

MATH/STAT 3460, Intermediate Statistical Theory  
Winter 2014  
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/3460/2014/](http://www.mathstat.dal.ca/~tkenney/3460/2014/)

**Office Hours:** Monday 15:30-16:30, Wednesday 15:30-16:30 & Thursday 10:00-11:00

**Lectures:** MWF: 14:35-15:25 319 Chase Building  
Maximum Likelihood, Frequency Properties, Tests of Significance

**Topics:** Sufficient Statistics and Conditional Tests

**Textbook:** "Probability and Statistical Inference Volume 2: Statistical Inference" (Second Edition)  
by J. G. Kalbfleisch  
published by Springer-Verlag, 1985

### Course Work and method of assessment

There will be a midterm exam and a final exam. The midterm will be held in class on Monday 3rd March, and should cover the material in Chapters 9–11. 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: Thursday 9th to Monday 26th April.

There will also be (approximately) weekly homework assignments, which must be handed on Fridays 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.

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	Monday	Wednesday	Friday
6th January	Introduction	9.1 Maximum Likelihood	9.1 Maximum Likelihood (cont.)
13th January	9.2 Combining Independent Events, 9.3 Relative Likelihood	9.4 Likelihood for Continuous Models	9.5 Censoring in Lifetime Experiments, 9.6 Invariance
20th January	9.6 Invariance (cont.), 9.7 Normal Approximations	9.7 Normal Approximations (cont.), 9.8 Newton's Method	10.1 Two-parameter Maximum Likelihood Estimation
27th January	10.2 Relative Likelihood and Contour Maps, 10.3 Maximum Relative Likelihood	10.3 Maximum Relative Likelihood (cont.), 10.4 Normal Approximations	10.5 A Dose-Response Example
3rd February	10.6 An example from Learning Theory	11.1 Sampling Distributions, 11.2 Coverage Probability	Monro Day
10th February	11.3 Chi-Square Approximation, 11.4 Confidence Intervals	11.4 Confidence Intervals (cont.) 11.5 Results for Two-parameter Models	11.6 Expected Information and Planning Experiments 11.7 Bias
24th February	Revision Chapters 9–11	Revision Chapters 9–11	Revision Chapters 9–11
3rd March	<b>MIDTERM EXAM</b>	12.1 Tests of Significance, 12.2 Likelihood Ratio Tests for Simple Hypotheses	12.3 Likelihood Ratio Tests for Compound Hypotheses
10th March	12.4 Tests for Binomial Probabilities, 12.5 Tests for Multinomial Probabilities	12.5 Tests for Multinomial Probabilities (cont.), 12.6 Tests for Independence in Contingency Tables	12.7 Cause and Effect, 12.8 Testing for Marginal Homogeneity
17th March	12.9 Significance Regions	15.1 The Sufficiency Principle	15.2 Properties of Sufficient Statistics
24th March	15.3 Exact Significance Levels and Coverage Probabilities, 15.4 Choosing the Reference Set	15.4 Choosing the Reference Set (cont.), 15.5 Conditional Tests for Composite Hypotheses	15.6 Some Examples of Conditional Tests
31st March	Revision	Revision	Revision
7th April	Revision	<b>END OF LECTURES</b>	

## 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, please 'phone 494-2836, email

access@dal.ca, drop in at the Killam, G28, or visit our website at [www.studentaccessibility.dal.ca](http://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>.

## **Dalhousie Writing Centre**

Writing expectations at university are higher than you will have experienced at high school (or if you are entering a master's or PhD program, the expectations are higher than at lower levels). The Writing Centre is a Student Service academic unit that supports your writing development. Make an appointment to discuss your writing. Learning more about the writing process and discipline-specific practices and conventions will allow you to adapt more easily to your field of study.