NC STATE UNIVERSITY

# ST 370 Course Syllabus, Fall 2024

# Probability and Statistics for Engineers

**Instructor:** Dr. Annie Booth (annie_booth@ncsu.edu)
**Office Hours:** Tuesday 11:00 - 11:45 am and Wednesday 12:00 - 12:45 pm @ SAS Hall 5210

**Teaching Assistant:** Joe Bates (jwbates3@ncsu.edu, *CC the instructor on emails to the TA*)

**Statistics Tutoring and Training Hub (STAT Hub):** In addition to the instructor's office hours, the Department of Statistics' STAT Hub offers light drop-in group tutoring for this course and several others. Starting in mid-September, STAT Hub will operate in the statistics tutoring room (SAS 1101) from 5:30-8pm Monday through Thursday (except on University holidays and breaks).

## Communication

We will use a Slack workspace for regular course communication including important announcements.

- https://join.slack.com/t/st370fall2024/shared_invite/zt-2omfhr89w-IdOGlbuQdLhYs8_CnlOD9g
- You must use your real name on your slack profile for this workspace.
- You may download the Slack app or use the web browser version, but I strongly recommend enabling push or email notifications.
- I encourage you to engage in discussions on Slack and to offer appropriate suggestions/help to each other, but all communications must adhere to the university's academic integrity policy and code of student conduct. *If you are not sure whether or how you should respond to another student's question, just wait for me to do so.*

If you need to contact me directly, you have two choices:

- You may send me a direct message on Slack.
- You may email me (please include "ST370" in the subject line).
- Remember to check the syllabus and Slack workspace first!

## Course Information

**Course Website**: through Moodle (NC State Wolfware)

**Schedule:** posted on Moodle (subject to change)

**Meeting Time/Location:** 2304 Erdahl Cloyd, T/Th, 1:30-2:45 pm (Section 5) or 3:00-4:15 pm (Section 6)

**Prerequisites:** MA 241

**Catalog Description:** The class is a calculus-based introduction to probability and statistics, with a focus on collection and summary of data, along with making formal inferences and practical conclusions on the basis of data. Topics may include sampling, descriptive statistics, designed experiments, simple and multiple regression, basic probability, discrete and continuous distributions, sampling distributions, hypothesis testing, confidence intervals, one and two-way ANOVA.

**Structure:** The majority of this course is **synchronous**, delivered through real-time, face-to-face class sessions. Lectures will not be recorded. Additional materials will be delivered through Moodle. Homeworks and quizzes will be submitted electronically through Moodle. Exams and comprehension checks will be administered in class in person.

## Learning Outcomes

After successfully completing the course, students will be able to

- ☐ Construct graphical and numerical summaries of data
- ☐ Calculate probabilities using basic probability distributions
- ☐ Assess statistical inference using basic statistics
- ☐ Apply the principles of good experimental design
- ☐ Determine the appropriate analysis method for multiple data types
- ☐ Effectively communicate results from a statistical analysis

## Course Materials

**Textbook:** Probability and Statistics for Engineering and the Sciences. Jay L. Devore. 8th or 9th edition. This textbook is optional. It is a useful supplement to our course notes and a great resource for additional practice problems.

**Calculator:** A standard non-graphing calculator is recommended for in-class exams.

**Statistical Software:** We will use R statistical software and the Rstudio GUI throughout this course. Instructions for downloading and installing R and Rstudio will be provided through Moodle.

## Grading

| Weight | Component | Details |
|---|---|---|
| 10 % | Quizzes | 5 assigned, lowest dropped, equally weighted otherwise |
| 20 % | Homework | 6 assigned, lowest dropped, equally weighted otherwise |
| 10 % | Comprehension Checks | 5 scheduled, lowest dropped, equally weighted otherwise |
| 30 % | Exam 1 | Grade may be replaced with higher grade on final exam |
| 30 % | Exam 2 | Grade may be replaced with higher grade on final exam |

- Grades will be kept to two decimal places and will NOT be rounded.
- Even if they are represented in the Moodle gradebook as points out of a total, all grades will be converted to percentages before any additional calculations.
- Letter grades will be assigned according to the Moodle defaults (see table at https://docs.moodle.org/404/en/Grade_letters).

## Homework

Homework will be assigned about every other week (on an alternating schedule with quizzes) and is due by 11:59 pm on the following Thursday. Homework is to be submitted electronically through Moodle. Late submissions received before 8:00 am the following day will be considered for 50% credit. Answers will be posted at this time, and no later submissions will be accepted.

Homework will include a combination of "by hand" problems and coding exercises. Solutions may be hand-written and scanned or type-set in LaTeX. Final submissions must be in PDF format. When applicable, R code must be submitted in additional R script files. All work must be legible, clearly labeled, and organized in problem order. Points will be deducted for failure to follow submission instructions.

Homework is open-notes/open-book. You may refer to the textbook and lecture notes. Some online resources are permissible (such as using Stack Exchange posts to help with R functions), but copying solutions from test banks or online forums is not acceptable. **You must submit your own original work.** The instructor reserves the right to randomly select a subset of homework exercises to grade instead of grading every problem. The lowest homework grade will be dropped.

## Quizzes

Quizzes will be assigned about every other week (on an alternating schedule with homeworks). They are due by 11:59 pm on the following Thursday and are to be submitted electronically through Moodle. **Late submissions will not be accepted.** Answers will be posted after the due date.

Quizzes will include a combination of multiple choice and short answer questions. They are open-notes/open-book and are not timed. The lowest quiz grade will be dropped.

## Comprehension Checks

On the days quizzes are due (indicated in the course schedule), we will start class with a "comprehension check." Comprehension checks are closed-book and closed-notes. They will include a small number of multiple choice and short answer questions and are designed to mirror the current quiz and previous homework. The best way to prepare is to regularly attend and take notes in class, review previous homework answer keys, and complete the quiz for that day before class. Make-ups will not be offered, but the lowest comprehension check grade will be dropped.

## Exams

There will be 2 regular semester exams, held in-person during class time on the following dates.

- Exam 1: Thursday, October 3, 2024
- Exam 2: Tuesday, November 26, 2024

You are permitted one index card (3.5 x 5 inches, front and back) and a standard non-graphing calculator (no cell phones). No other resources will be permitted. There will be an optional cumulative final exam held on Tuesday, December 10, 2023 at 12:00 pm (Section 5) or 3:30 pm (Section 6). Your final exam grade will replace your lowest semester exam grade (assuming it is higher).

## University Policies

**Academic Integrity and Honesty:** Students are required to comply with the university policy on Academic Integrity found in the Code of Student Conduct 11.35.01 sections 8 and 9. Students are required to uphold the Pack Pledge: "I have neither given nor received unauthorized aid on this test or assignment." Violations of academic integrity will be handled in accordance with the Student Discipline Procedures.

**Other Policies:** Students are responsible for reviewing the NC State University Policies, Regulations, and Rules which pertain to their course rights and responsibilities:

- Equal Opportunity and Non-Discrimination Policy Statement and additional references
- Code of Student Conduct
- Grades and Grade Point Average
- Credit-Only Courses
- Audits

## Student Resources

Academic and Student Affairs maintains a website with links for student support on campus, including academic support, community support, health and wellness, financial hardship or insecurity, and more. Find Help on Campus.

**Disability Resources:** Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with the Disability Resource Office (DRO). For more information on NC State's policy on working with students with disabilities, please see the Policies, Rules and Regulations page maintained by the DRO and REG 02.20.01 Academic Accommodations for Students with Disabilities.

**Safe at NC State:** At NC State, we take the health and safety of students, faculty and staff seriously. The Office for Institutional Equity and Diversity supports the university community by providing services and resources to support and guide individuals in obtaining the help they need. See the Safe at NC State webpage for resources.

*This syllabus was last updated on August, 16, 2024.*