# ST 371.002 Introduction to Probability and Distribution Theory Fall 2020

Instructor: Dr. Jonathan P Williams

Email: jwilli27@ncsu.edu Course website: https://jonathanpw.github.io/ST371 Office location: Zoom Office hours: 13:30-15:00 Tuesdays; 10:30-12:00 Thursdays; and by appointment Office phone: 919.513.0191

Teaching Assistant: Bowen Liu Email: bliu17@ncsu.edu

**Course Description and Student Learning Outcomes:** Basic concepts of probability and distribution theory for students in the physical sciences, computer science, and engineering. Provides the background necessary to begin study of statistical estimation, inference, regression analysis, and analysis of variance.

Prerequisite(s): Calculus II. Credit Hours: 3

**Text(s):** Probability and statistics for engineering and sciences, 9<sup>th</sup> Edition **Author(s):** Jay Devore; **ISBN-13:** 9781305684164

#### Grade Distribution:

Assignments	40%
Midterm exam 1	20%
Midterm exam 2	20%
Final exam	20%

#### Letter Grade Distribution:

А	73.00 - 76.99	$\mathbf{C}$
A-	70.00 - 72.99	C-
B+	67.00 - 69.99	D+
В	63.00 - 66.99	D
В-	60.00 - 62.99	D-
C+	$\leq 59.99$	$\mathbf{F}$
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For students taking the course as credit-only, S is equivalent to C- or better; otherwise U. No requirements, procedures, or expectations apply to students choosing to audit the course.

Final exam period: 09:00 – 13:00 on November 18, 2020.

**Personal note to students:** Please do not feel intimidated about interacting with me. Regardless of how busy or stressed I may appear to you, teaching your class is a part of my job, and I take that very seriously. I care deeply about the quality of your learning. Please always reach out to me if you have questions, concerns, or need help. I understand that it can be difficult and can even feel embarrassing to ask for help. However, I was once in your position, and I promise to always treat you with respect, empathy, and kindness. Nobody that ever did anything meaningful did so without first failing over and over again.

### Course policies and commentary:

- Lectures
  - Two 75 minute lectures will be pre-recorded each week and posted online by 23:59 on Tuesdays; view the lectures at your own convenience/pace. The lectures will be uploaded to a shared Dropbox folder, and will remain available for the duration of the Fall 2020 semester.
  - You will receive a link via your NCSU email to access the shared Dropbox folder, but you do NOT need to have a Dropbox account in order to access the folder. If you do have a Dropbox account then be careful NOT to sync the shared folder with your personal Dropbox account, unless you have adequate storage space available.
- Assignments
  - Homework will be assigned each Thursday evening, and will be due the following Thursday at 23:59. Completed assignments must be scanned, converted to .pdf format, and emailed to the instructor (jwilli27@ncsu.edu).
  - Each homework assignment will receive the same weight in the calculation of the final course grade (i.e., longer (shorter) assignments do not count for a larger (smaller) portion of the overall assignment course grade). For each assignment, each exercise has the following point distribution:
    - \* 2 points solution is correct
    - \* 1 point solution is mostly correct
    - \* 0 points solution is not relevant to the question

Only a random selection of exercises will be graded for each assignment.

- No late assignments will be accepted. Reach out to the instructor if you begin to fall behind!
- Take responsibility for understanding solutions to all assignments. For example, if you find a solution on StackExchange, then convince yourself that the solution is actually correct.
- Learn to distinguish between the things you do know and the things you do not know (this is one of the most important results of all education). To understand, to a particular degree, that a given statement is true means that you can explain why the statement is true, to the particular degree.
- Exams
  - Tentatively, all exams are take-home, and you will have 48 hours to complete, scan, and return.
  - Any communication with other individuals on exam related topics is strictly prohibited during exams.
  - Sharing/posting of any exam questions or other materials is strictly prohibited during exams.

- For each exam, each part of each problem has the following point distribution:
  - \* 3 points solution is correct, up to minor typos
  - $\ast~2$  points solution is mostly correct, but has a small mistake
  - $\ast\,$  1 point solution is sensible or on the right track
  - $\ast~0$  points solution is not relevant to the question
- A study guide will be provided by the instructor prior to each exam.

## Tentative Course Outline:

Week	Content
Week 1	<ul><li>Descriptive statistics</li><li>Chapter 1 from Devore</li></ul>
Week 2	<ul><li>Descriptive statistics</li><li>Chapter 1 from Devore</li></ul>
Week 3	<ul><li> Probability</li><li> Chapter 2 from Devore</li></ul>
Week 4	<ul><li> Probability</li><li> Chapter 2 from Devore</li></ul>
Week 5	<ul><li> Probability</li><li> Chapter 2 from Devore</li></ul>
Week 6	<ul> <li>Discrete random variables and probability distributions</li> <li>Chapter 3 from Devore</li> <li>Midterm 1 - Monday, September 14, 2020</li> </ul>
Week 7	<ul><li>Discrete random variables and probability distributions</li><li>Chapter 3 from Devore</li></ul>
Week 8	<ul><li>Discrete random variables and probability distributions</li><li>Chapter 3 from Devore</li></ul>
Week 9	<ul><li>Continuous random variables and probability distributions</li><li>Chapter 4 from Devore</li></ul>
Week 10	<ul><li>Continuous random variables and probability distributions</li><li>Chapter 4 from Devore</li></ul>
Week 11	<ul> <li>Continuous random variables and probability distributions</li> <li>Chapter 4 from Devore</li> <li>Midterm 2 - Monday, October 19, 2020</li> </ul>
Week 12	<ul><li>Joint probability distributions and random samples</li><li>Chapter 5 from Devore</li></ul>
Week 13	<ul><li>Joint probability distributions and random samples</li><li>Chapter 5 from Devore</li></ul>
Week 14	<ul><li>Joint probability distributions and random samples</li><li>Chapter 5 from Devore</li></ul>

**NCSU Polices, Regulations, and Rules:** Students are responsible for reviewing the NC State University Policies, Rules, and Regulations (PRRs) which pertain to their course rights and responsibilities, including those referenced both below and above in this syllabus:

- Equal Opportunity and Non-Discrimination Policy Statement https://policies.ncsu.edu/policy/pol-04-25-05 with additional references at https://oied.ncsu.edu/divweb/policies/
- Code of Student Conduct https://policies.ncsu.edu/policy/pol-11-35-01
- Grades and Grade Point Average https://policies.ncsu.edu/regulation/reg-02-50-03
- Credit-Only Courses https://policies.ncsu.edu/regulation/reg-02-20-15
- Audits https://policies.ncsu.edu/regulation/reg-02-20-04

**Policy on Academic Integrity:** Cheating, plagiarism and other forms of academic dishonesty will not be tolerated. Violations of academic integrity will be handled in accordance with the Student Discipline Procedures (NCSU REG 11.35.02).

**Disability Services for Students:** 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 at Holmes Hall, Suite 304, 2751 Cates Avenue, Campus Box 7509, 919-515-7653. For more information on NC State's policy on working with students with disabilities, please see the Academic Accommodations for Students with Disabilities Regulation (NCSU REG 02.20.01).

**Privacy:** Students may be required to disclose personally identifiable information to other students in the course, via digital tools, such as email or web-postings, where relevant to the course. Examples include online discussions of class topics, and posting of student coursework. All students are expected to respect the privacy of each other by not sharing or using such information outside the course.