620-332 Integral Transforms & Asymptotics

Credit Points:	12.50
Level:	3 (Undergraduate)
Dates & Locations:	2009, This subject commences in the following study period/s: Semester 2, - Taught on campus. Lectures and practice classes.
Time Commitment:	Contact Hours: 36 one-hour lectures (three per week) and up to 12 one-hour practice classes (one per week) Total Time Commitment: 120 hours total time commitment.
Prerequisites:	One of # *Mathematical Methods* # 620-234 (prior to 2009) and one of # 620-221 (prior to 2009) # *Analysis*
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 Paul Anthony Pearce
Subject Overview:	This subject introduces methods of evaluating real integrals using complex analysis; and develops methods for evaluating and inverting Fourier, Laplace and Mellin transforms, with selected applications including summing series and computing asymptotic series. Students should learn what an asymptotic expansion is and how it provides approximations; how to use Watson's lemma and the methods of Laplace, stationary phase and steepest descents to evaluate asymptotic expressions; and how to find asymptotic solutions to ordinary differential equations. This subject demonstrates a range of important and useful techniques and their power in solving problems in applied mathematics. Complex analysis covers advanced applications of contour integration. Integral transforms covers Fourier, Laplace and Mellin transforms; inversion by contour integration; convolution; and applications. Asymptotic expansions covers convergence and divergence; integrals with a large parameter, Watson's Lemma, Laplace's method, steepest descent, stationary phase; and WKB method for ordinary differential equations.
Objectives:	.
Assessment:	A 45-minute written test held mid-semester (either 0% or 20%); a 3-hour written examination in the examination period (80% or 100%). The relative weighting of the examination and the mid-semester test will be chosen so as to maximise the student's final mark.
Prescribed Texts:	None
Breadth Options:	This subject potentially can be taken as a breadth subject component for the following courses: # **Bachelor of Arts (https://handbook.unimelb.edu.au/view/2009/D09)**

	# **Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2009/F04)** # **Bachelor of Environments (https://handbook.unimelb.edu.au/view/2009/A04)** # **Bachelor of Music (https://handbook.unimelb.edu.au/view/2009/M05)** 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
Notes:	This subject is available for science credit to students enrolled in the BSc (pre-2008 degree only), BASc or a combined BSc course.
Related Majors/Minors/ Specialisations:	Mathematics & Statistics Major Mathematics and Statistics (Applied Mathematics specialisation) Mathematics and Statistics (Mathematical Physics specialisation)