BMEN30005 Biomechanics and Biotransport

Credit Points:	12.50
Level:	3 (Undergraduate)
Dates & Locations:	2011, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 36 hours of lectures; 12 hours of tutorials; 12 hours of workshops Total Time Commitment: 120 hours
Prerequisites:	These subjects may be taken concurrently.

Subject	Study Period Commencement:	Credit Points:
COMP20005 Engineering Computation	Not offered 2011	12.50
MAST20029 Engineering Mathematics	Summer Term, Semester 1, Semester 2	12.50

Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	This subject replaces

Subject	Study Period Commencement:	Credit Points:
436-388 Introduction to Biomechanics	Not offered 2010	

Core Participation Requirements:	For the purposes of considering applications for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005) and Students Experiencing Academic Disadvantage Policy, this subject requires all students to actively and safely participate in laboratory activities. Students who feel their disability may impact upon their participation are encouraged to discuss this with the Subject Coordinator and the Disability Liaison Unit. http://www.services.unimelb.edu.au/disability/
Coordinator:	Prof Marcus Pandy
Contact:	Email: **pandym@unimelb.edu.au (mailto:pandym@unimelb.edu.au)**
Subject Overview:	This module is designed to enable students to apply the fundamental principles of engineering to bioengineering applications. It aims to provide the foundation for subjects in biomechanics and biofluids. Topics covered include Newton's Laws for forces and moments, free body diagram analyses, transfer of linear and angular momentum possessed by mass and contributed by forces, rigid body and fluid statics to perform simple analysis on human systems. Students will attempt steady and unsteady state problems, and understand the concept of mechanical energy, Bernoulli equations and Reynolds Numbers. In addition to the above fundamentals,a students will be introduced to: # Biomechanics of solids that includes static force and moment analyses of rigid bodies applied to the musculoskeletal system, and mechanics of defomable bodies applied to biological tissues, # Biofluids encompassing kinematics of fluid flow and its application to blood flow in the body. Laboratory experiments and computation simulations will be conducted to highlight the above engineering principles and applications.
Objectives:	On completing this subject the student will/should have the ability to: # Explain the concepts of the conservation of linear and angular momentum;

	# Develop solutions for problems involving rigid body statics and fluid statics; # Relate the conservation of linear momentum to steady and unsteady states systems; # Determine Reynolds Number for fluid flow and understand the definition for laminar and turbulent flow; # Apply Bernoulli equation for systems with flowing liquids; # Solve simple two dimensional force and moment equilibrium problems related to the human musculoskeletal system; # Solve simple two dimensional rigid bodies musculoskeletal system; # Appreciate the complex problem of blood flow in the circulatory system.
Assessment:	Four Homework sets each 10% each;One laboratory report of 1000 words 10%;One written examination of two hours duration at the end of semester (50%)
Prescribed Texts:	To be advised
Breadth Options:	This subject potentially can be taken as a breadth subject component for the following courses: # **Bachelor of Arts (https://handbook.unimelb.edu.au/view/2011/B-ARTS)** # **Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2011/B-COM)** # **Bachelor of Music (https://handbook.unimelb.edu.au/view/2011/B-MUS)** You should visit **learn more about breadth subjects (http://breadth.unimelb.edu.au/breadth/info/index.html)** and read the breadth requirements for your degree, and should discuss your choice with your student adviser, before deciding on your subjects.
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Generic Skills:	On completing this subject, students should have developed their: # Ability to apply knowledge of science and engineering fundamentals. # Ability to undertake problem identification, formulation and solution. # Ability to utilise a systems approach to complex problems and to design and operational performance. # Proficiency in engineering design. # Ability to communicate effectively, with the engineering team and with the community at large. # Capacity for creativity and innovation. # Ability to function effectively as an indvidual and in multidisciplinary and multicultural teams, as a team leader or manager as well as an effective team member. # Capacity for lifelong learning and professional development.
Related Course(s):	Bachelor of Science
Related Majors/Minors/ Specialisations:	Bioengineering Systems Master of Engineering (Biomedical)