THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY | HKUST Summer School

ELEC 2600 – Probability and Random Processes in Engineering

School:	**School of Engineering**
Subject Area:	**Electronic and Computer Engineering**
Course Credit:	**4**
Instructor:	**QIAN Jun**
Pre-requisite/co-requisite:	**Details Here**

Notes:

- The syllabi provided here is for reference only and may be subject to changes and adjustments as determined by the course instructors.

The Hong Kong University of Science and Technology

UG Course Syllabus

Probability and Random Process in Engineering

ELEC2600

Credits: 4

Exclusion(s): ELEC2600H, MATH2421

Prerequisite(s): MATH 1003 or MATH 1014 or MATH 1020 or MATH 1024

Corequisite(s): MATH2011 or MATH2023

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Course Description

This course introduces the foundational concepts of statistical inference and random processes in electrical engineering, including the necessary probabilistic background. It includes a study of random variables, distribution and density functions, characteristic functions, conditional statistics, expectation, moments, and stochastic processes.

Intended Learning Outcomes (ILOs)

On successful completion of this course, students will be able to:

CO1: Understand the mathematical basis of probability models and apply these models to engineering challenges.

CO2: Manipulate and utilize probability models effectively to address and resolve various engineering problems.

CO3: Recognize and classify probabilistic experiments, developing appropriate probability models to accurately represent these experiments.

CO4: Utilize Python as a powerful software tool to manipulate, process, analyze, and plot data related to engineering probability models.

Required Texts and Materials

Probability, Statistics and Random Processes for Electrical Engineering, 3rd ed., Alberto Leon-Garcia, Addison Wesley, 2009.

List of Topics

Lecture Outline

Lecture 1	Course Introduction	Build a Probability Model	Conditional Probability & Independence
Lecture 2	Sequential Experiments	Discrete Random Variables	
Lecture 3	Expected Value and Moments	Important Discrete Random Variables	
Lecture 4	Continuous Random Variables	Expectation of Continuous Random Variables	
Lecture 5	Conditional PMF/CDF/PDF	Function of a Random Variable	
Lecture 6	Pairs of Discrete Random Variable	Midterm	
Lecture 7	Pairs of Continuous Random Variable	Conditional Probability and Independence	
Lecture 8	Joint Moments and Conditional Expectation	Sum of Two Random Variables	
Lecture 9	Pairs of Jointly Gaussian Random Variables	More than Two Random Variables	
Lecture 10	Laws of Large Numbers	Central Limit Theorem	
Lecture 11	Definition of a Random Process	Sum Processes and Independent Stationary Increment Processes	
Lecture 12	Mean and Autocorrelation of Random	Stationary Random Process	

Assessments:

Assessment Task	Contribution to Overall Course grade (%)
Homework	8%
Laboratory exercises	12%
Mid-Term	35%
Final examination	45%

Communication and Feedback

Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission. Students who have further questions about the feedback including marks should consult the instructor within five working days after the feedback is received.

Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to Academic Integrity | HKUST – Academic Registry for the University's definition of plagiarism and ways to avoid cheating and plagiarism.