

# Probability Models in Information Engineering

Department of Electrical Engineering  
City University of Hong Kong

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# Syllabus Outline

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- Probability

Definitions, rules and axioms, independent and dependent events, conditional probability, Bayes' rule, combinatorics

- Random Variables

Discrete and continuous random variables, distribution functions, multiple random variables, expected values, conditional distribution functions and expectation

- Random Processes

Types of random processes, stationarity, correlation, ergodicity

- Applications of Probability Modelling

Information entropy, detection, estimation

# Intended Learning Outcomes

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On successful completion of this course, you will

- Understand basic concepts and theories in probability
- Understand random variables and their distributions
- Understand random processes
- Apply probability, random variables and random processes to solve real-life problems including those in engineering areas such as signal processing, communications and networking
- Perform computer simulation to formulate, solve, analyze problems related to probability

# Teaching Schedule

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Date	Week	Remark
12 Jan.	1	
19 Jan.	2	
26 Jan.	3	
9 Feb.	4	Assignment 1
16 Feb.	5	Project 1
23 Feb.	6	Assignment 2
2 Mar.	7	Test 1 (15%)
9 Mar.	8	
16 Mar.	9	
23 Mar.	10	
30 Mar.	11	Assignment 3
6 Apr.	12	Test 2 (15%)
13 Apr.	13	Project 2

Note:

Lecture: Noon – 1:50p.m. (Wed. YEUNG LT-9)

Tutorial: 2:00p.m. – 2:50p.m. (Wed. LI 4400)

2:00p.m. – 2:50p.m. (Tue. LI 4400)

Tutorial starts at 12 Jan. (Wed.)

Due to Ching Ming Festival on 5 Apr. (Tue.), we skip the tutorial on 6 Apr. (Wed.)

Tutorial ends at 19 Apr. (Tue.)

For each test, 1.5-hour duration and open book format are assumed.

Teaching Assistants:

Mr. Xiaopeng Li; [x.p.li@my.cityu.edu.hk](mailto:x.p.li@my.cityu.edu.hk)

Mr. Zhaofeng Liu; [zhaofeliu3-c@my.cityu.edu.hk](mailto:zhaofeliu3-c@my.cityu.edu.hk)

# Assessment

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**Coursework:** 50%

- Assignments/Projects: 20%
- Tests: 30%

**Examination:** 50%

To pass the course, **at least 30%** of coursework **AND** examination marks are required.

**Act of academic dishonesty (e.g., plagiarism, submission for assessment of material that is not your own work, cheating in test or examination) will be liable to disciplinary actions**