PHYC90011 Particle Physics

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2014, Parkville This subject commences in the following study period/s: Semester 2, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 36 hours comprising 3 one-hour lectures/week Total Time Commitment: 120 hours
Prerequisites:	

Subject	Study Period Commencement:	Credit Points:
PHYC90007 Quantum Mechanics	Semester 1	12.50
PHYC90008 Quantum Field Theory	Semester 1	12.50

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 participation are encouraged to discuss this with the subject coordinator and the Disability Liaison Unit.
Coordinator:	Assoc Prof Jeffrey Mccallum
Contact:	Email: **msc@physics.unimelb.edu.au (mailto:msc@physics.unimelb.edu.au)**
Subject Overview:	Particle Physics is the study of the elementary constituents of matter, and the fundamental forces of nature. The subject introduces modern elementary particle physics, with an emphasis on the theoretical description of the Standard Model of Particle Physics and its experimental basis. Specific topics may include basic group theory; parity and CP violation; global and local symmetries; non-abelian gauge theory; QCD and the quark model; running coupling constants and asymptotic freedom; spontaneous symmetry breaking and the Higgs mechanism; the complete Standard Model Lagrangian; interactions of particles with matter; accelerators and detectors; deep inelastic scattering and structure functions; flavour mixing and neutrino oscillations.
Learning Outcomes:	The objectives of this subject are: # to introduce the experimental motivation and theoretical framework of the Standard Electroweak theory and QCD; # to understand the role that global and local symmetries play in modern elementary particle physics and to become acquainted with the concept of symmetry breaking; # to develop tools to enable the quantitative calculation of tree-level electroweak cross-sections; # to provide a foundation for more advanced studies in particle physics.
Assessment:	Up to four assignments totalling up to 36 pages of written work (20%), spaced equally during the semester, plus one four-hour end-of-semester written examination (80%).
Prescribed Texts:	None

Recommended Texts:	None
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 Course(s):	Master of Science (Physics)
Related Majors/Minors/ Specialisations:	Physics