UNIVERSITY of NICOSIA

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

Objectives of the Course:

The main objectives of the course are to:
- 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:

After completion of the course students are expected to:
- 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.

Course Contents:

- Probability
- Axioms of probability.

- 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, 4th 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