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:	**MIAO Wenchao**
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

4 Credits

Exclusion(s): ELEC2600H, MATH2421

Prerequisite(s): MATH1003 or MATH1014 or MATH1020 or MATH1024

Corequisite(s): MATH2011 or MATH2023

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Office Hours: By appointment

Course Description

An introduction to statistical inference and random processes in electrical engineering, including the necessary probabilistic background, random variables, distribution and density functions, characteristic functions, conditional statistics, expectation, moments, stochastic processes.

Intended Learning Outcomes (ILOs)

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

CO1 - Understand the mathematic basis of probability models and their application to engineering

CO2 - Manipulate probability models to solve engineering problem

CO3 - Recognize probabilistic experiments and develop relevant probability models for representing such experiments

CO4 - Use Python as a software tool to manipulate, process, analyze and plot quantities relating to engineering probability models

Assessment and Grading

This course will be assessed using criterion-referencing and grades will not be assigned using a curve. Detailed rubrics for each assignment are provided below, outlining the criteria used for evaluation.

Assessments:

Assessment Task	Contribution to Overall Course grade (%)	Due date
Homework	8%	TBD
Laboratory Exercises	12%	TBD
Mid-Term Examination	35%	TBD
Final Examination	45%	TBD

Mapping of Course ILOs to Assessment Tasks

Assessed Task	Mapped ILOs	Explanation
Homework, Laboratory Exercises, Mid-Term Examination, Final Examination	ILO1, ILO2, ILO3. ILO4	This task assesses students' ability to explain and apply concepts, evaluate their implications, critically analyze their role in society, and synthesize a well-argued solution.

Grading Rubrics

Detailed rubrics for each assignment will be provided. These rubrics clearly outline the criteria used for evaluation. Students can refer to these rubrics to understand how their work will be assessed.

Final Grade Descriptors:

Grades	Short Description	Elaboration on subject grading description
A	Excellent Performance	Demonstrates a comprehensive grasp of subject matter, expertise in problem-solving, and significant creativity in thinking. Exhibits a high capacity for scholarship and collaboration, going beyond core requirements to achieve learning goals.
B	Good Performance	Shows good knowledge and understanding of the main subject matter, competence in problem-solving, and the ability to analyze and evaluate issues. Displays high motivation to learn and the ability to work effectively with others.
C	Satisfactory Performance	Possesses adequate knowledge of core subject matter, competence in dealing with familiar problems, and some capacity for analysis and critical thinking. Shows persistence and effort to achieve broadly defined learning goals.
D	Marginal Pass	Has threshold knowledge of core subject matter, potential to achieve key professional skills, and the ability to make basic judgments. Benefits from the course and has the potential to develop in the discipline.
F	Fail	Demonstrates insufficient understanding of the subject matter and lacks the necessary problem-solving skills. Shows limited ability to think critically or analytically and exhibits minimal effort towards achieving learning goals. Does not meet the threshold requirements for professional practice or development in the discipline.

Course AI Policy

Students may use generative artificial intelligence tools to assist with assessment tasks, but they must declare any such use. When submitting work that has been created or substantially aided by AI tools, students are required to provide a clear statement detailing which parts of the work were generated by AI and how the tools were used. Failure to disclose the use of AI tools in coursework may be considered academic misconduct and could result in penalties.

Communication and Feedback

Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission. Feedback on assignments will include [specific details, e.g., strengths, areas for improvement]. Students who have further questions about the feedback including marks should consult the instructor within five working days after the feedback is received.

Required Texts and Materials

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

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.

Additional Resources

- Introduction to Random Signals and Applied Kalman Filtering, 4th ed., G. Brown and P. Y. C. Hwang, New York: John Wiley & Sons, 2012.
- Probability and Random Processes, 3rd ed., G. Grimmet and D. Strizaker, Oxford University Press, 2001.
- Probability, Random Variables and Stochastic Processes, 4th ed., A. Papouils and S. U. Pillai, Mc-Graw Hill, 2002.
- Probability, Random Processes and Estimation Theory for Engineers, 4th ed., H. Stark and J. W. Woods, Prentice Hall, 2012.