

ECE316 Probability and Random Processes Winter 2014

Course materials can be viewed on **LEARN ECE316**

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Office hours: By appointment (use e-mail to request)

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Office hours will be announced later.

Schedule: Classes:

Time 09:30-10:20 TWTh Room RCH 103

Please note there will be no lectures during the week of January 20-24, 2014.

Extra Lectures (on the following Tuesdays)

Time 12:30-01:20T Date 01/07 Room QNC 1502

Time 12:30-01:20T Date 01/28 Room QNC 1502 (**note change from official listing**)

Time 12:30-01:20T Date 02/04 Room QNC 1502

Time 12:30-01:20T Date 02/25 Room QNC 1502

Time 12:30-01:20T Date 03/11 Room QNC 1502

Time 12:30-01:20T Date 03/25 Room QNC 1502

Tutorials (on Wednesdays including week of Jan 20):

Time: 08:30-09:20 W Room RCH 103

Pre-requisites: Algebra and Calculus

Course outline

- Review of basic combinatorial analysis: Counting, permutations, combinations, identities (Chapter 1) (1 lecture) You are expected to read this chapter on your own and know the material as

background.

- Introduction to probability: Axioms, sample spaces, events, and set operations. Sample spaces with equally likely outcomes. Examples (Chapter 2 except 2.6) (3 lectures)
- Independence and conditioning: Independence, conditional probabilities, law of total probability, Bayes' formula (Chapter 3) (3 lectures)
- Random variables and distributions. Discrete and continuous. Expectation, moments, common distributions (Chapters 4 and 5) (7 lectures)
- Joint distributions and jointly distributed random variables: Sums of independent random variables, conditional distributions (Chapter 6 6.1-6.5, 6.7) (6 lectures)
- Expectations and their properties: Moments, moment generating functions, characteristic functions, conditional expectation and its properties, jointly Gaussian (Normal) random variables (Chapter 7) (6 lectures)
- Limit theorems: Probability inequalities, Central Limit Theorem (CLT), Laws of Large Numbers, simple convergence ideas. (Chapter 8.1, 8.2, 8.3) (5 lectures)
- Introduction to random processes: Bernoulli, Poisson process, wide-sense stationary process. (Chapter 10.1, 10.2) (2 lectures)

Course text: There is a required course text. It is a well written book and well worth your investing in it.

A First Course in Probability, (9th edition), Sheldon Ross, Pearson/Prentice-Hall, 2006, ISBN 0-13-185662-6

The edition really does not matter. There are many other good books that deal with the material. Another book that I think is well written and covers the material is:

Introduction to probability, D. P. Bertsekas and J. N. Tsitsiklis, Athena Scientific , 2002. ISBN 1-886529-40-X.

This is an excellent book for further reading and understanding some of the material.

Note: The relevant chapters in the text are indicated in the set of parentheses in each item.

Course evaluation

- Weekly problem sets will be posted on course website. It will be your own interest to try to work on the problem sets yourselves. Solutions to selected problems will be discussed in the tutorials. **For this reason it is in your interest to attend your tutorial section.** The remaining solutions will be posted on the course website the following week.

There will be one midterm examination. The date will be posted when available.

- **Marks break-up:** Midterm 40%, Final Exam 60%.

Additional notes about conduct of course and classroom rules.

- No laptops or mobiles or other devices to be used during lectures.
- Be sure to check the website for up-to-date course information and announcements.
- Lectures will not be verbatim from the book. The text is a supplement to the class lectures.
- All exams will be closed book. No calculators or summary sheets will be allowed. The relevant formulae will be provided.
- If you miss a midterm without a verifiable and valid reason you will receive a 0 for the midterm.
- It is important to attend the tutorial sections.

Academic Dishonesty

The ECE faculty expect every student to practice honourable and ethical behavior both inside and outside the classroom. Any actions that might unfairly improve a student's score on graded work or examinations will be considered cheating and will not be tolerated. Examples of cheating include (but are not limited to):

- Sharing results or other information during an examination.
- Bringing forbidden material or devices to an examination.
- Working on an exam before or after the official time allowed.
- Requesting a re-grade of answers or work that has been altered.
- Representing as your own work anything that is the result of the work of someone else or material taken from elsewhere (the web) without proper attribution.

Cheating on an exam will result in a failing grade for the entire course. Please note that after the exam papers are graded, they will be copied; therefore, requesting a re-grade of an exam which has been altered will automatically result in a failing grade for the course. All occurrences of academic dishonesty will be reported to the Associate Chair for Undergraduate Studies of ECE and the Faculty. If there is any question as to whether a given action might be construed as cheating, please see the professor or the TA before you engage in any such action.