

COURSE OUTLINE

Fall 2016

Department of Statistical and Actuarial Sciences Statistical Sciences 9864: Statistical Computing

Course Description Review of fundamental concepts in statistical computing, including programming, numerical methods and Monte Carlo simulations. A selection of advanced topics such as bootstrapping, robust methods, statistical graphics, Markov chain Monte Carlo, non-linear regression, relational databases, statistical learning, time series analysis, and spatial statistics.

Instructor Dr. Duncan Murdoch, Room WSC 225, ext. 83618,
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E-mail policy You are welcome to communicate with me by e-mail. However, e-mail should be used only to provide me with information or to ask a question that requires a brief response. For more lengthy discussions, you should raise questions during class, or visit my office during the office hours, or make an appointment to see me. Should you decide to send an e-mail, please remember that I may only read e-mails sent from your UWO student account. E-mails from other accounts (e.g. Gmail, Hotmail, Yahoo, etc.) could be deleted automatically as spam.

Web page Assignments and notices will be posted on OWL or on <http://www.stats.uwo.ca/faculty/murdoch/9864>

Class times 10:30-11:30 MWF in WSC 248

Attendance at all lectures is required. If you must miss a lecture, please get notes from another student to make up for it. Unless they are on OWL, notes will *not* be available from me.

Office Hours TBA.

Text There is no text for the course. We will start out by studying R, using *A First Course in Statistical Programming with R, 2nd ed* and manuals available online in R. R itself is available for download as well.

Braun, W.J. and Murdoch, D.J. (2016). *A First Course in Statistical Programming with R*, 2nd edition. Cambridge University Press.

This book has been a text for STAT 2864, and covers some of the material in 9864 at a more elementary level.

Later material will be presented in class notes.

Assignments/exam There will be 5 assignments and a final exam. All assignments will involve programming. Assignment due dates will be: Sept 26, Oct 17, Oct 31, Nov 14, Dec 5.

There will be a three-hour final exam in December, at a time and place TBA. The exam period runs from December 10 to 21. Do not make travel arrangements until you know your exam schedule; holding an airline ticket is *not* an acceptable reason to miss the exam.

Assessment Marks will be based on 50% assignments, 50% exam. Late assignments will be penalized 20% for each day late (weekends count as one day).

The final exam will cover the whole course. All assignments and the exam will involve programming.

Rules and Regulations University and department rules will be enforced, with an aim of maintaining courtesy, respect and honesty in the class. Please see the web page <http://www.stats.uwo.ca/ugstudies/mutual.htm>, "Mutual Expectations of Students and Instructors". In particular, if you are caught cheating on an assignment, test or exam, we will follow the university scholastic discipline policy as listed here: <http://www.uwo.ca/univsec/handbook/appeals/scholoff.pdf>.

Missed Assignments Assignments must all be completed. While it is fine to talk with your classmates about how to solve a problem, you must do your assignments yourself. Some assignments must be submitted in electronic form, and I may use software to detect plagiarism.

TOPICS AND APPROXIMATE TIMING

Week of:	Topic
Sep 9	Course outline and introduction
Sep 12, 19	Basic programming in R, R Markdown
Sep 26	Computer number systems, numerical optimization (A1 due)
Oct 3	Monte Carlo simulation
Oct 12	Bayesian methods (no class on Monday)
Oct 17	Markov chain Monte Carlo (A2 due)
Oct 24	Document processing in knitr and L ^A T _E X (no class on Friday)
Oct 31	R packages, testing, optimization (A3 due)
Nov 7	Relational databases and SQL
Nov 14	Graphics programming: rgl, ggplot2, leaflet (A4 due)
Nov 21	Running a simulation study and report writing
Nov 28, Dec 5	Catching up, and review (A5 due)