MCEN40006 Computational Biomechanics

Credit Points:	12.50
Level:	4 (Undergraduate)
Dates & Locations:	2010, Parkville This subject commences in the following study period/s: Semester 2, Parkville - Taught on campus.
Time Commitment:	Contact Hours: Thirty-six hours of lectures and 12 hours of tutorials Total Time Commitment: Estimated 120 hours
Prerequisites:	The prerequisites for this subject are 620-143 Applied Mathematics or equivalent, 436-202 Mechanics 1
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:	Assoc Prof Peter Vee Sin Lee
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 (eng-info@unimelb.edu.au)**
Subject Overview:	On completion of this subject students should gain an understanding of the structure and function of the skeletal, muscular, and sensory systems of the human body. Students should also be able to formulate simple, integrative models of the human neuromusculoskeletal system; and to use computational models of the human body to analyse muscle function during activities like standing, walking, running and jumping.
Objectives:	On completing this course students will be able to - # Describe the various elements comprising a computational model of the human neuromusculoskeletal system; # Formulate and solve differential equations that govern the motion of rigid-body (link-segmental) dynamical systems; # Describe the mechanical properties of various soft tissues, especially muscle, ligament, and tendon; # Formulate and solve differential equations that incorporate the major physiological properties of muscle, ligament, and tendon; # Formulate simple, integrative models of the human neuromusculoskeletal system;

	# Use computational models of the human body to study muscle function during movement; and # Gain experience in using an open source musculoskeletal modeling software package (OpenSim) to build models of the body and perform dynamic simulations of human movement.
Assessment:	One 2-hour end of semester written exam (45%), 3 in-class quizes (15%) and four homework assignments distributed throughout the semester (40%).
Prescribed Texts:	Abernethy B, Hanrahan SJ, Kippers V, MacKinnon LT, Pandy MG. The Biophysical Foundations of Human Movement, Human Kinetics, 2004. Second Edition.
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:	# Communication # Team work
Related Course(s):	Bachelor of Engineering (Biomedical) Biomechanics Bachelor of Engineering (EngineeringManagement)Mechanical&Manufacturing Bachelor of Engineering (Mechanical &Manufacturing)& Bachelor of Science Bachelor of Engineering (Mechanical &Manufacturing)/Bachelor of Commerce Bachelor of Engineering (Mechanical and Manufacturing Engineering) Bachelor of Engineering (Mechatronics) and Bachelor of Computer Science