PHYC10004 Physics 2: Physical Science & Technology

Credit Points:	12.50
Level:	1 (Undergraduate)
Dates & Locations:	2012, 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 120 hours
Prerequisites:	Physics and Mathematics prerequisites exist for this subject. Physics One of # Study score of 25 or more in VCE Physics 3/4 or equivalent

Subject	Study Period Commencement:	Credit Points:
PHYC10001 Physics 1: Advanced	Semester 1	12.50
PHYC10003 Physics 1	Semester 1	12.50
PHYC10005 Physics 1: Fundamentals	Semester 1	12.50

Mathematics

One of

Study score of 25 or more in VCE Mathematical Methods 3/4 or equivalent
Admission into the Bachelor of Science

Corequisites:	None
Recommended Background Knowledge:	Students who have not completed the equivalent of VCE Unit 3/4 Specialist Mathematics are encouraged to enrol in MAST10005 Calculus 1 prior to or concurrently with this subject. It will be assumed that students are familiar with the content of PHYC10001 Physics 1: Advanced or PHYC10003 Physics 1 or PHYC10005 Physics 1: Fundamentals.
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 # 640-122 Physics B (Adv) (prior to 2008) # 640-142 Physics B (prior to 2008) # 640-152 Physics for Biomedical Science B (prior to 2008) # 640-162 Physics: Principles & Applications B (prior to 2008)
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/

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Subject Overview:	This subject is designed for students with a sound background in physics, whose interests lie mainly in applications of physics to systems in the physical sciences, technology or engineering. Topics include: Fluids: water and air pressure, breathing, hydraulics, flight (pressure in fluids, buoyancy, fluid flow, viscosity, surface tension). Thermal physics: heating and cooling, energy balance in environments, engines, refrigerators (temperature and thermal energy, kinetic theory, phase changes, heat transfer mechanisms, first law of thermodynamics, diffusion). Electricity and magnetism: electrical devices, lightning, household electricity and electrical safety, electric motors, power generation and transmission, Earth's magnetic field, particle accelerators, communications (electric charge and field, conductors and insulators, electric potential, capacitance, resistance, electric circuits, magnetic field, Faraday's law of induction, Maxwell's equations, electromagnetic waves). Quantum and atomic physics: spectroscopy, lasers (photon, blackbody radiation, matter waves, quantisation in atoms, interaction of light with matter, x-rays). Nuclear physics and radiation: nuclear energy, radiation safety, formation of atoms in stars, carbon dating (the atomic nucleus, radioactive decay, half-life, ionising radiation, nuclear fission and fusion).
Objectives:	To enable students to understand the importance of physical principles to the physical, technological and engineering sciences, and develop their capacity to: # understand and explain the physics principles of fluids, thermal physics, electricity and magnetism, quantum, atomic and nuclear physics; # apply these principles using logical reasoning, together with appropriate mathematical reasoning, to a variety of familiar and novel situations and problems in the physical, technological and engineering 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:	R Knight, Physics for Scientists and Engineers: A Strategic Approach with Modern Physics, 2nd edition, Addison-Wesley, 2008
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/2012/B-ARTS)** # **Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2012/B-COM)** # **Bachelor of Environments (https://handbook.unimelb.edu.au/view/2012/B-ENVS)** # **Bachelor of Music (https://handbook.unimelb.edu.au/view/2012/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:	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; and # manage time effectively in order to be prepared for regular practical and tutorial classes, tests and the examination.
Notes:	This subject is available for science credit to students enrolled in the BSc (both pre-2008 and new degrees), BASc or a combined BSc course.
Related Majors/Minors/ Specialisations:	B-ENG Electrical Engineering stream B-ENG Mechanical Engineering stream Science credit subjects* for pre-2008 BSc, BASc and combined degree science courses Science-credited subjects - new generation B-SCI and B-ENG. Core selective subjects for B-BMED.