



Course Code ECE-532	Course Title Probability and Random Processes	ECTS Credits 8
Department Engineering	Semester Fall or Spring	Prerequisites ECE-330, MATH-191
Type of Course Required	Field Engineering	Language of Instruction English
Level of Course 2 nd Cycle	Year of Study 1 st	Lecturer(s) Dr George Gregoriou
Mode of Delivery Face-to-face	Work Placement N/A	Co-requisites None

Objectives of the Course:

<p>The main objectives of the course are to:</p> <ul style="list-style-type: none">• Study random variables and random processes as they apply in engineering disciplines.• Develop an understanding of discrete and continuous random variables and how they can be used to model and analyze systems.• Study probability density functions and cumulative distribution functions, and how they can be used to characterize engineering systems.• Understand sets of random variables and how they relate to engineering applications.• Provide students with the basics of stochastic processes and their application to signal processing and communications systems.• Study advanced topics such as random walks, spectral representation and spectrum estimation.

Learning Outcomes:

<p>After completion of the course students are expected to:</p> <ul style="list-style-type: none">• Demonstrate knowledge and understanding of the mathematical tools, methods and techniques used in the analysis of stochastic processes.• Explain non-deterministic phenomena using the random experiment model.• Apply the concept of random variable and use the probability distribution and density function associated with the random variable in calculating probabilities of events.• Be able to extend the concept of a random variable to that of a random process as an indexed set of random variables.• Apply the theory of random processes to signal processing and communications systems.• Demonstrate knowledge in topics such as random walks, spectral representation and spectrum estimation.
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Course Contents:

<ul style="list-style-type: none">• Probability• Axioms of probability.
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- Repeated trials.
- Random variable
- Functions of a random variable.
- Two random variables
- Sequence of random variables.
- Stochastic processes
- Random walks and other applications
- Spectral representation
- Spectrum estimation.

Learning Activities and Teaching Methods:

Lectures, in-class examples and exercises

Assessment Methods:

Homework, mid-term exam, project, final exam

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
A. Papoulis, S. Pillai	Probability, Random Variables and Stochastic Processes	McGraw Hill, 4 th edition	2001	0073660116

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
P. Z. Peebles	Probability, Random Variables and Random Signal Principles	McGraw Hill	2001	0073660078