MAST30021 Complex Analysis

Credit Points:	12.50
Level:	3 (Undergraduate)
Dates & Locations:	2012, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus. Semester 2, Parkville - Taught on campus. Lectures and practice classes.
Time Commitment:	Contact Hours: 3 x one hour lectures per week, 1 x one hour practice class per week Total Time Commitment: Estimated total time commitment of 120 hours
Prerequisites:	One of **Subject** / **Study Period Commencement:** / **Credit Points:** MAST20026 Real Analysis with Applications — Semester 1, Semester 2 — 12.50 MAST10009 Accelerated Mathematics 2 — Semester 2 — 12.50 And any other second year level subject from the Department of Mathematics and Statistics.
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	Students may only gain credit for one of # MAST30021 Complex Analysis, # 620-221 Real and Complex Analysis (prior to 2009) # 620-252 Analysis (prior to 2010).
Core Participation Requirements:	For the purposes of considering request 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 of 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/
Coordinator:	Dr Alexandru Ghitza, Prof Paul Pearce
Contact:	Third Year Coordinator **Email: tycoord@ms.unimelb.edu.au (mailto:tycoord@ms.unimelb.edu.au)**
Subject Overview:	Complex analysis is a core subject in pure and applied mathematics, as well as the physical and engineering sciences. While it is true that physical phenomena are given in terms of real numbers and real variables, it is often too difficult and sometimes not possible, to solve the algebraic and differential equations used to model these phenomena without introducing complex numbers and complex variables and applying the powerful techniques of complex analysis. Topics include: the topology of the complex plane; convergence of complex sequences and series; analytic functions, the Cauchy-Riemann equations, harmonic functions and applications; contour integrals and the Cauchy Integral Theorem; singularities, Laurent series, the Residue Theorem, evaluation of integrals using contour integration, conformal mapping; and aspects of the gamma function.

Objectives:	At the completion of this subject, students should understand the concepts of analytic function and contour integral and should be able to: # apply the Cauchy-Riemann equations # use the complex exponential and logarithm # apply Cauchy's theorems concerning contour integrals # apply the residue theorem in a variety of contexts # understand theoretical implications of Cauchy's theorems such as the maximum modulus principle, Liouville's Theorem and the fundamental theorem of algebra
Assessment:	Three or four written assignments due at regular intervals during semester amounting to a total of up to 50 pages (20%), and a 3-hour written examination in the examination period (80%).
Prescribed Texts:	None
Recommended Texts:	Jerrold Marsden and Michael J. Hoffman, Basic Complex Analysis, 3rd Ed. Freeman, 1998.
Breadth Options:	This subject potentially can be taken as a breadth subject component for the following courses: # **Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2012/B-COM)** # **Bachelor of Environments (https://handbook.unimelb.edu.au/view/2012/B-ENVS)** # **Bachelor of Music (https://handbook.unimelb.edu.au/view/2012/B-MUS)** You should visit **learn more about breadth subjects (http://breadth.unimelb.edu.au/breadth/info/index.html)** and read the breadth requirements for your degree, and should discuss your choice with your student adviser, before deciding on your subjects.
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.
Notes:	This subject is available for science credit to students enrolled in the BSc (both pre-2008 and new degrees), BASc or a combined BSc course.
Related Majors/Minors/ Specialisations:	Applied Mathematics (specialisation of Mathematics and Statistics major) Mathematical Physics Operations Research / Discrete Mathematics (specialisation of Mathematics and Statistics major) Pure Mathematics (specialisation of Mathematics and Statistics major) Science credit subjects* for pre-2008 BSc, BASc and combined degree science courses Science-credited subjects - new generation B-SCI and B-ENG. Core selective subjects for B-BMED.