Bioengineering Systems

Year and Campus:	2015
Coordinator:	Associate Professor David Grayden Department of Electrical and Electronic Engineering
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Overview:	Students who have completed the Bioengineering Systems major will be able to rigorously integrate the fundamental mathematics of systems modelling with the fundamental sciences of biology, chemistry and physics in the formulation and solution of problems involving biomedical systems. More specifically, core skills and knowledge that will be developed include: fundamental scientific comprehension that will lead to accurate mathematical modelling of biological and engineering systems, analytical and abstract thinking, problem-solving and design skills, ability to carry out laboratory experiments to confirm possible solutions to complex problems. At all levels of this major, we will ensure the development of excellent communication skills that will enable our graduates to deliver complex scientific information in a clear and concise fashion. The Bioengineering Systems major will open up pathways for students leading to accredited professional or scientific research careers in biomedical engineering (through further study in the Masters in Engineering or PhD programs respectively), applied mathematics, applied science, teaching, management and finance.
Learning Outcomes:	*Bioengineering Major Graduates should demonstrate:* # understanding of the basic concepts of mechanics and appreciation of the ways in which they can be applied to the study of human movement; # understanding of some of the common experimental methods used in human movement studies; # application of some of the theoretical methods used to analyse human movement; # analysis of signals in a biosignals context; # expertise in designing a solution to a particular sensing problem; # ability to explain the fundamentals of the operation of sensors and transducers for the measurement of biosignals; # proficiency in using a range of laboratory equipment to measure these quantities; # ability to describe the fundamental concepts of momentum, heat and mass transfer; # understanding of the roles of transport processes in the cells, tissues and organ systems of the human body; # capacity to formulate problems in chemical and biological systems, identifying fundamental transport processes and the equations that describe these systems; # application of these principles to the solution of problems in process and biomedical engineering; # competence in performing simple laboratory experiments that deepen and amplify theoretical concepts.
Structure & Available Subjects:	Completion of 50 points of study at Level 3.
Subject Options:	All three of:

Subject	Study Period Commencement:	Credit Points:
BMEN30005 Introduction to Biomechanics	Semester 1	12.50
BMEN30007 Biotransport Processes	Semester 2	12.50
BMEN30008 Biosystems Design	Semester 2	12.50

Plus one of

Subject	Study Period Commencement:	Credit Points:

	BMEN30006 Circuits and Systems	Semester 1	12.50
	ELEN30012 Signals and Systems	Semester 2	12.50
	Note: Bachelor of Biomedicine students completing this major should expect to complete BMEN30006 Circuits and Systems. The structure of the B-BMED course together with subject prerequisite sequences would normally prevent a B-BMED student from being eligible to enrol in ELEN30012 Signals and Systems. However, if a B-BMED student satisfies the prerequisites for ELEN30012, enrolment in and completion of that subject will contribute to this major.		
Notes:	In addition to these four core subjects, students must complete either MAST20029 Engineering Mathematics OR both of MAST20009 Vector Calculus AND MAST20030 Differential Equations at Level 2.		
Related Course(s):	Bachelor of Biomedicine Bachelor of Science		