

STA 3032/ 16271

Fall 2024

Engineering Statistics

MWF 10:40 AM - 11:30 AM in WEIM1064

Course Overview

Instructor:

Hongqiang Sun, sunh1@ufl.edu

Office Hour: Fri, 8:00-10:00 am

Zoom link: <https://ufl.zoom.us/j/5390445385>

Teaching Assistant:

Haidyn Sekeres, haidyn.sekeres@ufl.edu

Office Hour: Tue, 8:30-10:30 am, Griffin-Floyd Hall 234; <https://ufl.zoom.us/j/5550255921>

Grade: homework 1(1.2-2.22); exam1(Q4-5, points add-up); exam 3; exam 3 make-up

Wangxing Zhang, zhangwangxing@ufl.edu

Office Hour: Tue, Thu, 10:30-11:30 am, Griffin-Floyd Hall 116D; <https://ufl.zoom.us/j/7290921283>

Grade: homework 1(2.28-2.124, points add-up); exam1(Q1-3); exam 2; exam 1,2 make-up

Shannon Dowdy, s.dowdy@ufl.edu

Office Hour: Tue, 1-2 pm, <https://ufl.zoom.us/j/96053424920>

Grade: homework 2 (4.48-6.12, points add-up), 3

Jaden Jerue, jjerue1@ufl.edu

Office Hour: Thu, 3-4 pm, <https://ufl.zoom.us/j/3039283279>

Grade: homework 2 (3.12-4.34), 4, 5

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

- Access, manipulate, and analyze data using statistical software.
- Produce appropriate graphs and descriptive statistics for one and two variables, for both categorical and continuous data.
- Interpret graphs and descriptive statistics for one and two variables.
- Know and apply the basic probability rules, the concepts of expected value and variance for discrete and continuous variables.

- Know and apply the central limit theorem, which is crucial for inference
- Understand confidence intervals and hypothesis tests.
- Carry out and interpret one-sample and two-sample analyses for means and proportions.
- 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.

Grades - 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.

Required Text:

Probability & Statistics for Engineers & Scientists, 9th Edition available via UF All Access.

Author(s): Walpole, Myers, Myers, Ye; **ISBN-13:** 978-0134115856

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 instructor or 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

Assignments

Homework: Homework assignments will be given roughly every two or three weeks. 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. Students are expected to work independently on homework assignments unless otherwise specified in writing by the instructor. All deadlines are at 11:59 pm of the due/end date. The deadline of 11:59pm EST is a **strict** deadline. A homework that shows as being submitted at 12:00am (1 minute late) will be counted as 1 day late and receive a 25% off one day late penalty. It is best to submit your homework well before the deadline in case of any issues arising.

If you submit after the solution is posted, you will **score zero** for that particular homework.

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 4-function calculator or a scientific calculator. Graphing calculators, TI-nspires, virtual calculators, or other smart devices are **NOT** permitted. Cell phone usage will not be 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	Sep 30
Exam #2	Nov 01
Exam #3	Dec 04

Grade Corrections: If you believe there was a mistake made in the grading of your homework assignment or exam, please contact the TA's 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.

Grading

Grade distribution:

Homework	25%
Exams 1, 2, and 3	75% (25% each)

Letter grade assignment:

The following grade cutoffs are adopted grading scale,

90+ -> A
87 - 89.99 -> A-
83 - 86.99 -> B+
80 - 82.99 -> B
77 - 79.99 -> B-
70 - 76.99 -> C+
63 - 69.99 -> C
57 - 62.99 -> D
Less than 57 -> E

All grades are final and non-negotiable.

Attendance and Missed Assignments

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](#).

STA3032 (section 16271) is 100% in-person. There will not be any recorded lectures. Each student needs to be on campus to take lectures. Also, students are required to be on campus to take exams.

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](#).

UF and CLAS Policies

UF Grading Policies: [Grades and Grading Policies < University of Florida \(ufl.edu\)](#)

Academic Misconduct: You are required to abide by the [Student Honor Code](#). Any violation of the academic integrity expected of you on an assignment or exam will result in a minimum academic sanction of a failing grade on the assignment or exam.

Accommodation for 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. A request must be made to the instructor at least one week prior to the date for which the accommodation is requested. Accommodations will not be made retroactively.

Dropping Courses and Withdrawal: For questions relating dropping courses and withdrawals, please refer to the [UF catalog](#).

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/>.

Incomplete Grade: 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. Instructors are not required to assign incomplete grades. For further detail, please refer to the [CLAS Academic Advising Center page on incomplete grades](#).

U Matter, We Care: [U Matter, We Care](#) offers care related resources and programs focused on health, safety, and holistic well-being.

Tentative Course Outline

Module	Week	Content	Textbook Section
1	1	Summary Statistics: Location and Spread Graphical Summaries	1.1-1.5 1.6
2	2-5	Sample Space, Events, and Probability Counting Methods: Permutations and Combinations Conditional Probabilities and Independence Random Variables Discrete Probability Distributions Continuous Probability Distributions Central Limit Theorem	2.1-2.2, 2.4-2.5 2.3 2.6-2.7 3.1-3.4, 4.1-4.4 5.1-5.2, 5.4-5.5 6.1-6.4, 6.7, 8.6-8.7 8.3-8.4
Exam 1			
3	6-8	Inference on Population Mean: Confidence Intervals Inference on Population Mean: Hypothesis Tests Inference on Population Proportion Inference on Population Variance Signed-Rank Test	9.1-9.5 10.1-10.4 9.10, 10.8 9.12, 10.10 16.1-16.2
4	9-10	Inference on Two Population Means: Confidence Intervals Inference on Two Population Means: Hypothesis Tests Inference on Two Population Variances Contingency Tables: Test for Independence Wilcoxon Rank-Sum Test	9.8, 9.11 10.5, 10.9 9.13, 10.10 10.12 16.3
Exam 2			
5	11-12	Simple Linear Regression Checking Regression Assumptions and Transforming Data Quantile and Probability Plots Multiple Regression Qualitative Predictors	11.1-11.6, 11.8 11.10 8.8 12.1-12.2, 12.4-12.6 12.8-12.9
6	13-14	One-Way ANOVA: Completely Randomized Design Multiple Comparisons Randomized Complete Block Designs	13.1-13.3 13.6 13.7-13.8, 13.11
Exam 3			