

640-322 Statistical Physics (Advanced)

Credit Points:	12.500
Level:	Undergraduate
Dates & Locations:	2008, This subject commences in the following study period/s: Semester 1, - Taught on campus.
Time Commitment:	Contact Hours: 30 lectures, six 1-hour tutorials and up to six additional contact hours Total Time Commitment: 120 hours.
Prerequisites:	Physics 640-223 or 640-243. (Prior to 1999: physics 640-246 or 640-226.)
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	None
Core Participation Requirements:	It is University policy to take all reasonable steps to minimise the impact of disability upon academic study and reasonable steps will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact upon their active and safe participation in a subject are encouraged to discuss this with the relevant subject coordinator and the Disability Liaison Unit.
Coordinator:	Dr A Martin
Subject Overview:	<p>Statistical mechanics, the microscopic basis of classical thermodynamics, is developed in this subject. It is one of the core areas of physics, finding wide application in solid state physics, astrophysics, plasma physics and cosmology.</p> <p>Students completing this subject will be able to:</p> <ul style="list-style-type: none"> # explain the statistical basis of the second and third laws of thermodynamics and the application of statistical mechanics to a range of problems in physics; # calculate statistical and thermodynamic functions using the canonical, micro-canonical and grand-canonical ensembles; and # analyse and interpret mathematical expressions obtained in these calculations. <p>In addition, students will enhance their ability to:</p> <ul style="list-style-type: none"> # participate effectively as part of a group in tutorials; and # plan effective work schedules and manage their time to meet the deadlines for submission of assessable work and prepare for tests and examinations. <p>Using fundamental ideas from quantum physics, a systematic treatment of statistical mechanics is developed for systems in equilibrium. The content of this subject includes ensembles and the basic postulate; the statistical basis of the second and third laws of thermodynamics; canonical, micro-canonical and grand-canonical ensembles and associated statistical and thermodynamic functions; ideal quantum gases; black body radiation; the classical limit and an introduction to real gases; applications to solid state physics; and the Boltzmann equation and an introduction to kinetic theory.</p>
Assessment:	Tests totalling up to 2 hours and assignments totalling up to an equivalent of 3000 words during the semester (20%); a 3-hour written examination in the examination period (80%).
Prescribed Texts:	Statistical Physics: An Introductory Course (D J Amit and Y Verbin), World Scientific
Breadth Options:	This subject is a level 2 or level 3 subject and is not available to new generation degree students as a breadth option in 2008. This subject or an equivalent will be available as breadth in the future.

	Breadth subjects are currently being developed and these existing subject details can be used as guide to the type of options that might be available. 2009 subjects to be offered as breadth will be finalised before re-enrolment for 2009 starts in early October.
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Notes:	This subject is available for science credit to students enrolled in the BSc (pre-2008 degree only), BAsC or a combined BSc course. Formerly known as 640-322 Thermal Physics (Adv).