CHEM20020 Chemistry: Structure and Properties

Credit Points:	12.50
Level:	2 (Undergraduate)
Dates & Locations:	This subject is not offered in 2014. Lectures, tutorials and seminars.
Time Commitment:	Contact Hours: 3 x one hour lectures per week; 1 x one hour tutorial per week; 3 x one hour seminars during the semester. Total 51 hours Total Time Commitment: Estimated total time commitment of 120 hours
Prerequisites:	One of **Subject** / **Study Period Commencement:** / **Credit Points:** CHEM10004 Chemistry 2 / Summer Term, Semester 2 / 12.50 CHEM10006 Chemistry for Biomedicine / Semester 1 / 12.50
Corequisites:	None
Recommended Background Knowledge:	It is recommended that students who plan to major in Chemistry also enrol in two semesters of first year mathematics, for example MAST10005 Calculus 1, MAST10006 Calculus 2 and MAST10007 Linear Algebra. **Subject** / **Study Period Commencement:** / **Credit Points:** CHEM20018 Chemistry: Reactions and Synthesis / Semester 1 / 12.50
Non Allowed Subjects:	Students who have completed one of the following subjects may not also gain credit for these subjects: **Subject** / **Study Period Commencement:** / **Credit Points:** CHEM20014 Organic and Physical Chemistry 2 / Not offered 2014 / 12.50 CHEM20021 Physical Chemistry 2 / Not offered 2014 / 12.50 CHEM20022 Organic Chemistry 2 / Not offered 2014 / 12.50 CHEM20023 Inorganic Chemistry 2 / Not offered 2014 / 12.50 CHEM20024 Organic and Inorganic Chemistry 2 / Not offered 2014 / 12.50 CHEM20025 Physical and Inorganic Chemistry 2 / Not offered 2014 / 12.50
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 website:
Contact:	**second-year-director@chemistry.unimelb.edu.au (mailto:second-year-director@chemistry.unimelb.edu.au)**
Subject Overview:	This subject covers key concepts related to the stereochemical and electronic properties of molecules and the methods central to their study. Important elements of the subject include

	the spectroscopic characterisation and quantification of materials by a range of spectroscopic techniques, molecular orbital techniques and the application of approaches based on molecular symmetry and group theory to the understanding of molecular properties, stereo-selective reactions, bonding and spectroscopy. These topics have applications to advanced materials, light emitting polymers, chemical analysis and catalysis in biological and industrial systems.
Learning Outcomes:	Upon completion of this subject students should; # be able to classify molecules according to their symmetry and to relate their physical properties (e.g. dipole moment, isomerism) to the molecular symmetry; # have a basic knowledge of the basis and application of spectroscopic techniques that are conducted in the presence (NMR, EPR) or absence (IR, Raman, UV-Vis.) of an applied magnetic field; # be able to apply molecular orbital theory to simple homo- and heteronuclear diatomic molecules and polyatomic molecules; # be able to apply simple Huckel approaches to arrays of atoms having orbitals of pi symmetry; # be able to identify systems that are aromatic or antiaromatic in character and to have a knowledge of their basic reactions; # be able to describe the changes in bonding that occur to small molecules (e.g. CO) on binding to a transition metal and to be able to apply these concepts to the catalysis of reactions of those species.
Assessment:	Five short tests each of approximately 90 minutes duration conducted on-line using the learning management system (LMS) for a total of 20%; the tests will run in weeks 2, 4, 7, 10 and 12 and the mark for this component of the assessment will be based on the average of the four highest marks with each test contributing equally to this component of the assessment. A three hour examination at the end of the semester will contribute 80% to the final grade.
Prescribed Texts:	J McMurry, Organic Chemistry, 8th Ed. Thomson Brooks/Cole, 2012. P Atkins and J De Paula, Atkins' Physical Chemistry 9th Ed. Oxford University Press, 2010. P. Atkins, T. Overton, J. Rourke, M. Weller and F. Armstrong, Shriver and Atkins' Inorganic Chemistry, 5th Ed., Oxford University Press, 2010.
Recommended 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/2014/B-ARTS)** # **Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2014/B-COM)** # **Bachelor of Environments (https://handbook.unimelb.edu.au/view/2014/B-ENVS)** # **Bachelor of Music (https://handbook.unimelb.edu.au/view/2014/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:	This subject will provide students with opportunities to develop the following generic skills: # the ability to comprehend complex concepts and effectively communicate this understanding to the scientific community and in a manner accessible to the wider community; # the ability to analyse and solve abstract technical problems; # the ability to connect and apply the learnt concepts to a broad range of scientific problems beyond the scope of this subject; # an awareness of advanced technologies; # the ability to think and reason logically; # the ability to think critically and independently.

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:	Chemistry Environmental Science major Environments Discipline subjects Medicinal Chemistry Science credit subjects* for pre-2008 BSc, BASc and combined degree science courses Science-credited subjects - new generation B-SCI and B-ENG. Selective subjects for B-BMED