

PHYC20005 Quantum Mechanics & Thermal Physics

Credit Points:	12.50
Level:	2 (Undergraduate)
Dates & Locations:	2013, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus. Lectures and tutorials.
Time Commitment:	Contact Hours: 3 x one hour lectures per week, 1 x one hour tutorial per week Total Time Commitment: Estimated total time commitment of 120 hours
Prerequisites:	One of <ul style="list-style-type: none"> # 640-121 Physics A Advanced (prior to 2008) # 640-141 Physics A (prior to 2008) # 640-161 Physics: Principles & Applications A (prior to 2008) Plus one of <ul style="list-style-type: none"> # 640-122 Physics B Advanced (prior to 2008) # 640-142 Physics B (prior to 2008) # 640-162 Physics: Principles & Applications B (prior to 2008) Plus one of <ul style="list-style-type: none"> # 620-121 Mathematics A Advanced (prior to 2008) # 620-140 Intermediate Mathematics (prior to 2008) # 620-141 Mathematics A (prior to 2008) # 620-151 Introduction to Biomedical Mathematics (prior to 2008) # 620-161 Introductory Mathematics (prior to 2008)
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	Students cannot gain for this subject and either of the following <ul style="list-style-type: none"> # PHYC20010 Quantum Mechanics and Special Relativity # PHYC20009 Thermal and Classical Physics
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:	Dr Nicole Bell
Contact:	Email: PHYC20005@physics.unimelb.edu.au (mailto:PHYC20005@physics.unimelb.edu.au)
Subject Overview:	This subject introduces students to two fundamental areas of physics and is divided into two parts. In the quantum mechanics section, the framework of wave mechanics is established, while in thermal physics, concepts such as work, heat, temperature and entropy are introduced. The physics underlying these components is central to an understanding of many processes in physics, chemistry and engineering.

	Specific topics to be covered in the quantum mechanics section include the experimental basis of quantum mechanics; wave-particle duality, probability interpretation and the wave function; wavepackets; Schrodinger equation; one-dimensional examples such as potential steps, barriers and wells, linear momentum; operators and expectation values; an idea of three-dimensional problems and the hydrogen atom. The thermal physics section will cover the zeroth, first and second law of thermodynamics, kinetic theory, the microscopic origin of entropy, heat engines and refrigerators, paramagnetism, phase changes and chemical thermodynamics.
Objectives:	Students completing this subject should be able to: <ul style="list-style-type: none"> # explain the basic principles of quantum physics and the zeroth, first and second law of thermodynamics; # solve and analyse simple quantum mechanical problems; and # calculate and interpret the thermodynamic properties of several simple systems.
Assessment:	Tests totalling up to 2 hours during the semester (10%); two assignments totalling up to an equivalent of 3000 words (10%); a 3-hour written examination in the examination period (80%).
Prescribed Texts:	Serway, Moses and Moyer, Modern Physics, 3rd edn, Brooks/Cole-Thomson Learning, 2005
Recommended Texts:	D V Schroeder, An Introduction to Thermal Physics, Addison-Wesley Longman
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: <ul style="list-style-type: none"> # explain their understanding of physics principles and applications lucidly, both in writing and orally; # participate as an effective member of a group in tutorial discussions; # 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, the examination and to complete assignments.
Notes:	This subject is available for science credit to students enrolled in the BSc (pre-2008 degree only), BASc or a combined BSc course. The subject coordinator's approval is required for enrolment. The subject is available only to students in pre-2008 BSc (or its combined courses) who require successful completion of this subject for their degree. It will not be offered to New Generation BSc students.
Related Majors/Minors/Specialisations:	Physics Science credit subjects* for pre-2008 BSc, BASc and combined degree science courses