620-617 Phase Transitions and Critical Phenomena

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2009, This subject commences in the following study period/s: Semester 1, - Taught on campus. On-campus
Time Commitment:	Contact Hours: 36 hours comprising 2 one-hour lectures per week and 1 one-hour practice class per week. Total Time Commitment: Three contact hours and and hours private study per week.
Prerequisites:	None.
Corequisites:	None.
Recommended Background Knowledge:	It is recommended that students have completed a third year subject in applied mathematics methods (equivalent to 620-331 [2008] Applied PDEs or 620-332 [2008] Integral Transforms or 620-353 [2008] Discrete Mathematics).
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 participation are encouraged to discuss this with the subject coordinator and the Disability Liaison Unit.
Coordinator:	Prof Paul Anthony Pearce
Subject Overview:	The subject introduces the Gibbs ensembles of classical statistical mechanics, the relations to thermodynamics and the modern theory of phase transitions and critical phenomena including the concepts of critical exponents, universality and scaling. Applications include the ideal gas, mean field theories of fluids and ferromagnets and Ising lattice spin models.
Objectives:	After completing this subject students should: - understand the formulation of statistical mechanics; - know how to calculate equilibrium thermodynamic properties of physical interest in statistical systems; - have the ability to pursue further studies in this and related areas.
Assessment:	Up to 50 pages of written assignments (50%: two assignments worth 25% each, due mid and late in semester), a three-hour written examination (50%, in the examination period).
Prescribed Texts:	None - lecture notes are provided.
Recommended Texts:	C.J. Thompson, Classical Equilibrium Statistical Mechanics, Oxford 1988
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:	Upon completion of the subject, students should develop the following generic skills: - problem-solving skills including engaging with unfamiliar problems and identifying relevant strategies; - analytical skills including the ability to construct and express logical arguments and to work in abstract or general terms to increase the clarity and efficiency of an analysis; - time management skills: the ability to meet regular deadlines while balancing competing commitments.
Related Majors/Minors/ Specialisations:	R05 RM Master of Science - Mathematics and Statistics