STA 3032 (12286 in-person, section 1054)

Summer A 2025

Engineering Statistics

MTWRF 9:30 a.m. - 10:45 a.m. in AND 0134

Course Overview

Instructor: Dr. Thomas Ippolito

Office:	Griffin Floyd 103B
E-mail:	ippolitot@ufl.edu
Office Hours:	MW 11:00 a.m. - 12:00 p.m. in Griffin Floyd 103B
	TR 8:00 a.m. - 9:00 a.m. in Griffin Floyd 103B

Teaching Assistant 1: Quynh (Christina) Vu

E-mail:	quynhvu@ufl.edu
Office Hours:	M 1:00 p.m. - 3:00 p.m. in Griffin Floyd 234
	R 1:00 p.m. - 3:00 p.m. via Zoom. Meeting ID: 924 0765 8189.

Teaching Assistant 2: Zeyu Yuwen

E-mail:	zeyu.yuwen@ufl.edu
Office Hours:	F 3:00 p.m. - 4:00 p.m. in Griffin Floyd 218

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, and regression.

Course Goals:

1. Access, manipulate, and analyze 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 simple linear regression.

Student Learning Outcomes: At the end of this course, students will be expected to have achieved the following learning outcomes:

Content:

- Identify, describe, and explain the basic concepts, theories, and terminology of natural science and the scientific method, and apply them to analyze various systems.
- Demonstrate proficiency in accessing, manipulating, and analyzing data using statistical software, and producing appropriate graphs and descriptive statistics for one and two variables, across both categorical and continuous data.– Interpret graphs and descriptive statistics for one and two variables, drawing meaningful insights from the data.
- Understand and apply the basic probability rules, as well as concepts of expected value and variance for both discrete and continuous variables
- Apply the Central Limit Theorem effectively for inference, providing a foundation for statistical reasoning.
- Formulate mathematical models and arguments, utilizing statistical models to address real-world situations and provide effective solutions.
- Assessments will be made with textbook based assignments, coding assignments, quizzes, and exams.

Critical Thinking:

- Formulate empirically-testable hypotheses derived from the study of physical processes or living things, demonstrating a capacity for scientific inquiry and logical reasoning.
- Apply logical reasoning skills effectively through scientific criticism and argument, enabling rigorous evaluation of scientific ideas and theories.
- Apply techniques of discovery and critical thinking effectively to solve scientific problems and evaluate outcomes, demonstrating analytical skills in problem solving.
- Assessments will be made with textbook based assignments, quizzes, and exams.

Communication:

- Communicate scientific knowledge, thoughts, and reasoning clearly and effectively, both in written and verbal form.
- Report on statistical analysis of people's attitudes towards choices based on the framing of the choices, presenting findings with clarity and precision.
- Report on statistical analyses of global warming, employing numeric and graphical presentation to effectively convey information.
- Assessments will be made with textbook based assignments.

Prerequisite(s): MAC 2311 (Calculus beyond MAC 2311 (e.g., integration by parts) may be needed and discussed. Note that this is a statistics course and calculus is essential part of statistics.

Credit Hours: 3.

Required Text(s):

1. *Probability & Statistics for Engineers & Scientists*, 9th Edition.

Course Website: e-Learning

Course Communication:

- Use e-mail to contact the instructor regarding administrative matters. Please include **STA 3032** in the subject line.
- For questions regarding course content, please see the TAs during office hours.

Syllabus Changes: The instructor reserves the right to update any part of this syllabus as necessary. Students will be notified of any changes.

Course Policies

Demeanor

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

Attendance

Attendance is expected and will be essential for performing well in the class. There is however, no attendance grade. Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. For further information, refer to the university attendance policies.

Every effort should be made to attend the exam on the specified exam dates. Makeup exams are warranted only under exceptional circumstances. Contact the instructor as soon as you realize you will be unable to take the exam at the scheduled time. Each case will be reviewed individually. Valid and detailed documentation is required for scheduling a makeup.

Assignments

- All **deadlines are at 11:59 pm** of the due/end date. These are ***hard* deadlines** meaning that any open or ongoing assignments will automatically be submitted at the deadline.
- 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** where necessary.
- Acceptable document types for Canvas submissions are PDF.
- 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 7 business days from the assignment deadline.

Assignments: Homework assignments are to be turned in on Canvas as one file. Solutions must be legible and presented in the same order as given in the assignment. Students are expected to show ALL work for full credit. Please submit your assignments prior to the deadline and verify that the correct document was submitted on Canvas. There are no resubmissions after the deadline. Students are expected to work independently on homework assignments unless otherwise specified in writing by the instructor.

Assignment point distribution:

Assignment	Points
Assignment 1	51
Assignment 2	87
Assignment 3	27
Assignment 4	24
Assignment 5	15

Exams: Exams will be held in-class during regular class times. See below for exam dates. For the exams, you are allowed one A4 sheet (front and back) of notes and a scientific calculator or four-function calculator. Graphing calculators, TI-nspires, virtual calculators, or other smart devices are NOT permitted. Appropriate tables will be provided, if necessary. You are not allowed to print your own tables. The one A4 sheet (front and back) of notes must be handwritten and written by the student. Students must turn in their note sheet along with their exam. Failing to turn in a note sheet or using or copying another student's note sheet is an academic integrity violation and will result in an automatic 25% deduction on the respective exam.

Exam Dates (tentative):

Exam #1 ..... May 23th, at 9:30 a.m. - 10:45 a.m.
Exam #2 ..... June 6th, at 9:30 a.m. - 10:45 a.m.
Exam #3 ..... June 20th, at 9:30 a.m. - 10:45 a.m.

Grade Corrections: If you believe there was a mistake made in the grading of your homework assignment or exam, please see the instructor within *one week* after the grade has been posted. Questions regarding homework assignments should be first sent to the TA who graded it. Grade negotiation is not appropriate.

Assignment Deadlines: All **deadlines are at 11:59pm** of the due/end date. These are ***hard* deadlines** meaning that any open or ongoing assignments will automatically be submitted at the deadline. Sometimes students may be unable to complete their assignments due to extended hospitalization or illness, or some catastrophic event. In these cases the student must meet with the course instructor in person with all the appropriate documentation to discuss the situation. Each case will be reviewed individually.

Grading

Grade distribution:

Assignment	Weight
Homework	25%
Exam 1	25%
Exam 2	25%
Exam 3	25%
Total	100%

Letter grade assignment

This course has been designated a General Education course. Note that the minimum passing grade for General Education credits is a C. There will be *no rounding up* of scores. Grades will be based on the following scale:

Grade	Range
A	90 to 100
A-	87 to $<$ 90
B+	83 to $<$ 87
B	80 to $<$ 83
B-	77 to $<$ 80
C+	73 to $<$ 77
C	70 to $<$ 73
C-	67 to $<$ 70
D+	63 to $<$ 67
D	60 to $<$ 63
D-	57 to $<$ 60
E	$<$ 57

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

Make-up

Requirements for 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 during the open period. Only extreme situations will warrant an extension. Contact the instructor prior to the due date - as soon as you realize you will be unable to complete the assignment 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.
- Extension dates 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 an extension. Please reference the most recent Academic Calendar.

Addressing Issues

Technical difficulties

Please contact the UF Help desk via e-Learning "Help" tab or UF IT Service Portal. 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 at ippolitot@ufl.edu, or
- 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. The instructor must be emailed the form at least 14 days before an exam for accommodations to be arranged.

U Matter, We Care

U Matter, We Care 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 schedule

The following is a tentative outline of subjects that the course will cover, by week. The time spent on certain subjects will probably often be substantially more or less than what is estimated here, and certain subjects will be reiterated and expanded upon throughout the course.

Tentative Course Outline

⋆ Additional topics included.

Module	Week	Content	Notes	Textbook	Grader
1	1-2	Summary Statistics: Location and Spread	1.1-1.3	1.1-1.5	(Posted on Canvas)
		Graphical Summaries	1.4	1.6	
2	1-2	Sample Space, Events and Probability	2.1-2.2	2.1-2.2, 2.4-2.5	(Posted on Canvas)
		Counting Methods: Permutations and Combinations	2.3	2.3	
		Conditional Probabilities and Independence	2.4	2.6, 2.7	
	1-2	Random Variables: Properties	2.5.1-2.5.8	3.1-3.4, 4.1-4.4	(Posted on Canvas)
	1-2	Random Variables: Binomial, Geometric, N.B., Poisson	2.5.9	5.1-5.2, 5.4-5.5	(Posted on Canvas)
		Random Variables: Uniform, Normal, Chi-Square, t, F	2.5.10	6.1-6.4, 6.7, 8.6-8.7	
	1-2	Central Limit Theorem	2.6	8.3-8.4	
		Normal Probability/Quantile Plot	2.7	8.8	
Exam 1					
3	3-4	Inference on Population Mean: Confidence Intervals	3.1.1	9.1-9.5	(Posted on Canvas)
		Inference on Population Mean: Hypothesis Tests	3.1.2	10.1-10.4	
	3-4	Inference on Population Proportion	3.2	9.10, 10.8	
		Inference on Population Variance	3.3	9.12, 10.10	(Posted on Canvas)
		Distribution Free Inference: Sign and Wlcoxon	3.4	16.1-16.2	
4	3-4	Inference on Two Population Means: Confidence Intervals	4.1.1	9.8, 9.11	(Posted on Canvas)
		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	
	3-4	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	5-6	Simple Linear Regression	5.1.1-5.1.6	11.1-11.6, 11.8	(Posted on Canvas)
	5-6	Checking Assumptions and Transforming Data	5.2	11.10	
		Multiple Regression (I)	5.3.1-5.3.2	12.1-12.2, 12.4	(Posted on Canvas)
	5-6	Multiple Regression (II)	5.3.3	12.5-12.6	
		Qualitative Predictors	5.4	12.8-12.9	
6	5-6	Completely Randomized Design (CRD)	6.1.1	13.1-13.3	(Posted on Canvas)
		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					