BIEN30001 Bionanoengineering

Credit Points:	12.50
Level:	3 (Undergraduate)
Dates & Locations:	2010, Parkville This subject commences in the following study period/s: Semester 2, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 34 hours of lectures, 6 hours of tutorials and 8 hours of practical demonstrations. Total Time Commitment: Estimated 120 Hours
Prerequisites:	# 431-202 Engineering Analysis B or equivalent # 411-257 Chemical Process Analysis 2 # 610-283 Reactions and Synthesis
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	411652 Bionano Engineering
Core Participation Requirements:	For the purposes of considering request 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 of 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 David Dunstan
Contact:	Melbourne School of Engineering Office Building 173, Grattan Street The University of Melbourne VIC 3010 Australia General telephone enquiries: + 61 3 8344 6703 + 61 3 8344 6507 Facsimiles: + 61 3 9349 2182 + 61 3 8344 7707 Email: **eng-info@unimelb.edu.au (../../../)**
Subject Overview:	Nanotechnology and bionanotechnology, history and definition, fine particle fluids, coloidal 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, functionionalisation and biocompatibility of nano-particles for pharmaceutical, drug delivery biossay, biosensor and immunology applications. Safety and ethical issues in bionanotechnology.
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 written 3-hour end-of-semester examination (80%); One assignment of up to 4000 words (not including appendices and diagrams and tables) due in the second half of the semester (20%). A grade of greater than 50% in the exam is required to pass the subject.
Prescribed Texts:	Larson R.G. The Structure and Rheology of Complex Fluids
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:	The subject will enhance the following generic skills: # 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 # Ability to work in a team (practical work component)
Related Course(s):	Bachelor of Engineering Bachelor of Engineering (Chemical) and Bachelor of Science