610-285 Structure and Properties

Credit Points:	12.50
Level:	2 (Undergraduate)
Dates & Locations:	Lectures, tutorials and seminars.
Time Commitment:	Contact Hours: 3 one-hour lectures per week; 1 one-hour tutorial per week; 3 one-hour seminars during the semester Total Time Commitment: 120 hours total time commitment.
Prerequisites:	*Reactions and Synthesis*
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	Students who have completed 610-210 (or 610-211) and 610-220 (or 610-221) and 610-240 (or 610-241) may not also gain credit for *Structure and Properties.*
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 participation are encouraged to discuss this with the subject coordinator and the Disability Liaison Unit.
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.
Objectives:	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 H#ckel approaches to arrays of atoms having orbitals of p 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:	An assignment (1000 word equivalent) conducted in the first third of the subject (10%), three short tests each of less than 1 hour duration conducted on-line using the learning management system (LMS) for a total of 10% and a three-hour end of semester exam (80%)
Prescribed Texts:	None
Recommended Texts:	J McMurry, *Organic Chemistry*, Thomson Brooks/Cole, 6th edition, 2004. P Atkins and J De Paula, *Atkins' Physical Chemistry*, Oxford University Press, 8th edition, 2006. C E Housecroft and A G Sharpe, *Inorganic Chemistry*, Pearson Prentice-Hall, 3rd edition, 2008.
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
Generic Skills:	This subject will 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:	Students enrolled in the BSc (both pre-2008 and new degrees), BASc or a combined BSc course will receive science credit for the completion of this subject.
Related Majors/Minors/ Specialisations:	Environmental Science