MAST90069 Introduction to String Theory

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	This subject is not offered in 2011.
Time Commitment:	Contact Hours: 36 hours comprising 2 one-hour lectures and 1 one-hour practice class per week. Total Time Commitment: 3 contact hours and 7 hours private study per week.
Prerequisites:	None
Corequisites:	None
Recommended Background Knowledge:	It is recommended that students have completed subjects in vector analysis and complex analysis. Prior knowledge of quantum mechanics would be helpful but not essential as the lectures will be self-contained in this respect.
Non Allowed Subjects:	No disallowed subject combinations among new-generation subjects.
Core Participation Requirements:	For the purposes of considering requests for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Students Experiencing Academic Disadvantage Policy, academic requirements for this subject are articulated in the Subject Description, Subject Objectives, Generic Skills and Assessment Requirements for this entry.The University is dedicated to provide support to those with special requirements. Further details on the disability support scheme can be found at the Disability Liaison Unit website: http://www.services.unimelb.edu.au/disability/
Contact:	Email: **omar.foda@unimelb.edu.au (mailto:omar.foda@unimelb.edu.au)**
Subject Overview:	The first half of the course is a solid introduction to two-dimensional conformal field theory with emphasis on the operator formalism and explicit calculations. The second is an introduction to bosonic string theory based on the first half. Time allowing, one or more of the following topics will be discussed: D-branes, compactification, dualities and matrix models. For concreteness, only bosonic strings in the light-cone gauge with simple world-sheet and target space topologies will be discussed.
Objectives:	After completing this subject students should; * have learnt the basics of two-dimensional Conformal Field Theory (CFT), including Virasoro algebra and central charges, Hilbert space of states, free bosons, the conformal anomaly, Virasoro representations, CFT on a torus, bosonic strings, spectrum, tree amplitudes, vertex operators and 1-loop amplitudes. * understand the basic concepts of one or more of the following topics: D-branes, compactification, T-duality, S-duality and AdS/CFT duality. * appreciate the role of role of conformal field theory in computing bosonic string amplitudes. * be able to compute simple bosonic string correlation functions using conformal field theoretic techniques; * have the ability to pursue further studies in these and related areas.
Assessment:	Up to 40 pages of written assignments (40%: two assignments worth 20% each, due mid and late in semester), a 3 hour written examination (60%, in the examination period).
Prescribed Texts:	None
Recommended Texts:	E. Kiritsis, String Theory in a Nutshell, Princeton University Press, 2007.
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:	In addition to learning specific skills that will assist students in their future careers in science, they will have the opportunity to develop generic skills that will assist them in any future career path. These include: * problem-solving skills: the ability to engage with unfamiliar problems and identify relevant solution strategies; * analytical skills: the ability to construct and express logical arguments and to work in abstract or general terms to increase the clarity and efficiency of analysis; * collaborative skills: the ability to work in a team; * time-management skills: the ability to meet regular deadlines while balancing competing commitments.
Related Course(s):	Master of Science (Mathematics and Statistics)