

BMEN90011 Tissue Engineering

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 of lectures, 12 hours of tutorials Total Time Commitment: Estimated 120 hours
Prerequisites:	None
Corequisites:	None
Recommended Background Knowledge:	# 650-121 Biomolecules and Cells or Engineering Biology or equivalent # 620-155 Calculus II or equivalent # 610-150 Chemistry for Biomedicine or equivalent
Non Allowed Subjects:	None
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:	Dr Katharina Ladewig
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:	Students studying Tissue Engineering will become familiar with the history, scope and potential of tissue engineering. This will include the use of biomaterials in tissue engineering; major scaffold materials and fabrication methods, scaffold strength and degradation. Cell sources, selection, challenges and potential manipulation. Cell-surface interactions, biocompatibility and the foreign body reaction, and surface engineering. The role and delivery of growth factors for tissue engineering applications. In vitro and in vivo tissue engineering strategies, challenges, cell culture, scale-up issues and transport modelling. Ethical and regulatory issues. Clinical applications of tissue engineering, such as bone regeneration, breast reconstruction, cardiac and corneal tissue engineering, and organogenesis (e.g. pancreas).
Objectives:	On completion of this subject/ course students should be able to: # Explain the significance and future potential of tissue engineering # Identify key challenges in tissue engineering of different human tissues # Describe the design, fabrication and biomaterials selection criteria for tissue engineering scaffolds # Describe the sources and challenges of using stem cells and non-stem cells for tissue engineering

	# Use simple models to quantify aspects of bioreactor design explain the ethical and regulatory issues of significance in tissue engineering.
Assessment:	One 3-hour examination contributing 70% of the final assessment Two assignments each of up to the equivalent of 4000 words contributing 30% of the assessment.
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:	<p>On Successful completion of this subject, students should be able to:</p> <ul style="list-style-type: none"> # Describe the scope of tissue and potential of tissue engineering in society; # Evaluate the parameters that go into making a successful tissue engineering scaffold. # Understand the challenges of cell sourcing, biomaterials engineering and scale-up in tissue engineering; # Apply knowledge of basic science and engineering fundamentals; # Undertake problem identification, formulation and solution; # Utilise a systems approach to design and operational performance; # Function effectively as an individual and in multidisciplinary and multicultural teams, with the capacity to be a leader or manager as well as an effective team member.
Related Course(s):	Master of Biomedical Engineering Postgraduate Certificate in Engineering