

411-652 Bionano Engineering

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: 34 hours of lectures; 6 hours of tutorials and 8 hours of practical demonstrations Total Time Commitment: 120 Hours
Prerequisites:	None
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	None
Core Participation Requirements:	<p><p>For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Student Support and Engagement Policy, academic requirements for this subject are articulated in the Subject Overview, Learning Outcomes, Assessment and Generic Skills sections of this entry.</p> <p>It is University policy to take all reasonable steps to minimise the impact of disability upon academic study, and reasonable adjustments will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact on meeting the requirements of this subject are encouraged to discuss this matter with a Faculty Student Adviser and Student Equity and Disability Support: http://services.unimelb.edu.au/disability</p></p>
Coordinator:	Prof David E Dunstan
Subject Overview:	<p>Nanotechnology and bionanotechnology, history and definition, fine particle fluids, colloidal dispersions and emulsions. The role of surfaces in processing and materials manufacture. Coagulation, electrokinetics, nano-particle dispersion and stability criterion. Inter-particle forces and parameters that influence flow and gelation properties. The role of molecular additives in controlling inter-particle forces and stability. Nano-particle characterisation using light scattering. Solution properties of polymers, macromolecules, self assembly surfactants, lipids, proteins and polysaccharides. The role of self assembly in the formation of structured nano and biomaterials. Cell assembly and molecular components. Nano-particle formation through precipitation. Surface layer structure, functionalisation and biocompatibility of nano-particles for pharmaceutical, drug delivery biosay, biosensor and immunology applications. Safety and ethical issues in bionanotechnology.</p>
Objectives:	On completion of this course students will be able to describe the role of surfaces, polymers and surfactants in rheology and be able to apply this knowledge to describe the forces which influence bio-nano interactions.
Assessment:	One 3-hour examination contributing 60% of the final assessment and two assignments each of up to the equivalent of 4000 words contributing 40% of the assessment.
Prescribed Texts:	None
Recommended Texts:	Larson R.G. The Structure and Rheology of Complex Fluids
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:	The subject will enhance the following generic skills:

	<ul style="list-style-type: none"># Capacity for independent thought.# The ability to analyse and solve open-ended problems.# The ability to comprehend complex concepts and communicate lucidly this understanding.# Awareness of advanced technologies in the discipline.# The ability to work in a team (practical work component).
Related Course(s):	Master of Biomedical Engineering