PHYC10007 Physics for Biomedicine

Credit Points:	12.5
Level:	1 (Undergraduate)
Dates & Locations:	2016, 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 per week; 1 x one hour tutorial per week; 28 hours of practical work (8 x three hour laboratory sessions and up to 30 minutes of pre-laboratory activity) and 10 weekly assignments of 30 minutes each during the semester. Total Time Commitment: Estimated total time commitment of 170 hours
Prerequisites:	**MAST10012 Introduction to Mathematics (../../view/current/MAST10012)** or VCE Unit 3/4 Mathematical Methods (either) OR Admission into the Bachelor of Biomedicine course Assumed knowledge: some knowledge of physics to Year 10 level.
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	Students may only gain credit for one of # PHYC10002 Physics 2: Advanced # PHYC10004 Physics 2: Physical Science & Technology # PHYC10006 Physics 2: Life Sciences & Environment # PHYC10007 Physics for Biomedicine Students who have completed VCE Unit 3/4 Physics (with a score of 25 or more) will not be permitted to enrol in this subject.
Core Participation Requirements:	For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Student Support and Engagement Policy, academic requirements for this subject are articulated in the Subject Overview, Learning Outcomes, Assessment and Generic Skills sections of this entry. It is University policy to take all reasonable steps to minimise the impact of disability upon academic study, and reasonable adjustments will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact on meeting the requirements of this subject are encouraged to discuss this matter with a Faculty Student Adviser and Student Equity and Disability Support: http://services.unimelb.edu.au/disability
Coordinator:	Assoc Prof Roger Rassool
Contact:	Director of First Year Studies **Email: dfys@physics.unimelb.edu.au (mailto:dfys@physics.unimelb.edu.au)**
Subject Overview:	This subject will develop students' appreciation of the importance of physical principles to biomedicine as well as their understanding of the principles underpinning human structure and function, medical diagnostics and therapeutics. The subject provides an introduction to: *Mechanics:* in the context of human and animal movement (introduction to Newton's laws of motion, energy transfer and transformation). Waves: the basis of modern physics including lasers; *Fluids:* blood flow, respiration (pressure in fluids, fluid flow, viscosity);

	Thermal physics: energy balance of living organisms (thermal energy, temperature, heating processes, first law of thermodynamics); *Electricity and magnetism:* bioelectricity, nerve conduction, electrical safety (forces between electric charges, electric circuits, resistance, capacitance, magnetic forces); *Atomic physics and lasers:* fluorescence imaging and spectroscopy (structure of the atom, photons, spectroscopy, interaction of light with matter); *Radiation:* radiation safety, therapeutic uses of radiation (the atomic nucleus, isotopes, nuclear decay and radiation, physical and biological half-life, ionising radiation); and *Imaging:* modern biomedical imaging (X-rays, CT-scans and angiography, ultrasound imaging, positron emission tomography).
Learning Outcomes:	To enable students to understand the importance of physical principles to biological and environmental sciences, and develop their capacity to: # understand and explain the physics principles of fluids, thermal physics, electricity and magnetism, atomic, radiation and imaging physics; # apply these principles using logical reasoning, together with appropriate mathematical reasoning, to a variety of familiar and novel situations and problems in the biological and environmental sciences; and # acquire experimental data using a range of measurement instruments and interpret these data.
Assessment:	Ongoing assessment of practical work during the semester (25%); ten weekly assignments (10 x 1.5% = 15%); a 3-hour written examination in the examination period (60%). Satisfactory completion of practical work is necessary to pass the subject (i.e. attendance and submission of work for at least 80% of workshop sessions together with a result for assessed work of at least 50%).
Prescribed Texts:	Physics for the Life Sciences 2e, Martin Zinke-Allmang, Ken Sills, Reza Nejat and Eduardo Galiano-Riveros, Cengage Learning
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:	A student who completes this subject should be able to: # explain their understanding of physics principles and applications lucidly, both in writing and orally; # acquire and interpret experimental data and design experimental investigations; # participate as an effective member of a group in tutorial discussions, laboratory and study groups; # think independently and analytically, and direct his or her own learning; # manage time effectively in order to be prepared for regular practical and tutorial classes, tests and the examination.
Notes:	This unit is only available to students enrolled in the Bachelor of Biomedicine. Required equipment: laboratory coat and safety glasses. To prevent repetition of content, students who have completed VCE Unit 3/4 Physics, or equivalent, normally **will not** be permitted to enrol in this subject.
Related Course(s):	Bachelor of Biomedicine