



EEE 5543

Random Signal Principles

Section: RVC

Internet/Fully Online

Spring Term 2026

Course Time Zone: Eastern Time (ET). Course due dates and times are according to this time zone.

Professor Information

Atoussa Tehrani

Roles: Primary Instructor

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Response Time: 24 hours

Phone: (305)3484943

Office Hours: Wednesday 6:00 pm - 7:00 pm or by appointment

Office Location: EC3113

Department or Academic Unit: ECE

Course Prerequisites

Course prerequisites, if any, are listed below.

Course Description

This course covers the fundamentals of probability theory that includes probabilistic models, discrete and continuous random variables, multiple random variables and limit theorems. Bernoulli and Poisson processes that serve as the building blocks for more complex stochastic processes are covered in this course. They are used to model the behavior of random events in various fields, including communication, finance, and biology. Markov processes are also discussed; they are crucial in understanding the behavior of systems that follow a set of rules and can change state based on the current state and past states. They are used in applications ranging from predicting stock prices to analyzing traffic patterns.

The principles of random signals and processes are essential for understanding and analyzing the behavior of signals in various applications. These principles are applied in various fields such as communication, control, and signal processing. For example, in communication, random processes are used to model the noise and interference in signals, while in control systems, they are used to analyze the stability and performance of feedback systems. In signal processing, they are used to filter and transform signals to extract desired information.

Textbook and Course Materials

Introduction to Probability

Required/Recommended: Recommended

Authors: Dimitri P. Bertsekas, John N. Tsitsiklis

Publisher: Athena Scientific

Publication Date: 2008

Copyright Date: 2008

ISBN 10: 9781886529236

ISBN 13: 9781886529236

Chapters/Pages: 1 through 9

Readings, Materials, and Open Educational Resources (OER)

“Introduction to Probability” course on [MIT OpenCourseWare](#) taught by Prof. John Tsitsiklis

(textbook author).

Student Learning Outcomes/Objectives

- Define fundamental probability concepts including probabilistic models, conditional probability, and independence.
- Explain the difference between discrete and continuous random variables and describe their probability distributions.
- Describe the characteristics and applications of Bernoulli and Poisson processes, Markov chains, and random signals.
- Compute expectation, variance, and higher-order moments of random variables and functions of random variables.
- Apply probabilistic methods to model and analyze common engineering processes.
- Use joint, marginal, and conditional distributions in analyzing systems involving multiple random variables.

- Analyze the behavior of random processes such as Bernoulli, Poisson, and Markov models in time-dependent systems.
- Analyze correlation functions and spectral characteristics of random signals in communication and AI systems.
- Assess the implications of noise and uncertainty in system design using probabilistic tools.
- Evaluate statistical relationships using Pearson correlation and interpret significance using the Student's t-test.
- Design probabilistic models and apply spectral and statistical methods for solving problems in AI system design.

Expectations of this Course

This is an online course, which means most (if not all) of the course work will be conducted online. Expectations for performance in an online course are the same as a traditional course. In fact, online courses require a degree of self-motivation, self-discipline, and technology skills which can make these courses more demanding for some students.

Students are expected to:

- **review the getting started** page located in the course modules;
- **introduce yourself to the class** during the first week by posting a self-introduction in the appropriate discussion;
- **read the textbook** sections assigned for each Module
- **review the slides and watch** the module video lecture for each section

- **submit assignments** by the due date specified. **No late work will be accepted;**
- **take the practice quiz** to ensure that your computer is compatible with the learning management system, Canvas;
- **review** and follow the course calendar and weekly outlines;

The instructor will:

- respond to **emails** within **24 hours**;
- grade assignments and/or provide feedback within **7 days** of the assignment deadline.

Assignments & Assessments

Assignments

- Students must submit their homework assignments in Canvas by the due date. No credit is given to late submissions.
- All assignments are individual and each student must submit their own original work.
- The assignment rubric is included in each assignment.
- The expected turn-around time for feedback or grades is 7 days after the due date.

Quizzes

In order to mitigate any issues with your computer and online assessments, it is very important that you take the Practice Quiz from each computer you will be using to take your graded quizzes and exams. Assessments in this course are not

compatible with mobile devices and should not be taken through a mobile phone or a tablet.

- Students must take the quizzes in Canvas by the due date.
- When will students be able to see the results and the correct solutions after the quiz due date.
- The expected turn-around time for or grades is by the quiz due date.

Grading

This table indicates the categories used for evaluating the performance of students and the weight of each category.

Category	Weight
Homework	20%
Quizzes	20%
Midterm Exam	25%
Final Exam	35%
Total	100%

Letter Grade Distribution Table

Letter Grade	Range %
A	95 to 100
A-	90 to 94.99
B+	87 to 89.99
B	83 to 86.99
B-	80 to 82.99
C+	77 to 79.99
C	70 to 76.99

Letter Grade	Range %
D	60 to 69.99
F	0 to 59.99

Proctored Exams

The following Exams are proctored by using Honorlock:

- Midterm Exam
- Final Exam

Honorlock allows you to take exams online within a time frame set by your instructor. Your session is recorded and reviewed to ensure academic integrity.

Schedule of Topics

1/5/2026 - 1/18/2026	Ch 1 Sample space and probability
1/19/2026 - 2/1/2026	Ch 2 and Ch3 - Random variables
2/2/2026 - 2/15/2026	Ch 4 - Further topics on Random Variables
2/16/2026 - 3/8/2026	Ch 5 - Limit Theorem
3/9/2026 - 3/22/2026	Ch 6 - Bernoulli and Poisson Processes
3/23/2026 - 4/5/2026	Ch 7 - Markov Chains
4/6/2026 - 4/19/2026	Ch 8 and 9 - Statistical Inference

Canvas Schedule

Due Date	Assignment Name	Assignment Type	Points
	Academic Honesty Policy	Quiz	0
	Honorlock Practice Quiz	Quiz	0
	Open Forum	Discussion	0
1/18/26	Homework 1	Assignment	100
1/20/26	Homework 1 - Solutions	Assignment	0
2/1/26	Homework 2	Assignment	100
2/3/26	Homework 2 - Solutions	Assignment	0
2/3/26	Quiz 1	Quiz	100
2/15/26	Homework 3	Assignment	100
2/17/26	Homework 3 - Solutions	Assignment	0
2/17/26	Quiz 2	Quiz	100
2/20/26	Midterm Exam	Quiz	100
3/8/26	Homework 4	Assignment	100
3/17/26	Homework 4 - Solutions	Assignment	0

Due Date	Assignment Name	Assignment Type	Points
3/17/26	Quiz 3	Quiz	100

Course Communication

Communication in this course will take place via **the Canvas Inbox**. Check out the [Canvas Conversations Tutorial](#) or [Canvas Guide](#) to learn how to communicate with your instructor and peers using Announcements, Discussions, and the Inbox.

I will respond to all correspondence within **24 hours**.

Policies & Resources

Before starting this course, please review the Policies & Resources Page in Canvas, which includes comprehensive information on various University and Course Level Policies, such as:

- University Policies
- Accessibility and Accommodations
- Online Etiquette
- Technical Requirements and Skills
- Computer & Digital Literacy Skills
- Course Technology Accessibility Statements and Privacy Policies
- Academic Integrity
- Copyright Statement
- Nondiscrimination Statement
- Panthers Care & Counseling and Psychological Services (CAPS)
- Fair Use Policy

Zoom Video Conference

Zoom is a video conference tool that you can use to interact with your professor and fellow students by sharing screens, chatting, broadcasting live video/audio, and taking part in other interactive online activities.

Zoom meetings can be accessed via the Zoom link in the course navigation menu. Once you click on the Zoom link, it will route you to join the meeting for the respective class session. You will also be able to view upcoming meetings, previous meetings that you have already joined, and meeting recordings. Before joining an actual class session:

- Reference the [Zoom Student Tutorials](#) to learn about the tool, how to access your meeting room, and share your screen.
- Access the [Zoom Test Meeting Room](#) to test out the software before joining an actual session.

If you encounter any technical difficulties, please contact the [FIU Canvas Help Team](#). Please ensure you contact support immediately upon the issue occurring.

Nondiscrimination Statement

The **Office of Civil Rights Compliance and Accessibility (CRCA)** is responsible for ensuring that FIU maintains a workplace and learning environment free from discrimination, where current and prospective faculty, staff, and students are treated equitably. If any student, employee, or applicant has a sincere and reasonable belief that they have been discriminated against or harassed based on age, color, disability, marital status, ethnic or national origin, race, religion, retaliation, sex, or any other protected category, they can report their concerns to the CRCA team through report.fiu.edu.

