BMEN90011 Tissue Engineering & Stem Cells

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	This subject is not offered in 2013.
Time Commitment:	Contact Hours: 1 x two hour lecture + 1 x one hour lecture + 1 x one hour tutorial per week + 2 x two hours of laboratory work per semester Total Time Commitment: Estimated 120 hours
Prerequisites:	None
Corequisites:	None
Recommended Background Knowledge:	It is recommended that students have completed ANY ONE of: **BIOL10004 Biology of Cells and Organisms (../../view/current/BIOL10004)** **BIOL10002 Biomolecules and Cells (../../view/current/BIOL10002)** **CHEN90031 Bioprocess Engineering (../../view/current/CHEN90031)** (Prior to 2012 CHEN30014 Bioprocess Engineering) **BTCH90006 Bioprocess Engineering (../../view/current/BTCH90006)** CHEN90008 Biology for Engineers (Prior to 2013) As well as ONE OF:

Subject	Study Period Commencement:	Credit Points:
CHEM10006 Chemistry for Biomedicine	Semester 1	12.50
CHEM10003 Chemistry 1	Not offered 2013	12.50

And:

Subject	Study Period Commencement:	Credit Points:
MAST10006 Calculus 2	Not offered 2013	12.50

Non Allowed Subjects:

Subject	Study Period Commencement:	Credit Points:
BTCH90008 Tissue Engineering and Stem Cells	Not offered 2013	12.50

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/
Contact:	Email: **a.oconnor@unimelb.edu.au (mailto:a.oconnor@unimelb.edu.au)**
Subject Overview:	Students studying Tissue Engineering and Stem Cells will become familiar with the history, scope and potential of tissue engineering, and the potential role of stem cells in this field. This subject will address 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; 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, current status 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, selection, potential manipulations and challenges of using 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 # Discuss the challenges of in vivo implantation of biomaterials and scale-up issues relating to human clinical applications
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:	On successful completion of this subject, students should be able to: # 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 Master of Philosophy - Engineering Ph.D.- Engineering Postgraduate Certificate in Engineering
Related Majors/Minors/ Specialisations:	B-ENG Chemical Engineering stream B-ENG Chemical and Biomolecular Engineering stream Master of Engineering (Biomedical) Master of Engineering (Biomolecular) Master of Engineering (Chemical)