

640-384 Statistical Physics

Credit Points:	12.50
Level:	3 (Undergraduate)
Dates & Locations:	2009, This subject commences in the following study period/s: Semester 1, - Taught on campus. Lectures.
Time Commitment:	Contact Hours: 3 one-hour lectures per week. Total 36 hours. Total Time Commitment: 120 hours total time commitment.
Prerequisites:	One of # 640-223 (prior to 2009) # 640-243 (prior to 2009)
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	640-322 (prior to 2009), 640-342 (prior to 2009)
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 Andy 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>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>
Objectives:	<p>Students completing this subject should 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.
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:	D J Amit and Y Verbin, <i>Statistical Physics: An Introductory Course</i> , World Scientific
Recommended Texts:	K Huang, <i>Introduction to Statistical Physics</i> , Taylor and Francis
Breadth Options:	<p>This subject potentially can be taken as a breadth subject component for the following courses:</p> <ul style="list-style-type: none"> # Bachelor of Arts (https://handbook.unimelb.edu.au/view/2009/D09) # Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2009/F04)

	<p># Bachelor of Environments (https://handbook.unimelb.edu.au/view/2009/A04)</p> <p># Bachelor of Music (https://handbook.unimelb.edu.au/view/2009/M05)</p> <p>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.</p>
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Generic Skills:	<p>A student who completes this subject should be able to:</p> <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:	Students enrolled in the BSc (pre-2008 BSc), BASc or a combined BSc course will receive science credit for the completion of this subject.
Related Majors/Minors/Specialisations:	Mathematics and Statistics (Mathematical Physics specialisation)