BMEN90003 Clinical Engineering

Credit Points:	12.5
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2015, Parkville This subject commences in the following study period/s: Semester 2, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 48 hours Total Time Commitment: 200 hours
Prerequisites:	<table><tr><th>Subject</th><th>Study Period Commencement:</th><th>Credit Points:</th></tr><tr><td>BMEN30008 Biosystems Design</td><td>Semester 2</td><td>12.50</td></tr></table> **AND** Clinical placements are an integral part of this subject. Students will need to have completed a police check and have met immunisation requirements by week 3 of this subject. Please consult the subject coordinator for details.
Corequisites:	None
Recommended Background Knowledge:	None
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 Emmanuel Koumoundouros
Contact:	Assoc Prof David Grayden Email: **grayden@unimelb.edu.au (https://mce_host/faces/htdocs/%20grayden@unimelb.edu.au)**
Subject Overview:	**AIMS** This subject introduces students to the special requirements necessary for managing Medical Devices and Clinical/Biotechnological Environments. Topics covered include: detailed analysis of the cardiopulmonary system, including computer-aided modelling of the cardiovascular system and respiratory system; electrical devices that monitor/support these systems, international/national electrical/biological regulatory bodies and standards. **INDICATIVE CONTENT** Topics include: # Management of Medical Devices – the regulations, classifications and standard of Medical Devices. In particular AS3200 series of standards and AS3551 standard # Management of Clinical Areas – environmental control and electrical isolation in accordance to AS3000 and AS3003 # The Respiratory System – anatomy, physiology, mechanics of static and dynamics of breathing is monitored and modelled # The Cardiovascular System – anatomy, physiology, mechanics of static and dynamics of blood pressure monitoring systems

	# Electrophysiology – cellular physiology, electrical equivalent models, dipole models and Einthoven's model of the Electrocardiogram # These topics are complemented by exposure to Medical Devices in the Clinical Environment and use of software tools for modelling and parameter estimations in the Laboratory/Clinic.
Learning Outcomes:	**INTENDED LEARNING OUTCOMES (ILO)** Having completed this unit the student is expected to: 1 Describe the structure and function of cellular and cardiopulmonary systems 2 Interpret various measures of dynamic responses of the cardiopulmonary system 3 Calculate vascular resistances using thermodilution techniques 4 Implement and evaluate a physiological model on a computer 5 Develop models for analysing physiological systems to determine physiological parameters 6 Design a monitoring system to monitor a specific physiological process 7 Describe the principles underlying various life support devices 8 Identify types of medical devices and their safety requirements 9 Identify clinical and biotechnological workplace areas with their specialised environmental requirements 10 Identify the type of methodology required to analyse different systems using clinical studies
Assessment:	Continuous assessment of submitted clinical reports and small group (1-2 students) project work, over the semester approximately 4000 words in total, requiring 100-110 hours of work (80%); A one hour mid-semester test, (20%). Intended Learning Outcomes (ILOs) 1-10 are assessed in the continuous assessment. ILOs 1, 3, 7-10 are assessed in the mid-semester test.
Prescribed 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:	# Ability to apply knowledge of basic science and engineering fundamentals # Ability to communicate effectively, not only with engineers but also with the community at large # Ability to undertake problem identification, formulation and solution # Ability to utilise a systems approach to design and operational performance # Ability to function effectively as an individual and in multi-disciplinary teams, with the capacity to be a leader or manager as well as an effective team leader # Understanding of the social, cultural, global and environmental responsibilities of the professional engineer, and the need for sustainable development # Understanding of professional and ethical responsibilities and commitment to them # Capacity for independent critical thought, rational inquiry and self-directed learning profound respect for truth and intellectual integrity and for the ethics of scholarship.
Notes:	**LEARNING AND TEACHING METHODS** The subject is delivered through lectures, electronic resources; workshop classes that combine both tutorial and hands-on laboratory activities and clinical placements in hospitals where students apply the theory. **INDICATIVE KEY LEARNING RESOURCES** Students are provided with lecture slides, lecture notes, worked problem sets, project specifications, a number of Australian Standards notes and reference text lists. **CAREERS / INDUSTRY LINKS** Exposure to industry and industry participation is achieved by visits to a selection of the following sites: Royal Melbourne Hospital, Royal Children's Hospital, The Mercy Hospital for Women, St Vincent's Hospital Melbourne. Some workshops may be conducted in hospitals that are affiliated with The University of Melbourne.

Related Course(s):	Master of Biomedical Engineering
Related Majors/Minors/ Specialisations:	Master of Engineering (Biomedical)