



蘇州大學
Soochow University

STA 245 Introduction to Applied Probability

Fall 2023

Course Credits: 4

Contact Hours: 56 hours

Instructor: TBA

Email: TBA

COURSE OBJECTIVES

STA 245 is an introductory course in applied probability. Topics covered include: Introduction to probability theory, strategies of counting; the basic probability model, sample spaces, and conditional probability, including Bayes' theorem. Random variables (discrete and continuous) and their expectations, with coverage of the following distributions: binomial, Poisson, geometric, uniform, exponential, and normal. Introduction to jointly distributed random variables. Sequences of random variables, the law of Large Numbers and the Central Limit Theorem. Constant Markov Chains. Applications of probability to statistics.

Upon completion of this course, students will be able to:

1. Solve simple probability problems using different probability distributions and techniques;
2. Gain probabilistic understanding of various processes, view and analyze various processes and events in terms of uncertainty and randomness;
3. Understand how to choose and apply the right probability distribution or method to model and solve concrete problems effectively;
4. Understand and apply concepts from discrete probability, such as conditional probability and independence, to a wide range of situations;
5. Comprehend the fundamental concepts of continuous probability, including expectation (mean) and joint distributions for continuous random variables;
6. Gain insight into the applications of Markov chains in diverse situations.

PREREQUISITES



MAT 166 Differential and Integral Calculus

GRADING

Grades will be determined by accumulating points, with 100 points being the maximum, as follows:

ITEM	POINTS
Quizzes	20 Points
Assignments	20 Points
Midterm 1	15 Points
Midterm 2	15 Points
Final Exam	30 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

$$A \geq 90 > B \geq 80 > C \geq 70 > D \geq 60 > F.$$

We reserve the right to make adjustments to the overall grading policy.

COURSE MATERIALS

Required Texts:

Paul E. Pfeiffer, David A. Schum, *Introduction to Applied Probability*, Academic Press, 2014.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	<p>Topics:</p> <p>Topic 1: An Approach to Probability</p> <p>Topic 2: Elementary Strategies of Counting</p> <p>Topic 3: Basic Probability Model, Sample Spaces</p> <p>Topic 4: Sets and Events</p> <p>Assignment#1</p>



	Assessments: Quiz#1
Module 2	Topics: Topic 5: A Probability System Topic 6: Conditional Probability, Bayes' Theorem Topic 7: Independence in Probability Theory Topic 8: Composite Trials and Sequence of Events Assignment#2 Assessments: Quiz#2
Module 3	Topics: Topic 9: Random Variables Topic 10: Distribution and Density Functions Topic 11: Joint Probability Distributions Topic 12: Independence of Random Variables, Functions of Random Variables Assessments: Midterm#1
Module 4	Topics: Topic 13: Mathematical Expectation and Mean Value Topic 14: Variance and Other Movements Topic 15: Correlation and Covariance Topic 16: Conditional Expectation Assessments: Midterm#2
Module 5	Topics: Topic 17: Sequences of Random Variables Topic 18: The Central Limit Theorem Topic 19: Constant Markov Chains Topic 20: Final Exam Review, Q&A Assessments: Final Exam

ATTENDANCE

1) Class attendance is required. Missing classes without permission will lead to decrease in overall grade.

Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow University Academic Administration Office, the student might get a written warning



and might be prohibited from attending final exam.

2) Participants in this course are expected to arrive in class promptly and adequately prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed the reading prior to class and prepare thoughtful reflections/commentaries to share with fellow colleagues.

LEARNING REQUIREMENTS

- 1) Late assignments are not acceptable and are subjected to grade deductions.
- 2) Assignments submitted in the wrong format will be counted as not submitted.
- 3) Failure to submit or fulfill any required course component results in failure of the class.
- 4) Make-up for midterm and final exams only with valid excuses, as defined by the University.
- 5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

TECHNOLOGY POLICY

The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities DIRECTLY related to the course (e.g., note taking, reading course documents).

ACADEMIC INTEGRITY POLICY

Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.



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DISABILITY ACCOMMODATION

Soochow University is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.