ACTL40008 Advanced Financial Mathematics II

Credit Points:	12.50
Level:	4 (Undergraduate)
Dates & Locations:	2011, Parkville This subject commences in the following study period/s: Semester 2, Parkville - Taught on campus.
Time Commitment:	Contact Hours: Three hours of lectures and/or tutorials per week Total Time Commitment: Not available
Prerequisites:	The following:

Subject	Study Period Commencement:	Credit Points:
ACTL40004 Advanced Financial Mathematics I	Semester 1	12.50

Corequisites:	None
Recommended Background Knowledge:	Please refer to Prerequisites and Corequisites.
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 Mark Joshi
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Subject Overview:	No-arbitrage pricing in continuous-time models; rational bounds for puts and calls; multidimensional Brownian motion and stochastic calculus; Girsanov's Theorem; pricing of options on dividend-paying securities; connections with partial differential equations; exotic options; interest-rate derivatives; actuarial applications.
Objectives:	# Understand, apply and find model-free no arbitrage bounds on derivatives prices # Understand and apply risk-neutrality, completeness and replication in the context of Binomial and trinomial trees # Deduce the Black--Scholes formula as a limit of tree prices # Use and manipulate Taylor series expansions of smooth functions # Have familiarity with the Greeks and be able to predict their behaviour under market movements # Informally derive and use Ito's formula to solve problems # Derive the Black--Scholes equation using Ito's formula # Define and use continuous time martingales. # Understand the relationships between martingale theory and derivatives pricing, and solve problems thereon. # Price European options using formulas, trees, numerical integration and replication methodologies, and discuss the pros and cons of each. # Price barrier options. # Price path-dependent exotic options using multiple techniques.

	# Understand higher-dimensional Brownian motion. # Use multi-dimensional martingale theory to price multi-asset options including quanto and Margrabe options. # Run higher-dimensional Monte Carlo simulations. # Give an actuary's viewpoint on all these topics.
Assessment:	A 50-minute mid-semester test (20%) and a 2-hour end of semester examination (80%).
Prescribed Texts:	You will be advised of prescribed texts by your lecturer.
Recommended Texts:	Information Not Available
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:	# High level of development: written communication; problem solving; statistical reasoning; application of theory to practice; interpretation and analysis; critical thinking. # Some level of development: synthesis of data and other information; evaluation of data and other information.