CHEM90018 Advanced Chemical Applications 2

Credit Points:	12.5
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2016, Parkville This subject commences in the following study period/s: July, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 30 hours comprising four 1-hour lectures and one 1-hour tutorials each week. Total Time Commitment: 170 hours per semester
Prerequisites:	Entry into the **Master of Science (Chemistry) (../../view/current/mc-sciche)** . Other students with appropriate Chemistry background may be permitted to enrol with subject coordinator approval.
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	Modules taken as part of subject CHEM90010 cannot be taken as part of CHEM90018.
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/
Coordinator:	Dr Alessandro Soncini
Contact:	**asoncini@unimelb.edu.au (mailto:asoncini@unimelb.edu.au)**
Subject Overview:	This subject provides a series of specialised modules in different areas of chemistry. Students must choose two modules. A selection of the following 12-lecture modules will be available: **Free Radicals in Synthesis** This module will outline the fundamental steps important to radical chain chemistry and show how these principles can be used in the total synthesis of important molecular frameworks. **Advanced Physical Organic Chemistry** This module will explore the interrelationships between structure and reactivity in organic molecules. Topics such as substituent effects, linear free energy relationships and the Hammett equation will be applied to the determination of organic reaction mechanisms. **Biological and Medicinal Chemistry** This module will explore modern drug design principles, as well as the molecular basis of therapeutic activity and methods of synthesis of various drugs. Case studies will be used to highlight the discovery and development of important drug classes. **Advanced Materials and Materials Characterisation** This module will explore the design of advanced materials from the micro to nano-domain and their application in areas such as biomedicine and diagnostics. Common materials characterisation techniques, such as fluorescence microscopy, electron microscopy and atomic force microscopy, will also be studied. **Magnetism in Chemistry** This module will explore magnetochemistry in the context of isolated spins, discrete spin clusters and extended systems. Areas covered will include magnetic susceptibility, the mechanisms of magnetic exchange interactions, long range ordering in extended solids, spin crossover complexes and single-molecule magnets.

Learning Outcomes:	The objectives of this subject are to provide students with an increased knowledge and understanding of advanced chemical principles, with emphasis on: # magnetochemistry and spin systems # properties and performance materials # inter-relationships between structure and reactivity in organic molecules # sono-chemical principles # the chemistry of biological systems Such knowledge will facilitate insights into the structure and properties of matter and the nature of chemical and biochemical transformations.
Assessment:	Each module will be assessed by either; a 1.5 hour exam after completion of the module, or a 1 hour exam after completion of the module (60%) and an assignment (up to 3000 words, 40%) due at the end of semester, or a 1.5 hour exam after completion of the module (80%) and a 15 minute oral presentation mid-semester (20%).
Prescribed 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 gain skills in: # advanced problem-solving and critical thinking skills # an ability to evaluate the professional literature # an understanding of the changing knowledge base # a capacity to apply concepts developed in one area to a different context # the ability to use conceptual models to rationalize experimental observations.
Related Course(s):	Doctor of Philosophy - Engineering Master of Philosophy - Engineering Master of Science (Chemistry)