

UNIVERSITY OF TORONTO
Department of Electrical and Computer Engineering

Random Processes
ECE537
Fall 2024

Instructor: Prof. Elvino S. Sousa

Contact Info: BA7102, 416-978-3651, es.sousa@utoronto.ca
Cell: 416-554-6815.

Office hours: Thursdays 5-7 PM. There will be some exceptions to these dates. I will also be available at other times on a walk-in basis whenever I am in my office.

Introduction to the principles and properties of random processes, with applications to communications, control systems, and computer science. Topics include random vectors, random convergence, random processes, specifying random processes, Poisson and Gaussian processes, stationarity, mean square derivatives and integrals, ergodicity, power spectrum, linear systems with stochastic input, mean square estimation, Markov chains, recurrence, absorption, limiting and steady-state distributions, time reversibility, and balance equations.

Prerequisite: STA286, ECE355 or ECE302.

Corequisite: ECE355 can be taken at the same time as ECE357.

Textbook:

Alberto Leon-Garcia, *Probability and Random Processes for Electrical Engineering*, 3rd Edition, Pearson-Prentice-Hall, 2008.

Recommended References

1. Jeffrey S. Rosenthal, *A First Look at Rigorous Probability Theory*, 2nd Edition, World Scientific, 2006.
2. A. Papoulis and A. U. Pillai, *Probability, Random Variables, and Stochastic Processes*, 4th Edition, McGraw-Hill, 2002.

Lectures		
First: Sept 3; Last: Dec 3. (Oct 28-Nov 1, Fall study break, no lectures)		
Tuesday	12-1 PM	WB 219
Thursday	12-1 PM	WB 219
Friday	12-1 PM	WB 219

Tutorial: Weekly (Starting Sep 12)		
Fridays	1-3 PM	BA 2175

TA: Mohammad Javad-Kalbasi mohammad.javadkalbasi@mail.utoronto.ca

Grading

Final Exam	40%
Midterms (2x12.5%): Oct 15, 6:30 – 8 PM; Nov 12, 6:30 - 8 PM	25%
Quizzes (2 x 5%, Oct 1, Nov 22)	10%
Programming Assignments	25%
Total	100%

Test dates are subject to change.

- The quizzes and midterm will be Closed Book. The Final Exam will be Type D.
- There will be regular problem sets. These will be taken up in the Tutorials.

Graduate Attributes

This course focusses on “Knowledge Base for Engineers” and “Problem Analysis” graduate attributes. Students taking this course will be able to:

- Demonstrate competence in mathematics and modeling.
- Understand the natural sciences and engineering fundamentals
- Possess specialized engineering knowledge appropriate to the program
- Identify and characterize an engineering problem
- Formulate a solution plan (methodology) for an engineering problem
- Formulate and interpret a model
- Execute solution process for an engineering problem