**Probability and Stochastic Process**

**Instructor**

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### Course description

This course will introduce students to the modelling, quantification, and analysis of uncertainty. Topics covered include: formulation and solution in sample space, random variables, transform techniques, simple random processes and their probability distributions, limit theorems, and Markov chains.

**Prerequisites**

Calculus、Linear Algebra

### Weekly Schedule

| **Time** | **Teaching focus** |
| --- | --- |
| Week 1 | Probability and axioms |
| Week 2 | Conditioning and Bayes’ rule |
| Week 3 | Independence |
| Week 4 | Discrete random variables;  Probability mass functions; Expectations |
| Week 5 | Conditional expectation;  Multiple discrete random variables |
| Week 6 | Continuous random variables |
| Week 7 | Multiple continuous random variables |
| Week 8 | Derived distributions, convolution |
| Week 9 | Mean square estimation;  Covariance and correlation; Transforms |
| Week 10 | Conditional Expected Value |
| Week 11 | Sum of a random number of random variables |
| Week 12 | Holiday |
| Week 13 | Weak law of large numbers |
| Week 14 | Central limit theorem |
| Week 15 | Bernoulli process; Poisson process |
| Week 16 | Course review |

**Reference textbook:**

S.Ross, A First Course in Probability, 8ed, Prentice-Hall, 2010