

# MAST90020 Functional Analysis

<b>Credit Points:</b>	12.5									
<b>Level:</b>	9 (Graduate/Postgraduate)									
<b>Dates &amp; Locations:</b>	2016, Parkville This subject commences in the following study period/s: Semester 2, Parkville - Taught on campus.									
<b>Time Commitment:</b>	Contact Hours: 36 hours comprising three 1-hour lectures per week Total Time Commitment: 170 hours									
<b>Prerequisites:</b>	Both of the following, or equivalent. <table border="1" data-bbox="386 573 1485 779"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>MAST20022 Group Theory and Linear Algebra</td> <td>Semester 2</td> <td>12.50</td> </tr> <tr> <td>MAST30026 Metric and Hilbert Spaces</td> <td>Semester 2</td> <td>12.50</td> </tr> </tbody> </table>	Subject	Study Period Commencement:	Credit Points:	MAST20022 Group Theory and Linear Algebra	Semester 2	12.50	MAST30026 Metric and Hilbert Spaces	Semester 2	12.50
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MAST20022 Group Theory and Linear Algebra	Semester 2	12.50								
MAST30026 Metric and Hilbert Spaces	Semester 2	12.50								
<b>Corequisites:</b>	None									
<b>Recommended Background Knowledge:</b>	None									
<b>Non Allowed Subjects:</b>	None									
<b>Core Participation Requirements:</b>	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: <a href="http://www.services.unimelb.edu.au/disability/">http://www.services.unimelb.edu.au/disability/</a>									
<b>Coordinator:</b>	Prof Christian Haesemeyer									
<b>Contact:</b>	Christian Haesemeyer <a href="mailto:christian.haesemeyer@unimelb.edu.au">christian.haesemeyer@unimelb.edu.au</a> ( <a href="mailto:christian.haesemeyer@unimelb.edu.au">mailto:christian.haesemeyer@unimelb.edu.au</a> )									
<b>Subject Overview:</b>	Functional analysis is a fundamental area of pure mathematics, with countless applications to the theory of differential equations, engineering, and physics. The students will be exposed to the theory of Banach spaces, the concept of dual spaces, the weak-star topology, the Hahn-Banach theorem, the axiom of choice and Zorn's lemma, Krein-Milman, operators on Hilbert space, the Peter-Weyl theorem for compact topological groups, the spectral theorem for infinite dimensional normal operators, and connections with harmonic analysis.									
<b>Learning Outcomes:</b>	After completing this subject, students will understand the fundamentals of functional analysis and the concepts associated with the dual of a linear space. They will also have an understanding of how these are used in mathematical applications in pure mathematics such as representation theory. They will have the ability to pursue further studies in this and related areas.									
<b>Assessment:</b>	eleven equally weighted (4% each) homework assignments due weekly throughout the semester (44% total); one three-hour written examination (56%).									

<b>Prescribed Texts:</b>	A. Bressan, Lecture Notes on Functional Analysis: With Applications to Linear Partial Differential Equations, Graduate Studies in Mathematics Vol. 143, American Mathematical Society, 2013
<b>Recommended Texts:</b>	R.J. Zimmer. Essential Results in Functional Analysis. Univ of Chicargo Press, 1990.
<b>Breadth Options:</b>	This subject is not available as a breadth subject.
<b>Fees Information:</b>	Subject EFTSL, Level, Discipline & Census Date, <a href="http://enrolment.unimelb.edu.au/fees">http://enrolment.unimelb.edu.au/fees</a>
<b>Generic Skills:</b>	<p>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:</p> <ul style="list-style-type: none"> <li># problem-solving skills: the ability to engage with unfamiliar problems and identify relevant solution strategies;</li> <li># 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;</li> <li># collaborative skills: the ability to work in a team;</li> <li># time-management skills: the ability to meet regular deadlines while balancing competing commitments.</li> </ul>
<b>Related Course(s):</b>	Doctor of Philosophy - Engineering Master of Philosophy - Engineering Master of Science (Mathematics and Statistics)
<b>Related Majors/Minors/Specialisations:</b>	Mathematics and Statistics