
ST 371 Course Syllabus

ST 371 – Introduction to Probability and Distribution Theory

Section 003

Fall 2021

3 Credit Hours

Course Description

Basic concepts of probability and distribution theory for students in the physical sciences and engineering. Provides the background necessary to begin study of statistical estimation, inference, regression analysis, and analysis of variance.

Learning Outcomes

Upon completion of this course students will be able to:

1. Graphically describe data distributions.
 2. Decide which distribution to use for some common processes.
 3. For some commonly used distributions, calculate related probabilities, mean and variance.
 4. Describe the relationship between two variables using their joint distribution, covariance and correlation.
 5. Understand sampling distribution, central limit theorem and its application.
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Course Structure

Lectures: 2 per week, TuTh 3:00-4:15pm with recordings available via Panopto.

Homework: 11 total weekly assignments; solutions submitted electronically via Moodle.

Exams: two midterms and one final; in class with calculator and one page of notes permitted for midterms, three pages for final.

Instructors

Dan Harris (doharris) - *Instructor*

Email: doharris@ncsu.edu

Phone: 919-515-1924

Office Location: SAS Hall 5118

Office Hours:

My office hours are offered in-person in SAS 5118 or may be accessed via Zoom

M 1:00pm-3:00pm ET

Th 10:30am-12:30pm ET

Min Zhang (mzhang27) - *Teaching Assistant*

Email: mzhang27@ncsu.edu

Phone: xxx-xxx-xxxx

Office Location: Min will offer office hours via Zoom

Office Hours: TuTh 5:00pm-6:00pm ET

Course Meetings

Lecture

Days: TH

Time: 3:00pm - 4:15pm

Campus: Main

Location: Erdahl-Cloyd 2304

This meeting is required.

Meeting Notes

All lectures will be recorded and archived on Panopto for students to review. Please be advised this course is being recorded for current and potential future educational purposes. By your continued participation in this recorded course, you are providing your permission to be recorded. Please be aware that the situation regarding COVID-19 is frequently changing, and the delivery mode of this course may need to change accordingly. Regardless of the delivery method, we will strive to provide a high-quality learning experience.

Course Materials

Textbooks

Probability and Statistics for Engineering and Sciences - Devore, Jay

Edition: 9th

ISBN: 9781305684164

Cost: eBook: \$40 (rent, included with Cengage "All In"), hardcover \$150-\$200 new

*This textbook is required.***Expenses**

None.

Materials

None.

Requisites and Restrictions**Prerequisites**

MA 241

Co-requisites

MA 242

Restrictions

None.

Transportation

This course will not require students to provide their own transportation. Non-scheduled class time for field trips or out-of-class activities is NOT required for this class.

Safety & Risk Assumptions

None.

Grading**Grade Components**

Component	Weight	Details
Homework	100	There will be 11 homework assignments worth 10 points each. They will be posted to the course website and will be due the following week by submitting a single pdf or image file with solutions via Moodle. One lowest homework grade will be dropped. For each assignment, some additional problems will be assigned for extra practice; solutions for these problems do not need to be submitted.
Two Midterm Exams	100 points each	Midterm Exam 1: 9/23/2021; Midterm Exam 2: 11/9/2021. All exams are closed book & note. Basic calculators (such as TI-83) and a single page of handwritten notes may be used on all exams. Requests for re-grading of exams must be made in writing. These requests should contain a complete description of the reason for grade adjustment and the student's name. The request should be attached to the exam and submitted to the instructor within two weeks of the day graded exams are made available to the students.
Comprehensive Final Exam	200	Final Exam: 12/7/2021. The final exam is closed book & note. Basic calculators (such as TI-83) and three pages of handwritten notes may be used on the exam. Requests for re-grading of exams must be made in writing. These requests should contain a complete description of the reason for grade adjustment and the student's name. The request should be attached to the exam and submitted to the instructor within two weeks of the day graded exams are made available to the students on Moodle.
Options Related to COVID-19	N/A	NC State returned to normal class grading beginning Summer 2021. The "enhanced S/U grading" and "late drop" options are no longer available. For more information, visit https://studentservices.ncsu.edu/your-resources/covid-19/spring2020-sat-grading/#return .

Letter Grades**This Course uses Standard NCSU Letter Grading:**97 ≤ **A+** ≤ 10093 ≤ **A** < 97

90 ≤	A-	< 93
87 ≤	B+	< 90
83 ≤	B	< 87
80 ≤	B-	< 83
77 ≤	C+	< 80
73 ≤	C	< 77
70 ≤	C-	< 73
67 ≤	D+	< 70
63 ≤	D	< 67
60 ≤	D-	< 63
0 ≤	F	< 60

Requirements for Credit-Only (S/U) Grading

In order to receive a grade of S, students are required to take all exams and quizzes, complete all assignments, and earn a grade of C- or better. Conversion from letter grading to credit only (S/U) grading is subject to university deadlines. Refer to the Registration and Records calendar for deadlines related to grading. For more details refer to <http://policies.ncsu.edu/regulation/reg-02-20-15>.

Requirements for Auditors (AU)

Information about and requirements for auditing a course can be found at <http://policies.ncsu.edu/regulation/reg-02-20-04>.

Auditors must accrue at least 35 points for in-class activities to receive a grade of "AU."

Policies on Incomplete Grades

If an extended deadline is not authorized by the instructor or department, an unfinished incomplete grade will automatically change to an F after either (a) the end of the next regular semester in which the student is enrolled (not including summer sessions), or (b) the end of 12 months if the student is not enrolled, whichever is shorter. Incompletes that change to F will count as an attempted course on transcripts. The burden of fulfilling an incomplete grade is the responsibility of the student. The university policy on incomplete grades is located at <http://policies.ncsu.edu/regulation/reg-02-50-3>.

Late Assignments

All due dates are firm and no late work will be accepted, unless arrangements are made with the instructor prior to the time assignments are due. Computer failures, lost files, and sickness (other than COVID-19) or other difficulties are not generally valid excuses for submitting an assignment late. Exceptions to this policy may be made in the event a student is quarantined because of COVID-19; please inform the instructor as soon as possible to make arrangements for any necessary alterations to assignment schedules.

Attendance Policy

For complete attendance and excused absence policies, please see <http://policies.ncsu.edu/regulation/reg-02-20-03>

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Attendance is required. For complete attendance and excused absence policies, please see <http://policies.ncsu.edu/regulation/reg-02-20-03>.

If you test positive for COVID-19, or are told by a healthcare provider that you are presumed positive for the virus, please work with your instructor on health accommodations and follow other university guidelines, including self-reporting ([Coronavirus Self Reporting](#)): Self-reporting is not only to help provide support to you, but also to assist in contact tracing for containing the spread of the virus. If you are in quarantine, have been notified that you may have been exposed to COVID-19, or have a personal or family situation related to COVID-19 that prevents you from attending this course synchronously, please connect with the instructor to discuss the situation and make alternative plans, as necessary.

Absences Policy

For complete excused absence policies, please see <http://policies.ncsu.edu/regulation/reg-02-20-03>.

Makeup Work Policy

There is no make up for in-class activities or homework assignments unless arranged in advance (see Late Assignments Policy). Students who are unable to attend an exam for a legitimate unavoidable reason may take a make-up exam only if they provide suitable documentation. According to university policy, a student must notify the instructor in advance if s/he will miss an exam. If it is not possible to notify the instructor in advance, the instructor must be given notice as soon as possible after the exam. Suitable documentation of an absence: examples include a physician's note in case of illness or letter from the University or a student's advisor. Students who have a personal emergency (extreme family illness or death, etc.) should contact the Division of Academic & Student Affairs (515-2446; <http://dasa.ncsu.edu/>) to obtain documentation.

Additional Excuses Policy

If you are quarantined or otherwise need to miss class because you have been advised that you may have been exposed to COVID-19, you should not be penalized regarding attendance or class participation. However, you will be expected to develop a plan to keep up with your coursework during any such absences. If you become ill with

COVID-19, you should follow the steps outlined in the Attendance Policy section above. COVID 19-related absences will be considered excused; documentation need only involve communication with your instructor.

Academic Integrity

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Students are required to comply with the university policy on academic integrity found in the Code of Student Conduct found at <http://policies.ncsu.edu/policy/pol-11-35-01>

Basic calculators (such as TI-XX) or computer software (such as R) may be used in conjunction with any resources posted to Moodle (lecture recordings, lecture slides, previous assignments, practice exams) or the Internet to complete all homework assignments. Students may form groups to collaborate on homework, but every student must submit their own solutions. For exams, Basic calculators (such as TI-XX) and the specified number of pages of handwritten notes may be used. Violations of academic integrity will be handled in accordance with the Student Discipline Procedures (NCSU REG 11.35.02).

Academic Honesty

See <http://policies.ncsu.edu/policy/pol-11-35-01> for a detailed explanation of academic honesty.

Honor Pledge

Your signature on any test or assignment indicates "I have neither given nor received unauthorized aid on this test or assignment."

Digital Course Components

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.

Digital Course Components:

Moodle: you will need a computer and reliable Internet access.

Panopto: you will need a computer and reliable Internet access with adequate bandwidth for video streaming.

Zoom (office hours only): you will need a computer and reliable Internet access with adequate bandwidth for video streaming, plus web camera, headphones, and microphone.

If you need access to additional technological support, please see the NC State Libraries Technology Lending program at <https://www.lib.ncsu.edu/devices>.

Accommodations for Disabilities

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, 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 (REG02.20.01) (<https://policies.ncsu.edu/regulation/reg-02-20-01/>).

Non-Discrimination Policy

NC State provides equal opportunity and affirmative action efforts, and prohibits all forms of unlawful discrimination, harassment, and retaliation ("Prohibited Conduct") that are based upon a person's race, color, religion, sex (including pregnancy), national origin, age (40 or older), disability, gender identity, genetic information, sexual orientation, or veteran status (individually and collectively, "Protected Status"). Additional information as to each Protected Status is included in NCSU REG 04.25.02 (Discrimination, Harassment and Retaliation Complaint Procedure). NC State's policies and regulations covering discrimination, harassment, and retaliation may be accessed at <http://policies.ncsu.edu/policy/pol-04-25-05> or <https://oied.ncsu.edu/divweb/>. Any person who feels that he or she has been the subject of prohibited discrimination, harassment, or retaliation should contact the Office for Equal Opportunity (OEO) at 919-515-3148.

Course Schedule

NOTE: The course schedule is subject to change.

Lecture TH 3:00pm - 4:15pm — Week 1 — 08/15/2021 - 08/21/2021

Devore ch. 1: course introduction, plots, location, variability

Lecture TH 3:00pm - 4:15pm — Week 2 — 08/22/2021 - 08/28/2021

Devore chs. 2.1-2.5: sample space, probability, conditional probability, law of total probability

Lecture TH 3:00pm - 4:15pm — Week 3 — 08/29/2021 - 09/04/2021

Devore chs. 2.5-3.2: independence, Bayes rule, Monty Hall problem, discrete random variables

Lecture TH 3:00pm - 4:15pm — Week 4 — 09/05/2021 - 09/11/2021

Devore chs. 3.2-3.4: expected values, binomial distribution

Lecture TH 3:00pm - 4:15pm — Week 5 — 09/12/2021 - 09/18/2021

Devore chs. 3.4-3.5: binomial, hypergeometric, negative binomial distribution

Lecture TH 3:00pm - 4:15pm — Week 6 — 09/19/2021 - 09/25/2021

Review for Midterm Exam 1

Midterm Exam 1 (9/23)

Lecture TH 3:00pm - 4:15pm — Week 7 — 09/26/2021 - 10/02/2021

Devore chs. 3.6, 4.1-4.2: Poisson distribution, continuous random variables

Lecture TH 3:00pm - 4:15pm — Week 8 — 10/03/2021 - 10/09/2021

Fall Break

Devore ch.4.2: continuous random variables

Lecture TH 3:00pm - 4:15pm — Week 9 — 10/10/2021 - 10/16/2021

Devore ch. 4.3: normal distribution

Lecture TH 3:00pm - 4:15pm — Week 10 — 10/17/2021 - 10/23/2021

Devore chs. 4.4-4.5: exponential distribution, gamma distribution, lognormal distribution

Lecture TH 3:00pm - 4:15pm — Week 11 — 10/24/2021 - 10/30/2021

Devore chs. 4.5, 5.1: beta distribution, joint distributions of two random variables

Lecture TH 3:00pm - 4:15pm — Week 12 — 10/31/2021 - 11/06/2021

Devore chs. 5.2: covariance, correlation

Review for Midterm Exam 2

Lecture TH 3:00pm - 4:15pm — Week 13 — 11/07/2021 - 11/13/2021

Midterm Exam 2 (11/9)

Devore chs. 5.3: statistics and distributions

Lecture TH 3:00pm - 4:15pm — Week 14 — 11/14/2021 - 11/20/2021

Devore chs. 5.4-5.5: distribution of sample mean, distributions of linear combinations

Lecture TH 3:00pm - 4:15pm — Week 15 — 11/21/2021 - 11/27/2021

Devore ch. 5.5: distributions of linear combinations

Thanksgiving

Week 16 — 11/28/2021 - 12/03/2022

No class meetings

Lecture TH 3:00pm - 4:15pm — Week 17 — 12/05/2021 - 12/11/2021

Final Exam (12/7)
