Contents

Course Details

- Tutorials
  - Wednesday 1-2
- Lectures
  - Wednesday
  - 3-5
- Exam
  - Mid term
    - 20%
  - Summer exam
    - 80%

Course Overview

1. Random Events
   - Counting
   - Events
   - Axioms of probability
   - Bayes
   - Independence
2. Random Variables
   - Discrete RVs
   - Mean and variance
   - Correlation
   - Conditional Expectation

3. Inequalities and laws of large numbers
    - Markov
    - Chebyshev
    - Chernoff bounds
    - Sample mean
    - Weak law of large numbers
    - Central limit theorem
    - Confidence intervals
    - Bootstrapping
4. Statistical models
    - Continuous random variables
    - Logistic regression
    - Least squares

Probability in Computer Science

- Machine learning, data analytics, "big data"
- Cloud applications, data centres, network design
    - Data centres e.g. load balancing, queues, job arrivals, capacity and reliability
    - Networks e.g. WiFi random access, queues, traffic arrivals, information theory
- Spam, passwords, hash tables, etc.

Probability in Real Life

- Insurance, financial markets, the economy
- Health