640-615 Condensed Matter Physics

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2009, This subject commences in the following study period/s: Semester 2, - Taught on campus.
Time Commitment:	Contact Hours: 36 hours comprising 3 one-hour lectures/week. Total Time Commitment: Not available
Prerequisites:	# 640-610 Quantum Mechanics # 640-611 Quantum Field Theory # A third year subject in statistical physics equivalent to 640-322 Statistical Physics (Advanced) or 640-342 Statistical Physics or 640-384 Statistical Physics.
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	None
Core Participation Requirements:	For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Student Support and Engagement Policy, academic requirements for this subject are articulated in the Subject Overview, Learning Outcomes, Assessment and Generic Skills sections of this entry. It is University policy to take all reasonable steps to minimise the impact of disability upon academic study, and reasonable adjustments will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact on meeting the requirements of this subject are encouraged to discuss this matter with a Faculty Student Adviser and Student Equity and Disability Support: http://services.unimelb.edu.au/disability
Coordinator:	Dr Nicole Bell
Subject Overview:	This subject provides an advanced introduction to condensed matter physics. The general topics covered are (i) experimental and theoretical aspects of the characterisation of condensed matter using eletrons and x-rays and (ii) the quantum model of solids and its relevance to semiconductor and mesoscopic physics. Specific topics covered may include: (i) the imaging of condensed matter at the atomic level and (ii) the determination of how atoms are bonded; (iii) application of imaging beyond the nanoscale; (iv) magnetism; (v) superconductivity; (vi) the properties of semiconductor devices and (vii) mesoscopic systems.
Objectives:	The objectives of this subject are: # To challenge the students to expand their knowledge of condensed matter physics and provide a foundation for further advanced studies. # To broaden their appreciation of how condensed matter physics integrates into the discipline of physics overall. # To develop a deep understanding of how condensed matter is characterised on the atomic scale. # To understand the role of quantum effects in micro- and meso-scopic systems and acquire a fundamental understanding of a range of physical phenomena in condensed matter systems.
Assessment:	Two assignments totalling up to 36 pages of written work (20%), spaced equally during the semester. One 15 minute presentation, to be held at the end of semester, on a topic chosen by the student with guidance from the lecturer (10%). One four-hour end-of-semester written examination (70%).
Prescribed Texts:	Nil.

Recommended Texts:	Nil.
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:	At the completion of this subject, students should have gained skills in: # analysing how to solve a problem by applying simple fundamental laws to more complicated situations; # applying abstract concepts to real-world situations; # solving relatively complicated problems using approximations; # participating as an effective member of a group in discussions and collaborative assignments; # managing time effectively in order to be prepared for group discussions and undertake the assignments and exam.
Related Majors/Minors/ Specialisations:	R05 RP Master of Science - Physics