THE OHIO STATE UNIVERSITY

STAT 6201

Mathematical Statistics (20963) Autumn 2026

Syllabus - Graduate Instructor Information

Name: Sagnik Nandy

Professional Qualifications
PhD, Statistics, University of Pennsylvania
MStat, Statistics, Indian Statistical Institute
BStat, Statistics, Indian Statistical Institute

Syllabus - Required or Recommended Readings

1. Probability and Statistics, Fourth Edition, by Morris H. DeGroot and Mark J. Schervish, Pearson Education, 2012. ISBN: 978-0321500465
2. Calculus, Volume 1: One-Variable Calculus, with An Introduction to Linear Algebra, by Tom M. Apostol, Waltham, Mass: Blaisdell, 1967. ISBN: 9780471000051.
3. https://ocw.mit.edu/courses/18-014-calculus-with-theory-fall-2010 (https://ocw.mit.edu/courses/18-014-calculus-with-theory-fall-2010/pages/course-notes/)

Syllabus - Course Schedule

Week	Topic	Material
1	Review of Calculus	

Week	Topic	Material
2	Introduction to Probability	
3	Conditional Probability and Independence	
4	Random Variables	
5	Moments and MGF	
6	Multivariate distributions	
7	Special distributions	
8	Notions of Stochastic Convergence	
9	Introduction to Poisson Process and Brownian motion	
10	Introduction to Hypothesis Testing, NP Lemma	
11	Z and t-tests, Pearson's chi-square	
12	Maximum likelihood estimation, Bayes estimation	

Course Details - Instructor Contact Details

Instructor Email: nandy.15@osu.edu

Course Details - Office Hours

Office Hours: MF 9:30-10:30 am, W 4:30-5:30 pm

Course Details - Additional Instructional Staff

Teaching Assistant: Hyeonglae Cho (Cho.1280@buckeyemail.osu.edu)

Course Details - Class Meeting Details

Class Meeting Details: 08:00 AM-09:15 AM - Cockins Hall 232 - MWF

Course Details - Course Description

Probability, random variables, expectation, moment generating functions, discrete and continuous distributions, limit theorems, maximum likelihood and Bayesian estimation, confidence intervals, hypothesis tests, Neyman-Pearson lemma, t and F tests. Prereq: Math 2153 or equiv, or permission of instructor. Not open to students with credit for 6301 or 6801.

Course Details - More About This Course

STAT 6201 offers an introduction to some of the core concepts from probability theory and statistical inference. Topics covered include probability, random variables, moments, moment generating functions, discrete and continuous distributions, stochastic convergence, confidence intervals, hypothesis tests, Neyman-Pearson lemma, t and F tests, maximum likelihood and Bayesian estimation

Course Details - Course Learning Outcomes

By the end of this course, students should successfully be able to:

☒ Understand the basic concepts in probability and statistics.

☒ Compute probabilities and moments for discrete and continuous

distributions.

☒ Comprehend the probabilistic methods needed to analyze and critically evaluate statistical models and arguments.

☒ Recognize the importance of statistical ideas.

Course Details - Canvas Assignment Schedule

Date	Name	Assignment Type	Points
9/9/26	Quiz 1	Assignment	10
9/30/26	Quiz 2	Assignment	10
10/12/26	Midterm 1	Assignment	30

Course Details - Grading Policy

Component	Grade	Date
Quiz 1	10	September 9, 2026
Quiz 2	10	September 30, 2026
Midterm 1	30	October 12, 2026
Quiz 3	10	November 5, 2026
Quiz 4	10	November 26, 2026
Midterm 2	30	December 9, 2026

Course Details - Grading Scale

Letter Grade	Percentage Range
A	100% to 93%
A-	< 93% to 90%
B+	< 90% to 87%

Letter Grade	Percentage Range
B	< 87% to 83%
B-	< 83% to 80%
C+	< 80% to 77%
C	< 77% to 73%
C-	< 73% to 70%
D+	< 70% to 67%
D	< 67% to 60%
E	< 60% to 0%

Course Details - Other

Homework, Collaboration, and Generative AI Policy

Homework will be assigned on a weekly basis. Homework assignments are intended to provide regular practice with the concepts, methods, and techniques developed in the course. Homework will not be collected or graded. Solutions will be posted by the instructor after students have had a reasonable opportunity to work on the assignment.

Students are expected to complete the homework assignments carefully and in a timely manner before consulting the posted solutions. Although homework does not contribute directly to the course grade, it is an integral part of the course. Quizzes will be based substantially on the concepts, methods, and types of problems appearing in the homework. Quiz questions may draw upon, modify, extend, or combine homework material, but will not necessarily be identical to homework problems.

Collaboration

Students are encouraged to discuss homework problems and course concepts with their classmates. Such collaboration may include comparing approaches, discussing relevant definitions and theorems, identifying errors, and explaining mathematical ideas to one another.

Collaboration should nevertheless support, rather than replace, each student's individual learning. Students are expected to make a serious independent effort on the homework and to ensure that they personally understand any solution obtained through collaboration. Students should not rely on another student's completed solution as a substitute for working through a problem themselves.

Unless explicitly authorized by the instructor, collaboration is not permitted on quizzes, examinations, or other individually assessed work.

Use of Generative Artificial Intelligence in homework

The use of generative artificial intelligence ("GenAI") tools, including but not limited to ChatGPT, Claude, Gemini, Copilot, and similar systems, is permitted for homework and other ungraded study activities, subject to the conditions below.

Students may use GenAI as a study aid to:

- explain definitions, concepts, proofs, or computational techniques;
- provide hints or suggest approaches to homework problems;
- generate examples or related practice problems;
- critique or check a solution developed by the student;
- identify possible mathematical, logical, or computational errors;
- compare alternative solution strategies;
- assist with visualization, computation, or exploratory work; and
- generate or discuss solutions to homework problems for purposes of study and verification.

Permission to use GenAI does not eliminate the student's responsibility to learn the material. Students are responsible for critically evaluating all AI-generated output. GenAI systems may produce incorrect arguments, invalid calculations, fabricated references, or superficially plausible but mathematically false statements. The student bears full responsibility for determining whether any information obtained from a GenAI system is correct.

Students are strongly encouraged to attempt each homework problem independently before requesting a complete solution from a GenAI system and, after using GenAI, to reproduce and explain the argument without AI assistance. The purpose of the homework is preparation for individually assessed work; the

ability to obtain an AI-generated solution will not substitute for the ability to solve or analyze related problems independently.

Unless explicitly authorized by the instructor, students may not use GenAI during quizzes, examinations, or any other assessment designated as individual work. This prohibition includes using GenAI to generate answers, obtain hints, check calculations, rewrite responses, debug solutions, or otherwise assist with an assessment. Where GenAI is prohibited, submitting work produced in whole or in part through unauthorized GenAI assistance may constitute a violation of the Code of Student Conduct.

Course Materials and Intellectual Property

Instructor-created course materials may be subject to copyright or other intellectual-property protections. Unless explicitly permitted by the instructor, students may not upload, distribute, reproduce, or provide substantial portions of instructor-created materials—including lecture notes, slides, solution sets, examinations, quizzes, or other restricted materials—to external GenAI systems.

Homework problems are an exception for purposes of the homework policy above: students may provide the text of an assigned homework problem to a GenAI system when doing so is reasonably necessary to obtain permitted study assistance. This permission does not extend to posted instructor solutions, quizzes, examinations, or other materials that the instructor has identified as restricted.

The instructor may establish different GenAI rules for a particular assignment, quiz, examination, project, or other course activity. Any activity-specific instructions supersede this general policy. When there is uncertainty about whether a particular use of GenAI is permitted, students are responsible for obtaining clarification from the instructor before using it.

Course Details - Instructor Policies

Instructor Availability, Class Attendance, and Course Communication Policy

Class Attendance

Students are strongly encouraged to attend all regularly scheduled class meetings in person. Class meetings are an essential component of the course and may include explanations, examples, derivations, problem-solving strategies, questions from students, and other discussion that is not reproduced in the materials posted on Canvas.

Students should not assume that posted lecture notes, slides, handouts, or other materials constitute a complete record of what was covered in class. Material discussed during class, including examples or concepts not appearing in posted materials, is considered part of the course content and may be assessed on quizzes, midterms, or other course activities.

Students who miss class are responsible for determining what material was covered and for obtaining any necessary notes or information from classmates or other available course resources.

Office Hours

The instructor encourages students to make regular use of in-person office hours for questions concerning course material, homework, assessment preparation, or other course-related matters.

Students are encouraged to attend regularly scheduled office hours in person whenever possible. No appointment is required for regularly scheduled office hours unless otherwise announced by the instructor.

Occasionally, circumstances may require the instructor to cancel or modify a scheduled office hour. Cancelled or substantially modified office hours will be announced through Canvas. Students are responsible for monitoring Canvas for such announcements.

Additional meetings outside regular office hours may be arranged at the instructor's discretion and subject to availability.

Email Communication

Students may contact the instructor by email regarding course-related matters. The instructor will make a reasonable effort to read and respond to student

emails; however, a response to every email is not guaranteed, and students should not assume that an email will receive an immediate response.

Questions requiring substantial mathematical explanation are generally better addressed during class or office hours. Students should not rely on an email sent shortly before a quiz, midterm, class meeting, or other time-sensitive course activity as a means of obtaining an immediate response.

Students remain responsible for course requirements, assessment dates, and announcements posted on Canvas regardless of whether an individual email has received a response.

Cancellation or Modification of Class Meetings

If the instructor plans to cancel a class meeting or convert a regularly scheduled in-person class to an asynchronous format, the instructor will ordinarily announce the change in class at least one week in advance. Relevant information may also be communicated through Canvas.

In emergency or unforeseen circumstances, it may be necessary to cancel, modify, or convert a class meeting with less than one week's notice. In such circumstances, the instructor will make a reasonable effort to inform students as promptly and appropriately as circumstances permit, including through Canvas or another official course communication channel.

Students are responsible for monitoring course announcements for changes to the instructional schedule.

Asynchronous Class Meeting on November 2

The class scheduled for November 2 will be conducted asynchronously. There will be no regular in-person class meeting on that date.

The instructor will post a recorded video lecture covering the material for that class. Students are responsible for viewing the posted lecture and learning the material presented in it. Unless otherwise announced by the instructor, material covered in the asynchronous lecture is part of the regular course content and may be assessed on subsequent quizzes, midterms, or other course activities.

Information concerning access to the recorded lecture and any accompanying materials will be communicated through Canvas.

Course Details - Course Policies

Quiz and Midterm Examination Policy

There will be four in-class quizzes and two in-class midterm examinations during the semester. The scheduled dates for all quizzes and midterms are posted on Canvas. Students are responsible for consulting Canvas regularly and being aware of all assessment dates.

Quizzes

Each quiz will be worth 10 points, for a total of 40 points across the four quizzes.

All quizzes will be administered in person and during the regularly scheduled class period. The material covered by each quiz will be announced by the instructor in advance. Quiz problems may be based on the concepts, techniques, and types of problems appearing in the assigned homework, but students should not expect quiz questions to be identical to homework problems. Problems may be modified, combined, or presented in a different form.

Students are expected to be present in class on the scheduled quiz date. Late, delayed, or make-up quizzes will not ordinarily be permitted. A make-up quiz may be authorized only in exceptional circumstances and solely at the discretion of the instructor. The existence of an absence or scheduling conflict does not, by itself, guarantee that a make-up assessment will be provided.

Midterm Examinations

There will be two midterm examinations, each worth 30 points, for a total of 60 points.

Both midterms will be administered in person during the regularly scheduled class period, unless the instructor explicitly announces otherwise.

Each midterm examination will be comprehensive through the material covered in the course up to the date of that examination. Accordingly, students should expect a midterm to assess material from any earlier portion of the course, rather than only material introduced since the preceding quiz or examination.

Students are required to take each midterm at its scheduled time. Late, delayed, or make-up midterm examinations will not ordinarily be permitted. Exceptions may be granted only in exceptional circumstances and solely at the discretion of the instructor.

Missed Assessments and Exceptions

Students who believe that exceptional circumstances will prevent or have prevented them from taking a quiz or midterm as scheduled should contact the instructor as promptly as reasonably possible. Any alternative assessment, make-up examination, rescheduling, or other accommodation under this policy requires the express approval of the instructor.

Permission granted in one instance does not create an entitlement to the same accommodation in another instance or for another student. Any make-up assessment that is authorized need not be identical in format, content, or difficulty to the original assessment, provided that it evaluates substantially the same course material and learning objectives.

Nothing in this policy is intended to supersede accommodations or procedures that the University requires the instructor to provide under applicable University policies.

Changes to Assessment Policies and Schedules

The instructor reserves the right to modify the quiz or midterm schedule, the material covered by an assessment, the format of an assessment, or the policies described above when circumstances reasonably require such a change. Any such changes will be communicated to students through an appropriate course communication channel, including Canvas and/or an in-class announcement.

Students are responsible for reviewing course announcements and Canvas regularly for updates to assessment dates, coverage, and policies.

Course Details - AI Use Policy

Generative Artificial Intelligence Use Policy

Because this course does not include graded take-home assignments, the use of generative artificial intelligence ("GenAI") for homework and other out-of-class study activities is generally permitted and primarily advisory in nature. Students are encouraged to use GenAI in ways that support, rather than replace, their own learning.

GenAI can fabricate information, produce incorrect mathematical arguments or calculations, create citations to sources that do not exist, or omit key information. You are ultimately responsible for the accuracy and integrity of any work or reasoning that you rely upon. Students should critically evaluate all AI-generated output and should not assume that a response is correct merely because it is stated confidently or presented in a polished form.

Permitted Uses: Study Assistance

Students may use GenAI as a virtual tutor for homework and general course preparation. Permitted uses include asking GenAI to:

- explain concepts, definitions, theorems, proofs, or methods;
- provide hints or alternative approaches to homework problems;
- work through or explain solutions to homework problems;
- generate additional examples or practice problems;
- quiz you on course topics;
- check calculations or mathematical reasoning;
- critique a solution that you have developed;
- help identify errors or gaps in an argument; and
- summarize or reorganize content that you have personally authored, such as your own class notes.

Although these uses are permitted, students are strongly encouraged to make a serious independent attempt at homework problems before consulting GenAI. Homework is intended to prepare students for quizzes and examinations, where

students will be required to demonstrate their own understanding without such assistance.

Brainstorming, Exploration, and Feedback

Students may use GenAI for brainstorming, exploration, and feedback in connection with ungraded course work. This may include generating possible solution strategies, comparing approaches, suggesting questions to investigate, or commenting on the clarity and correctness of student-created work.

Students remain responsible for determining whether any AI-generated suggestion is mathematically valid, relevant, and appropriate. The instructor's notes, lectures, assigned materials, and posted solutions should be treated as authoritative for the purposes of this course when they conflict with an AI-generated response.

Instructor-Created Course Materials

The materials in this course may be subject to copyright protection. Unless explicitly permitted by the instructor, students should not input or allow GenAI systems to access substantial portions of instructor-created course materials, including lecture slides, lecture notes, posted solutions, quizzes, examinations, or other restricted materials.

Students may, however, provide an individual homework problem to a GenAI system when doing so is reasonably necessary for the permitted study uses described above.

Quizzes, Midterms, and Other In-Class Assessments

The permissive policy described above applies to homework and other ungraded study activities only.

Unless explicitly permitted by the instructor for a particular assessment, the use of GenAI is strictly prohibited during quizzes, midterm examinations, and any other individually assessed in-class work. This prohibition includes using GenAI to:

- obtain an answer or partial answer;

- receive hints or suggested approaches;
- check calculations or reasoning;
- generate, rewrite, or complete any portion of a response; or
- otherwise assist with the assessment.

Unauthorized use of GenAI during an assessment may constitute academic misconduct under the Ohio State University Code of Student Conduct and will be handled in accordance with applicable University procedures.

Student Responsibility

Permission to use GenAI for studying does not reduce the student's responsibility to learn the material. Students should be able to reproduce, explain, and apply any argument or method they encounter through GenAI without relying on the AI system during an assessment.

In particular, students should be aware that quiz questions may be based on homework concepts and methods but may differ substantially from the exact homework problems. Reliance on AI-generated homework solutions without understanding the underlying reasoning is therefore unlikely to provide adequate preparation for assessments.

The instructor may modify the permitted or prohibited uses of GenAI for a particular course activity. Any specific instructions provided by the instructor for an assignment, quiz, examination, or other activity supersede this general policy. Students who are uncertain whether a particular use of GenAI is permitted should ask the instructor before using it.

Syllabus - University Policies

Office of Undergraduate Education - Standard Syllabus Statements

- Academic Misconduct
- Religious Accommodations
- Accommodations for Disability and Illness
- Intellectual Diversity
- Grievances and Solving Problems

- Creating an Environment Free from Harassment, Discrimination, and Sexual Misconduct
- Copyrights
- Content Warnings
- Mental Health Support
- Resources for Military-Connected Students
- Campus-wide Class Cancellations