640-354 Sub-atomic Physics

Credit Points:	12.500
Level:	Undergraduate
Dates & Locations:	2008, This subject commences in the following study period/s: Semester 2, - Taught on campus.
Time Commitment:	Contact Hours: 36 lectures and up to six 1-hour tutorials Total Time Commitment: 120 hours.
Prerequisites:	Physics 640-223 or 640-243.
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:	Prof B H J McKellar; Dr M N Thompson
Subject Overview:	The subject provides an introduction to the unified picture of elementary particles and atomic nuclei - how the elementary quarks combine to form strongly interacting particles, and how two of these, the proton and neutron combine to form atomic nuclei; how quarks and their composites interact with the leptons and with each other; how we study these systems experimentally; and the exciting unanswered questions in this field of physics. Students completing this subject will be able to: # explain the unified picture of quarks and leptons, hadrons, and atomic nuclei, and their basic properties and interactions; and # solve and analyse problems in these areas by applying simple quantum mechanical reasoning. In addition, students will enhance their ability to plan effective work schedules and manage their time to meet the deadlines for submission of assessable work and prepare for tests and examinations. Topics covered will be selected from: quarks and leptons; strong, electromagnetic and weak interactions; symmetries and conservation laws; structure, models and properties of hadrons; structure, models and properties of nuclei; scattering and decay processes; accelerators; detectors; fission and fusion reactors; applications of nuclear and particle physics techniques; and other topics in sub-atomic physics of contemporary interest.
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:	Particles and Nuclei: An Introduction to the Physical Concepts (B Povh et al), 3rd edn, Springer-Verlag Berlin, 2002
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. Previously known as 640-354 Nuclear and Particle Physics.