

# BMEN90011 Tissue Engineering & Stem Cells

Credit Points:	12.50																													
Level:	9 (Graduate/Postgraduate)																													
Dates & Locations:	2011, Parkville This subject commences in the following study period/s: Semester 2, Parkville - Taught on campus.																													
Time Commitment:	Contact Hours: 3 x one hour lectures + 1 x one hour tutorial per week Total Time Commitment: 120 hours																													
Prerequisites:	None																													
Corequisites:	None																													
Recommended Background Knowledge:	<p>It is recommended that students have taken ANY ONE of the following three subjects (or equivalent) prior to enrolling in this subject:</p> <table><tr><th>Subject</th><th>Study Period Commencement:</th><th>Credit Points:</th></tr><tr><td>BIOL10004 Biology of Cells and Organisms</td><td>Semester 1</td><td>12.50</td></tr><tr><td>BIOL10002 Biomolecules and Cells</td><td>Semester 1</td><td>12.50</td></tr><tr><td>CHEN90008 Biology for Engineers</td><td>Semester 1</td><td>12.50</td></tr></table> <p>As well as EITHER ONE of the following subjects (or equivalent):</p> <table><tr><th>Subject</th><th>Study Period Commencement:</th><th>Credit Points:</th></tr><tr><td>CHEM10006 Chemistry for Biomedicine</td><td>Semester 1</td><td>12.50</td></tr><tr><td>CHEM10003 Chemistry 1</td><td>Semester 1, Semester 2</td><td>12.50</td></tr></table> <p>And the following subject (or equivalent):</p> <table><tr><th>Subject</th><th>Study Period Commencement:</th><th>Credit Points:</th></tr><tr><td>MAST10006 Calculus 2</td><td>Semester 1, Semester 2</td><td>12.50</td></tr></table>			Subject	Study Period Commencement:	Credit Points:	BIOL10004 Biology of Cells and Organisms	Semester 1	12.50	BIOL10002 Biomolecules and Cells	Semester 1	12.50	CHEN90008 Biology for Engineers	Semester 1	12.50	Subject	Study Period Commencement:	Credit Points:	CHEM10006 Chemistry for Biomedicine	Semester 1	12.50	CHEM10003 Chemistry 1	Semester 1, Semester 2	12.50	Subject	Study Period Commencement:	Credit Points:	MAST10006 Calculus 2	Semester 1, Semester 2	12.50
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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: <a href="http://www.services.unimelb.edu.au/disability/">http://www.services.unimelb.edu.au/disability/</a>																													
Coordinator:	Assoc Prof Andrea O'Connor																													
Contact:	Email: <a href="mailto:a.oconnor@unimelb.edu.au">a.oconnor@unimelb.edu.au</a> (mailto:a.oconnor@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).
<b>Objectives:</b>	On completion of this subject/ course students should be able to: <ul style="list-style-type: none"> <li># Explain the significance and future potential of tissue engineering</li> <li># Identify key challenges in tissue engineering of different human tissues</li> <li># Describe the design, fabrication and biomaterials selection criteria for tissue engineering scaffolds</li> <li># Describe the sources and challenges of using stem cells and non-stem cells for tissue engineering</li> <li># Use simple models to quantify aspects of bioreactor design explain the ethical and regulatory issues of significance in tissue engineering.</li> </ul>
<b>Assessment:</b>	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.
<b>Prescribed Texts:</b>	None
<b>Breadth Options:</b>	This subject is not available as a breadth subject.
<b>Fees Information:</b>	Subject EFTSL, Level, Discipline & Census Date, <a href="http://enrolment.unimelb.edu.au/fees">http://enrolment.unimelb.edu.au/fees</a>
<b>Generic Skills:</b>	On Successful completion of this subject, students should be able to: <ul style="list-style-type: none"> <li># Describe the scope of tissue and potential of tissue engineering in society;</li> <li># Evaluate the parameters that go into making a successful tissue engineering scaffold.</li> <li># Understand the challenges of cell sourcing, biomaterials engineering and scale-up in tissue engineering;</li> <li># Apply knowledge of basic science and engineering fundamentals;</li> <li># Undertake problem identification, formulation and solution;</li> <li># Utilise a systems approach to design and operational performance;</li> <li># 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.</li> </ul>
<b>Related Course(s):</b>	Master of Biomedical Engineering Postgraduate Certificate in Engineering
<b>Related Majors/Minors/Specialisations:</b>	B-ENG Chemical and Biomolecular Engineering stream Master of Engineering (Biomedical) Master of Engineering (Biomolecular) Master of Engineering (Chemical)