MATH/STAT 3360, Probability
Winter 2011
Toby Kenney

Instructor:	Toby Kenney Department of Mathematics and Statistics Chase Building, Room 251 email: tkenney@mathstat.dal.ca
Course Website:	`www.mathstat.dal.ca/~tkenney/3360/2011`
Office Hours: (provisional)	Monday 11:00-12:00, Tuesday 11:00-12:00 & Thursday 14:30-15:30
Lectures:	TT: 13:05-14:25 319 Chase Building
Topics:	discrete and continuous distributions, properties of random variables, law of large numbers, central limit theorem
Textbook:	"A First Course in Probability" (Eighth Edition) by Sheldon Ross published by Prentice Hall, 2010

Course Work and method of assessment

There will be a midterm exam and a final exam. The midterm will be held in class on Thursday 27th October, and should cover the material in Chapters 1–5. This may be changed, depending on the progress in lectures. The final exam will be scheduled by the Registrar's Office during the examination period: Friday 9th to Tuesday 20th December.

There will also be (approximately) weekly homework assignments, which must be handed on Thursdays in the lecture. After this, I will put the model solutions on the course website. **No credit can be given for late homework.** The overall homework mark will be made up of an average of the weekly homework marks, with the exception of the worst mark for each student.

The homework sheet will be divided into 3 sections: The *basic questions* section tests the basic concepts covered in the course: everyone should be able to do all these questions. The *standard questions* section has questions where the concepts covered in the course can be applied to realistic situations, or questions which involve a stronger theoretical insight; these questions are mostly straightforward, though there may be the occasional tricky question included. The *bonus questions* section has questions which are either more challenging, or else raise interesting or important issues that are not central to this course.

Sometimes a question will be started on one sheet, but continued on the following sheet, after the relevant material has been covered. In this case, the full question will be given on the earlier sheet, but the parts that should only be attempted with the later sheet are clearly marked, and are repeated on the later sheet. For some questions, I may occasionally give out a hint, rather than a complete model solution. Revised answers to these questions may then be submitted with the following week's homework.

Grades will be determined by performance in the exams and the weekly homeworks. The midterm exam counts for 30%, the final counts for 55%, while the homework counts for the remaining 15%. You must pass the final exam to obtain a passing grade in the course.

Weekly Readings

Since class time is limited, I will be using it for explaining concepts and going over examples, rather than reading through the textbook. You should therefore read through the relevant sections of the textbook *before* the lecture, in order to gain the full benefit from the lecture. The sections of the textbook that

will be covered each lecture will be listed on the website. This list may be updated from time to time, depending on the progress made in earlier lectures. Here is the current plan.

Week beginning	Tuesday	Thursday
5th September		Introduction
12th September	1.2 Basic Principle of Counting (Multiplication Principle, Rule of product), 1.3 Permutations	1.4 Combinations, 1.5 Multinomial Coefficients
19th September	2.2 Sample Spaces & events, 2.3 Axioms of Probability, 2.4 Simple Propositions	2.5 Sample Spaces of Equally Likely Events, 2.6 Probability as a Continuous Set Function, 2.7 Probability as a Measure of Belief
26th September	3.2 Conditional Probability, 3.3 Bayes Formula	3.4 Independant Events, 3.5 $P(.\|F)$ is a probability
3rd October	4.1 Random Variables, 4.2 Discrete Random Variables , 4.3 Expected Value	4.6 Bernoulli & Binomial Random Variables, 4.7 Poisson Random Variables
10th October	4.4 Expectation of a Function of a Random Variable, 4.5 Variance, 4.9 Expectation of Sums of Random Variables, 4.10 Cumulative Distribution Functions	5.1 Continuous Random Variables, 5.2 Expectation and Variance of Continuous Random Variables, 5.3 Uniform Random Variables
17th October	5.4 Normal Random Variables, 5.5 Exponential Random Variables, 5.7 Distribution of a Function of a Random Variable	Revision Chapters 1-5
24th October	Revision Chapters 1-5	MIDTERM EXAMINATION
31st October	6.1 Joint Distribution Functions, 6.2 Independent Random Variables	6.3 Sums of Independent Random Variables, 6.7 Joint Probability Distribution of Functions of Random Variables
7th November	6.4 Conditional Distributions (Discrete), 6.5 Conditional Distributions (Continuous)	STUDY DAY
14th November	7.2 Expectation of Sums of Random Variables, 7.3 Moments of the Number of Events that Occur, 7.4 Covariance, Variance of Sums and Correlation	7.5 Conditional Expectation, 7.6 Conditional Expectation and Prediction
21st November	7.7 Moment Generating Functions, 7.8 Additional Properties of Normal Random Variables	8.2 Markov's Inequality, Chebyshev's Inequality and the Weak Law of Large Numbers, 8.3 The Central Limit Theorem
28th November	8.4 The Strong Law of Large Numbers, 8.5 Other Inequalities (One-sided Chebyshev Inequality, Chernoff Bounds)	Revision
5th December	Revision	END OF LECTURES

Sections of the text covered

We expect to cover most of the material in Chapters 1–8 in the textbook.

Students with disabilities

Students with disabilities are encouraged to register as quickly as possible at the Student Accessibility Services if they want to receive academic accommodations. To do so, plese 'phone 494-2836, email access@dal.ca, drop in at the Killam, G28, or visit our website at www.studentaccessibility.dal.ca.

Plagiarism

Plagiarism is a serious academic offense which may lead to loss of credit, suspension or expulsion from the university. Please read the Policy on Intellectual Honesty contained in the Calendar or on the Dalhousie web site at: http://www.registrar.dal.ca/calendar/ug/UREG.htm#12.