MAST90061 Modern Statistical Methods

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2011, Parkville This subject commences in the following study period/s: Semester 2, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 36 hours comprising 2 one-hour lectures per week and 1 one-hour practice class per week. Total Time Commitment: 3 contact hours and 7 hours private study per week.
Prerequisites:	None
Corequisites:	None
Recommended Background Knowledge:	It is recommended that students have completed third year subjects in statistics (equivalent to 620-328 Linear Statistical Models and 620-330 Modern Applied Statistics).
Non Allowed Subjects:	None
Core Participation Requirements:	For the purposes of considering requests for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Students Experiencing Academic Disadvantage Policy, academic requirements for this subject are articulated in the Subject Description, Subject Objectives, Generic Skills and Assessment Requirements for this entry.The University is dedicated to provide support to those with special requirements. Further details on the disability support scheme can be found at the Disability Liaison Unit website: http://www.services.unimelb.edu.au/disability/
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Subject Overview:	Modern statistics is a blend of statistical theory and computational techniques. The understanding and application of modern statistical techniques such as the bootstrap, nonparametric density estimation, nonparametric regression, additive models, tree based methods, the EM algorithm and Markov chain Monte Carlo methods require the development of their theoretical properties, as well as development of suitable algorithms. In this course the emphasis will be on theory behind these techniques, and on how well they perform in both statistical research and applications.
Objectives:	After completing this subject students should gain: • an understanding of theory and computing of modern statistics and how they are implemented in applications; • the skills of using nonparametric and Monte Carlo methods in statistics; and • the ability to pursue further studies in this and related areas.
Assessment:	Up to 40 pages of written assignments (20%: two assignments worth 10% each,due mid and late in semester), a 3-hour written examination (80%, in the examination period).
Prescribed Texts:	None
Recommended Texts:	A.C. Davison & D.V. Hinkley. Bootstrap Methods and their Application, Cambridge UP, Cambridge (1997). G.H. Givens & J.A. Hoeting. Computational Statistics. Wiley (2005). T. Hastie, R. Tibshirani & J. Friedman. The Elements of Statistical Learning: Data Mining, Inference, and Prediction. Springer (2009). D. Ruppert, M.P. Wand & R.J. Carroll. Semiparametric regression, Cambridge University Press. (2003). M. P. Wand & M.C. Jones. Kernel Smoothing, Chapman&Hall (1995).

Breadth Options:	This subject is not available as a breadth subject.
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Generic Skills:	In addition to learning specific skills that will assist students in their future careers in science, they will have the opportunity to develop generic skills that will assist them in any future career path. These include: * problem-solving skills: the ability to engage with unfamiliar problems and identify relevant solution strategies; * analytical skills: the ability to construct and express logical arguments and to work in abstract or general terms to increase the clarity and efficiency of analysis; * collaborative skills: the ability to work in a team; * time-management skills: the ability to meet regular deadlines while balancing competing commitments.
Related Course(s):	Master of Operations Research and Management Science Master of Science (Mathematics and Statistics)