ST 501 Course Syllabus (Fall 2024)

Fundamentals of Statistical Inference I

INSTRUCTOR and TA INFORMATION

Name	Email
Minh Tang (course instructor)	mtang8@ncsu.edu
Jisu Oh (TA)	joh26@ncsu.edu

Virtual Office Hours

Zoom office hours with the course instructor are every Tuesday and Thursday from 8pm to 9pm (tentatively). Zoom office hours with the TA (Jisu Oh) are every Tuesday and Thursday from 3pm to 4pm. The zoom link is listed on the Moodle web-page for the course. I (the course instructor) am happy to meet one-on-one at a separate time if appropriate. Please email me to set up an appointment.

Email and Response Time

I try to respond to all email inquiry within 24 hours (unless I am traveling). If you had not heard back after 24 hours, please kindly send me a reminder of follow-up email.

General Discussion Board

The Moodle page for the course include a a general discussion bound. Questions about the course content can be posted on this discussion board as these questions can be answered by either the course instructor, the TA, or your fellow students and the provided answers can then be seen by everyone. I (the course instructor) will try to provide prompt responses to questions posted on this discussion board.

Weekly Update

I'll send a weekly reminder email to help everyone keep on track and communicate any common issues.

COURSE INFORMATION

Course website https://wolfware.ncsu.edu/courses/my-wolfware

Course Credit Hours: 3

Meeting Time and Location

No in-person meetings or synchronous activities (other than optional zoom office hours).

Prerequisites

MA 242 (Calc III) is required.

Required Textbook and/or Software

Textbooks: Mathematical Statistics and Data Analysis - John A. Rice
Edition: 3rd . ISBN: 978-0534399429
This course will cover the first 6 chapters of the book as well as a few topics not included in the book. The book will also be used for ST 502. **Do not** purchase the soft cover book (as it could be a slightly different version with slightly different or rearranged problems).

Lecture Notes

There will be lecture slides and lecture videos posted for most of the materials discussed in the textbook. Supplementary materials will be uploaded as appropriate. For additional lecture notes, see also the Penn State website for their online class ST414.

Software: Students in this course will use the R statistical software and the Rstudio IDE.
These software are open source, work on all major platforms, and are free to anyone. They are widely used in statistics and data science (behind python in data science but still quite popular).

Scanner: Students can (and are encouraged) to submit their "written" homework in pdf or word format (as it is easier to keep track of homework submissions and assigned grade). It is acceptable to write the homework by hand and scan it to a pdf. Therefore, you will need to have access to a scanner or use a phone app (easiest thing to do). We are not allowed to suggest an app due to liability purposes, but a quick search of “picture to pdf app” will give many good results. Alternatively, students may also type their homework assignment.

COURSE OVERVIEW

Catalog Description

First of a two-semester sequence in probability and statistics taught at a calculus-based level. Probability: discrete and continuous distributions, expected values, transformations of random variables, sampling distributions.

Students should gain an understanding of probability and random variables in order to have the foundation to conduct statistical inference in ST 502.

Structure

The course is **completely asynchronous**. Participants should set aside sufficient time in their schedules to read over the book, watch the lecture videos, and work on the assignments.

There are six borad unites for the course. These sections each have their material broken up into weeks. Each week you will have videos to watch and usually a homework assignment or exam to complete. Dates for the exam are provided later in this syllabus. Scheduling of the exam is done through the DELTA TESTING SERVICE here at NC State.

To obtain course help there are a number of options:

- General Discussion Board - This should be used for any question you feel comfortable asking and having others view. The TA, other students, and I will answer questions on this board. The discussion board also allows me to see if there is any subtle issues or common misunderstanding about the course materials that I can try to address in subsequent lectures.

- E-mail - If there is a question that you don't feel comfortable asking the whole class you can use e-mail. The TA and I will be checking daily (during the regular work week).

- Zoom Office Hours – You are strongly encouraged to attend either my or the TA office hours. These sessions can be used to share screens and have multiple users. You can do text chat, voice, and video and they are great for a class like this. Please send me an email if you want to schedule a meeting outside of these office hours.

LEARNING OUTCOMES

Course Learning Outcomes (COs): At the end of this course students will be able to

- find and interpret probabilities, expected values, and quantiles associated with a random variable or random vector.
- identify where commonly used parametric distributions are appropriate and use them to answer questions of interest.
- utilize methods for determining the distribution of a transformation.
- explain and implement convergence results, concepts, and proofs.
- use simulation based methods for approximating quantities such as probabilities, expected values, and distributions.

TECHNOLOGY REQUIREMENTS

Hardware

NC State's Online and Distance Education provides technology requirements and recommendations for computer hardware.

Software

> Moodle and Wolfware
    - Moodle Accessibility Statement

    - Moodle Privacy Policy
    - NCSU Privacy Policy
- Adobe Reader (for reading PDF files)
    - Accessibility Statement
    - Adobe Privacy Policy
- Zoom:
    - Zoom Accessibility Statement
    - Zoom Privacy Policy
- G Suite
    - Accessibility Statement
    - Privacy Policy
- Office 365
    - Accessibility Statement
    - Privacy Policy
- R Statistical Software and R Studio for programming

Computer Skills and Digital Information Literacy

Students are expected to have a reasonable understanding of how computers function and the logic required to instruct them. Students should be able to open and save files, upload attachments, and do similar tasks.

NETIQUETTE

Netiquette is the term used to describe the special set of rules for online communication.

Participants in the course should be aware that their behavior impacts other people, even online. I hope that we will all strive to develop a positive and supportive environment and will be courteous to fellow participants (including the course instructor). Due to the nature of the online environment, there are some things to remember when taking an online course and engaging with others.

Do: Follow the same standards of behavior that you subscribe to offline. Keep in mind that all online communication is documented and therefore permanent.

Don't: Flame others inn discussion forums. Flaming is the act of responding in a highly critical, sarcastic, or ridiculing manner, especially if done on a personal level. The discussion board are meant for constructive exchanges and learning.

Do: Ensure you are using the discussion board (or email me) to get help when you are struggling. It is perfectly acceptable to reach out for help after giving a good faith effort.

Do: Remember to read over your posts before selecing "Submit".

Don't: Use slang, poor grammar, and other informal language in discussion forums or emails (if possible).

GRADING

Grading Policy

It is the student's responsibility to be aware of their grades in the course and the appropriate level of work required. Your final grade in this course will depend on the following (subject to change with ample and advanced notification):

Item	Portion of Grade
Homework	**20%**
2 Midterm Exams	**40% (20% for each midterm)**
Final Exam	**40%**

Homework: There will be 8 homework assignments (weighted equally). Some of the assignments will include a programming portion. These assignments exist to give you a low-stakes way to practice the material. You can get help from the instructor, the TA, or your fellow classmates. The discussion board is a great place to go to ask questions about homework assignments! Students must complete their own work. Any copying of work (from another student or a website) will be prosecuted for academic dishonesty. See also the section on academic honesty later in the syllabus. Two assignments with the lowest scores will be dropped from the calculations for the grades. If an emergency arises, please contact the course instructor to discuss. It is possible that not all problems assigned will be graded, in which case questions that are graded will be chosen by the instructor (prior to looking at anything that is turned in).

Assignments are an **essential** part of the course. Successful completion of these assignments, **on your own** (with possibly a few hints from your instructor or classmates) is correlated with a good final grade. Bouncing of ideas (with your classmates) on homework problems is encouraged; but do exercise great caution in not delegating too much to your peers as

"**Mathematics is not a spectator sport. The only way to learn mathematics is to do mathematics" (Paul Halmos)**

Every student should make sure to write up his/her solutions independently of others. The assignments should be either written up **neatly** or typeset using e.g., LaTeX, Rmarkdown.

Exams: All exams are closed books. Students are allowed one page of notes (double sided) for the mid term exams and two pages of notes (double-sided) for the final exams so that memorization is not required. You are also allowed to use a calculator during the exams (although a calculator is not necessary). The exams are inherently cumulative including the final exam. The midterm exams are limited to 90 minutes while the final exam is limited to 150 minutes. All exams are held in the classroom. Except for the above page(s) of notes you may not seek help from other any resources during the exams.

If cheating occurs (either providing or receiving), the students will receive an F for the course.

Students who are unable to take an exam during the designated exam window for a legitimate unavoidable reason may be given the opportunity for a make-up exam or a re-weighting of their scores. You **must** take the exam with an in-person proctor (local or remote -setup through DELTA – see below)

Exams Dates

Midterm Exam 1 – Monday September 16, 2024 to Wednesday, September 18, 2024.

Midterm Exam 2 – Friday October 25, 2024 to Tuesday, October 29, 2024

Final Exam – Monday, December 9, 2024 to Wednesday, December 11, 2024.

DELTA Testing Services — This course requires proctored exams facilitated through DELTA. A proctor is an impartial third-party who verifies the identity of the student and ensures the academic integrity of an exam

Local students – DELTA Testing Services will offer exams for on-campus students at one of the local test centers. Please visit the DELTA Testing Services website for more information about on-campus testing.

Step 1: Make an Appointment. Exams at the DELTA Test Centers are by appointment only. To schedule your appointment, visit **go.ncsu.edu/takemytest**

Step 2: Come prepared

a) Bring a photo ID.
b) Know your UnityID.
c) If you are a DUO user, bring your registered device.

Students with Accommodations — If you have approved accommodations with NC State's Disability Resource Office (DRO), DELTA Testing Services wants to ensure that you receive the appropriate accommodations when you go to the test center. Students must fill out the Accommodation Request Form for each course in which accommodations are received **prior to making an appointment**. Once DELTA has processed your request(s), a confirmation email will be sent informing you that your accommodations have been processed and your appointments can be scheduled. Appointments must be made at least 4 hours in advance. You will not be able to schedule your appointment with your accommodations until your request has been received and processed by DELTA.

Off-Campus students — DELTA Testing Services will oversee the process of approving an off-campus proctor, sending all exam materials, and receiving any materials from your proctor.

To use a remote proctor for an exam, you must submit an online request and it must be approved by DELTA Testing Services.
Submit your request at least 7 days before your exam window. Most exam material is sent 2 - 3 business days before the exam window.

a) Pre-approved proctors are marked on the website's interactive map and are selectable in a drop-down menu in the request form.
b) If you do not see a pre-approved option in your area, it is your responsibility to find a proctor who meets the guidelines. When submitting a request, if your proctor is not pre-approved, select "other" and fill in the remote proctor's information. (Please double-check the remote proctor's email address.)

If you have any additional questions contact deproctor@ncsu.edu or call 919.513.1513.

Grading Scale

This course uses this grading scale (numbers are in percentages). Slight curving and might be done at the end of the semester but this curving can only improve your assigned grades. Rounding up to the nearest percentage point is also possible but not guaranteed.

Range	Letter
95 and above	A+
[90, 95)	A
[87,90)	A-
[83, 87)	B+
[80,83)	B
[77, 80)	B-
[73, 77)	C+
[70, 73)	C
[65, 70)	C-
[60, 65)	D+
[55, 60)	D
[50, 55)	D-
50 or lower	F

Note: This course may not be taken as an **S/U graded course**.

Students who wish to **audit** the course with satisfactory status must register officially for the course and will be required to obtain an 80% or greater in total on the homework assignments including the final assignment to receive credit.

COURSE POLICIES

Late Assignments

Late assignments are not accepted. Two of the lowest score assignments will be **dropped** from the grade calculations.

Grading disputes

Your assignment scores and exams score will be entered and stored on the Moodle page for the course. You are responsible for keeping track of your scores and to notify the course instructor should there be any missing grades or discrepancies. Grading dispute for an assignment will be considered only if the dispute is initiated within one week of the grade being entered. Grading dispute for an exam should be made within 72 hours of the score being entered. Grading dispute might entail regrading the whole submission.

Incomplete Grades

Incomplete (IN) grades are given only as specified in university regulations.

Attendance and Participation

There are generally no attendance or participation requirements. Attendance is really done through your watching of videos and participation is done through your discussion board posts and assignments.

Withdrawal Process: https://studentservices.ncsu.edu/your-classes/withdrawal/process/

General

Be nice! Also, some things in this course are going to be hard – math problems are not always easy and technology doesn't always work.

Course Assistance

As mentioned previously, to obtain course help there are a number of options:

- General Discussion Board - This should be used for any question you feel comfortable asking and having others view. The TA, other students, and I will answer questions on this board. This will be the fastest way to receive a response!
- E-mail - If there is a question that you don't feel comfortable asking the whole class you can use e-mail. The TA and I will be checking daily (during the regular work week).
- Zoom Office Hours Sessions.

  If you have technical difficulties, you can email the helpdesk (help@ncsu.edu, 919-515-4357). For specific questions about wolfware, moodle, or other instructional tools, you can contact LearnTech (learntech@ncsu.edu, 919-513-7094)

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. Therefore, students are required to uphold the university pledge of honor and exercise honesty in completing any assignment.

Please refer to the Academic Integrity web page for a detailed explanation of the University's policies on academic integrity and some of the common understandings related to those policies.

Students may be required to disclose personally identifiable information to other students in the course, via electronic tools like 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.

Outlined below are explicitly prohibited behaviors. This list is taken from Dr. Logan Opperman and is not exhaustive, but any of the following behaviors surrounding any assignment (homework, exam) constitutes an academic integrity violation for that assignment.

- Accessing complete or partial solutions* to the assignment provided on Chegg, Course Hero, or any other website, aside from those provided directly through the course Moodle page.
- Publishing the assignment in whole or part to Chegg, Course Hero, or any other website.
- Indirectly or directly acquiring advance access to an assignment or providing a fellow student with advance access to the assignment, subverting an imposed time limit.
- Indirectly or directly providing or acquiring solutions* to the assignment, in whole or in part, to any individual, fellow student or otherwise, excepting specifically identified an designated group members during the completion of an assignment which is explicitly a group assignment; even in that case, solutions should be developed collaboratively.
- Seeking any form of help in the completion of an assignment from any individual aside from the instructor or the TA. (hiring a private tutor is acceptable, but they cannot help you as you complete the assignments.)
- Plagiarizing the words or mathematical work of another resource (including course materials), without explicit reference and citation. Any submitted work should otherwise be original.
- Aiding any other student to commit the behaviors above.

Students are responsible for reviewing the NC State University PRR's which pertains 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

Students with 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)

Trans-Inclusive Statement

In an effort to affirm and respect the identities of transgender students in the classroom and beyond, please contact me if you wish to be referred to using a name and/or pronouns other than what is listed in the student directory.

Basic Needs Security

Any student who faces challenges securing their food or housing or has other severe adverse experiences and believes this may affect their performance in the course is encouraged to notify the instructor if you are comfortable in doing so. Alternatively, you can contact the Division of Academic and Student Affairs to learn more about the Pack Essentials program https://dasa.ncsu.edu/pack-essentials/

SYLLABUS MODIFICATION STATEMENT

Some modifications may be needed to the course as we go along. If the syllabus is modified in a substantial way, students will be contacted via an announcement.