

620-635 Advanced Materials Modelling

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2009, This subject commences in the following study period/s: Semester 2, - Taught on campus.
Time Commitment:	Contact Hours: 36 hours comprising 1 two-hour lecture per week and 1 one-hour practical class per week. Total Time Commitment: Not available
Prerequisites:	None
Corequisites:	None
Recommended Background Knowledge:	It is recommended that students complete a third year subject in continuum mechanics (equivalent to 630-342 [2008] Industrial & Applied Mathematics).
Non Allowed Subjects:	None
Core Participation Requirements:	It is University policy to take all reasonable steps to minimise the impact of disability upon academic study and reasonable steps will be made to enhance a student's participation in the University's programs. This subject requires all students to actively and safely participate in laboratory activities. Students who feel their disability may impact upon their participation are encouraged to discuss this with the subject coordinator and the Disability Liaison Unit.
Coordinator:	Assoc Prof Antoinette Tordesillas, Dr Sean Shi
Subject Overview:	This subject focuses on physical principles and techniques for modelling the behaviour of advanced materials, which find applications in modern technological advances ranging from nanoelectromechanical systems and Atomic Force Microscopy to processes in the pharmaceutical and geotechnical industries involving the manipulation of fine powders and grains. Particular attention will be paid to development of continuum techniques and discrete models for describing the deformation and mechanical behaviour of fluids and granular materials. As such this subject will draw directly on fundamental knowledge gained by students in the field of continuum mechanics. Topics to be covered include basic elements of granular deformation and flow and numerical methods in fluid mechanics. Advanced mathematical techniques will also be introduced enabling both exact and approximate solutions.
Objectives:	After completing this subject, students should: <ul style="list-style-type: none"> # appreciate the context in which continuum and discrete modelling may arise in applications of advanced materials; # develop high level mathematical tools and knowledge that can be used to model a range of problems in solid mechanics; # develop the ability to implement physically justified approximations in solution of complex problems; # be exposed to both computational and analytical tools, and understand the various contexts in which they can be applied; and # gain the ability to pursue further studies in this and related areas.
Assessment:	Up to 60 pages of assignments (75%: three assignments worth 25% each, due early, mid and late in semester), a two-hour written examination (25%, in the examination period).
Prescribed Texts:	TBA.
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:	Upon the completion of this subject, students should develop the following generic skills: <ul style="list-style-type: none"># problem-solving skills (especially through tutorial exercises and assignments) including engaging with unfamiliar problems and identifying relevant strategies;# analytical skills including the ability to construct and express logical arguments and to work in abstract or general terms to increase the clarity and efficiency of the analysis;# ability to work in a team, through interactions with other students.
Related Majors/Minors/ Specialisations:	R05 RM Master of Science - Mathematics and Statistics