. Discussion amongst students is encouraged, but when in doubt, direct your questions to the instructor.
- Students are expected to **show and explain their work**.
- All electronically **submitted work must be as one merged file**. In Canvas, all uploaded files automatically get a grade of 0, until the teaching assistant grades them.
- Feedback will provided within two business days from the assignment deadline.

Projects/Quizzes

Under each module in e-Learning,

- **Projects** that are based on (primarily) textbook exercises.
- **Quizzes** that are *timed* and range from conceptual to applied.
- **R assignments** that are similar to (secondary) textbook exercises.
- **MyLab StudyPlan** Mastery Points (MP). The publisher provides a built in studyplan that has been assigned. With each section there are practice problems that will subsequently open up the "Quiz Me" which contains 5 questions and 60% needed to earn the mastery points.

All deadlines are posted on e-learning. **Assignments are automatically submitted at deadline even if in progress.**

Exams

After the completion of certain modules, exams will be administered via Honorlock. For (more) complete information about Honorlock please visit the "Start Here" page of the class website. *Due to the nature of online exams via Canvas, it is important to keep in mind that technical issues may arise and although we try to implement fail-safes, please try to plan accordingly by saving work, documenting issues and preparing any material ahead of time.*

- Exams are timed with a duration of about 75 minutes (60 minutes with up to 15 minutes provided for the startup) and will be **available for 1 day only**. Be sure to study the material and familiarize yourself with the posted in Canvas procedures prior to the exam.
- Only 1 attempt.
- Only allowed **one screen/monitor**.

- It is highly encouraged to use a **reliable device** with a **reliable internet connection**. Being disconnected means that you are no being longer supervised which could potentially mean that your exam will not be graded.
- Practice problems (not practice exams) will be provided.

Allowed material:

- Instructor provided (in Canvas) formula sheet(s) and R-reference sheet. It is recommended to have the material ready and printed ahead of time (in case of technical issues).
- Access to R or WolframAlpha (when needed) will be provided through the exam.
- One sheet of blank scratch paper.

Important dates:

Exam #1 ..... February 17th, 08:30 - 23:59
Exam #2 ..... March 24th, 08:30 - 23:59
Exam #3 ..... April 29th, 08:30 - 23:59

Grading

Grade distribution:

Exams 1, 2 and 3	40%	(5% lowest, 15% second best, 20% best)
Projects	20%	
Quizzes	20%	(includes Intro quiz, lowest quiz dropped)
R assignments	15%	
MyLab StudyPlan	5%	
Total	100%	
Extra Credit	0-1%	(class and discussion forum participation)

Final grade and can be calculated using:

$$\begin{aligned}\text{Final} =& 0.05(\text{lowest exam}) + 0.15(\text{second best exam}) + 0.20(\text{best exam}) \\ &+ 0.20\left(\frac{\sum \text{projects}}{300} \times 100)\right) \\ &+ 0.20\left(\frac{\sum \text{quizzes} - \text{lowest}}{100} \times 100\right) \\ &+ 0.15\left(\frac{\sum \text{R assignments}}{60} \times 100\right) \\ &+ 0.05 \text{ MyLab StudyPlan (as a percentage of total mastery points)} \\ &(+0 \text{ to } 0.01 \text{ class and discussion forum participation})\end{aligned}$$

Letter grade assignment

There will be *no rounding up* of scores.

		A	91 to 100	A-	88 to $<$ 91
B+	84 to $<$ 88	B	80 to $<$ 84	B-	77 to $<$ 80
C+	74 to $<$ 77	C	70 to $<$ 74	C-	67 to $<$ 70
D+	64 to $<$ 67	D	60 to $<$ 64	D-	55 to $<$ 60
E	$<$ 55				

Final grades shown on e-Learning are not accurate because they do not account for the conditional weighing of exams.

To view the result of the letter grades to your GPA please visit the UF Grade and Grading Policies.

Make-up

Requirements for class attendance and make-up exams, assignments, and other work in this course as well as policies regarding absences, religious holidays, illness and student athletes are consistent with UF Attendance Policies.

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.
- Make-ups need to be scheduled within a week from the assignment deadline. Student is responsible for scheduling.
- 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 most recent Academic Calendar.

Addressing Issues

Technical difficulties

Please contact the UF Help desk via e-Learning "Help" tab. Any requests for make-ups due to technical issues must be accompanied with appropriate documentation/proof including screenshots and communication with the help desk. You MUST contact your instructor within 24 hours of the technical difficulty if you wish to request a make-up.

Grievances/Commendations

Should you have any grievances or commendations with your experience in this course you can always address them to the instructor (anonymously) or to the Department of Statistics. For issues that are not satisfactorily resolved at the department level or which seem to be broader than one department, students are referred to the Office of the Ombuds.

UF and CLAS Policies

Dropping, Withdrawing and Incomplete

Dropping and Withdraw

For late course drops and course withdrawals check the catalog.

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 CLAS incomplete grade policy and contract.

Accommodating Students with Disabilities

Students requesting accommodation for disabilities must first register with the Disability Resource Center (DRC). The DRC 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.

U Matter, We Care

U Matter, We Care, through the Dean of Student's Office, offers care related resources and programs focused on health, safety, and holistic well-being.

Academic Misconduct

Students are held accountable to the UF Student Honor and Conduct Code.

Evaluations

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at `https://gatorevals.aa.ufl.edu/students/`. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via `https://ufl.bluera.com/ufl/`. Summaries of course evaluation results are available to students at `https://gatorevals.aa.ufl.edu/public-results/`.

Tentative Course Outline

⋆ Additional topics included.

Module	Week	Content	Notes	Textbook	Projects
1	1-2	Summary Statistics: Location and Spread	1.1-1.3	1.1-1.5	1
		Graphical Summaries	1.4	1.6	
2	2	Sample Space, Events and Probability	2.1-2.2	2.1-2.2, 2.4-2.5	2.1
		Counting Methods: Permutations and Combinations	2.3	2.3	
		Conditional Probabilities and Independence	2.4	2.6, 2.7	
	3-4	Random Variables: Properties	2.5.1-2.5.8	3.1-3.4, 4.1-4.4	2.2
	4	Random Variables: Binomial, Geometric, N.B., Poisson	2.5.9	5.1-5.2, 5.4-5.5	2.3
		Random Variables: Uniform, Normal, Chi-Square, t, F	2.5.10	6.1-6.4, 6.7, 8.6-8.7	
	5	Central Limit Theorem	2.6	8.3-8.4	
		Normal Probability/Quantile Plot	2.7	8.8	
Exam 1					
3	6	Inference on Population Mean: Confidence Intervals	3.1.1	9.1-9.5	3.1
		Inference on Population Mean: Hypothesis Tests	3.1.2	10.1-10.4	
	7	Inference on Population Proportion	3.2	9.10, 10.8	
		Inference on Population Variance	3.3	9.12, 10.10	3.2
		Distribution Free Inference: Sign and Wlcoxon	3.4	16.1-16.2	
4	8	Inference on Two Population Means: Confidence Intervals	4.1.1	9.8, 9.11	4
		Inference on Two Population Means: Hypothesis Tests	4.1.2	10.5, 10.9	
		Inference on Two Population Variances	4.2	9.13, 10.10	
	9	Distribution Free Inference: Wilcoxon and Levene	4.3	16.2-16.3	
		Contingency Tables: Test of Independence (Pearson)	4.4	10.12	
Exam 2					
5	10	Simple Linear Regression	5.1.1-5.1.6	11.1-11.6, 11.8	5.1
	11-12	Checking Assumptions and Transforming Data	5.2	11.10	
		Multiple Regression (I)	5.3.1-5.3.2	12.1-12.2, 12.4	5.2
	12-13	Multiple Regression (II)	5.3.3	12.5-12.6	
		Qualitative Predictors	5.4	12.8-12.9	
6	14	Completely Randomized Design (CRD)	6.1.1	13.1-13.3	6
		CRD: Post Hoc comparisons	6.1.2	13.6	
		Randomized Complete Block Design (RCBD)	6.2.1	13.7-13.8, 13.11	
Exam 3					