MAST90049 Random Walks & Random Structures

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2010, Parkville This subject commences in the following study period/s: Semester 2, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 36 hours: 1 x two-hour lecture per week and 1 x one-hour practical class per week. Total Time Commitment: 120 hours
Prerequisites:	None
Corequisites:	None
Recommended Background Knowledge:	It is recommended that students have completed a sound subject in real & complex analysis (equivalent to 620-221 [2008] Real and Complex Analysis or 620-252 [2008] Analysis) and a third year subject in partial differential equations (equivalent to 620-331 [2008] Applied Partial Differential Equations).
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/
Coordinator:	Prof Barry Hughes
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Subject Overview:	This subject is concerned with selected mathematical models of systems that evolve randomly with time and/or exhibit structural randomness and the application of these models in the physical biological and social sciences. Random walk models in discrete and continuous spaces and in discrete and continuous time are considered and related to both classical diffusion and to contemporary theories of anomalous diffusion. Random media are modelled using effective medium ideas scaling arguments and renormalization ideas and the rigorous framework of percolation theory.
Objectives:	After completing this subject students will # have learned how probabilistic modelling can be applied in a variety of areas from engineering, physical sciences, life sciences and social sciences; # know how a variety of mathematical techniques they have met in other contexts can be applied to systems that evolve randomly with time or exhibit structural randomness; # come to appreciate the role of simulation and physically motivated analytic approximations as exploratory tools in circumstances where rigorous arguments are difficult or presently unavailable, and where precise calculations may be available in principle but impractical to implement; # have 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:	None
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:	# Problem-solving skills including the ability to engage with unfamiliar problems and identify relevant solution strategies # Analytical skills through the ability to construct and express logical arguments and to work in abstract or general terms to increase the clarity and efficiency of analysis # Through interactions with other students, 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 Science (Mathematics and Statistics)