CHEMISTRY (CHEM)

CHEM*7100 Selected Topics in Inorganic Chemistry Unspecified [0.50]
Discussion of specialized topics related to the research interests of members of the Centre. Special topics could include, for example: bioinorganic chemistry; inorganic reaction mechanisms; synthetic methods in inorganic and organometallic chemistry; homogeneous and heterogeneous catalysis; chemistry of polynuclear compounds.
Department(s): Department of Chemistry
Location(s): Guelph, Waterloo Campus

CHEM*7120 X-ray Crystallography Unspecified [0.50]
Introduction: crystals, basic concepts; space groups: the reciprocal lattice; x-ray diffraction; the phase problem; structure factors; electron density; small molecule structure solution, structure refinement, structure results, journals and databases, paper writing.
Department(s): Department of Chemistry
Location(s): Guelph

CHEM*7130 Chemistry of Inorganic Solid State Materials Unspecified [0.50]
Introduction to solid state chemistry, common crystal structures, principles of solid state synthesis, theory and experimental methods for characterizing solids, including thermal analysis techniques, powder x-ray and neutron diffraction methods; special topics to include one or more of the optical, electronic, magnetic, or conductive properties of inorganic materials. A one semester-long undergraduate course (at least third-year level) in inorganic chemistry, preferably with content in structural and/or solid state must be taken prior to registering for this course.
Department(s): Department of Chemistry
Location(s): Guelph, Waterloo Campus

CHEM*7150 Structure and Bonding in Inorganic Chemistry Unspecified [0.50]
Free electron, Hueckel and extended Hueckel methods for molecules and clusters. Perturbation theory. Applications of group theory in inorganic chemistry; Jahn-Teller effects in molecules and solids. Energy bands in one, two and three dimensions. Three semester-long undergraduate courses in inorganic chemistry and one semester-long undergraduate course in quantum mechanics or group theory must be taken before registering for this course.
Department(s): Department of Chemistry
Location(s): Guelph

CHEM*7170 Advanced Transition Metal Chemistry Unspecified [0.50]
Magnetoochemistry of transition metal compounds. Electronic spectra of complex ions including applications of molecular orbital and ligand field theories. Stabilization of unusual oxidation states and co-ordination numbers. Bonding, structure and reactivity of certain important classes of metal complexes, e.g., metal hydrides, metal-metal bonded species, biologically significant model systems such as macrocycles.
Department(s): Department of Chemistry
Location(s): Guelph

CHEM*7180 Advanced Organometallic Chemistry Unspecified [0.50]
Reactions, structure and bonding of organometallic compounds of transition and non-transition metals.
Department(s): Department of Chemistry
Location(s): Guelph

CHEM*7200 Selected Topics in Analytical Chemistry Unspecified [0.50]
Special topics could include, for example: trace analysis using modern instrumental and spectroscopic methods; advanced mass spectrometry (instrumentation and interpretation of spectra); analytical aspects of gas and liquid chromatography.
Department(s): Department of Chemistry
Location(s): Guelph, Waterloo Campus

CHEM*7240 Chemical Instrumentation Unspecified [0.50]
Instrumental components and optimum application; rudiments of design; electrical, spectral, migrational and other methods.
Department(s): Department of Chemistry
Location(s): Guelph, Waterloo Campus

CHEM*7260 Topics in Analytical Spectroscopy Unspecified [0.50]
Atomic emission and absorption spectroscopy; methods of excitation and detection; quantitative applications. Molecular electronic spectroscopy, UV, visible and Raman; instrumental characteristics; applications to quantitative determinations, speciation, measurements of equilibrium, etc. Sources and control of errors and interferences. Determination and description of colour.
Department(s): Department of Chemistry
Location(s): Guelph

CHEM*7270 Separations Unspecified [0.50]
Material to be covered is drawn from the following topics: diffusion; isolation of organic material from the matrix; chromatographic techniques - principles of chromatographic separation, gas (GLC, GSC), liquid (LLC, LSC, SFC, IEC), supercritical fluid (SFC) chromatographies; GC-MS, CG-FTIR; electrophoresis, flow field fractionation. Prerequisites: undergraduate level course in instrumental analysis.
Department(s): Department of Chemistry
Location(s): Guelph

CHEM*7280 Electroanalytical Chemistry Unspecified [0.50]
A study of electroanalytical techniques and their role in modern analytical chemistry. The underlying principles are developed. Techniques include chronamperometry, chronocoulometry, polarography, voltammetry, chronopotentiometry, coulometric titrations, flow techniques, electrochemical sensors and chemically modified electrodes.
Department(s): Department of Chemistry
Location(s): Guelph

CHEM*7290 Surface Analysis Unspecified [0.50]
Department(s): Department of Chemistry
Location(s): Guelph

CHEM*7300 Proteins and Nucleic Acids Unspecified [0.50]
Determination of protein sequence and 3-dimensional structure, protein anatomy; prediction of protein structure; intermolecular interactions and protein-protein association; effects of mutation. Nucleic acid structure and anatomy; DNA and chromatin structure; RNA structure; snRNPs and ribozymes; protein-nucleic acid interactions.
Department(s): Department of Chemistry
Location(s): Guelph

CHEM*7310 Selected Topics in Biochemistry Unspecified [0.50]
Discussion of specialized topics related to the research interests of members of the Centre: for example, recent offerings have included peptide and protein chemistry, biochemical toxicology, medical aspects of biochemistry, glycolipids and glycoproteins, redox enzymes, biological applications of magnetic resonance, etc.
Department(s): Department of Chemistry
Location(s): Guelph

Discussion of specialized topics related to the research interests of the members of the Centre. Special topics could include for example: theory of intermolecular forces; density matrices; configuration interaction; correlation energies of open and closed shell systems; kinetic theory and gas transport properties; theory of the chemical bond.


The synthesis of organic compounds is discussed and emphasis is placed on the design of synthetic routes. Examples drawn from the organic literature will be used to illustrate these aspects.

The physical properties of polymers are considered in depth from a molecular viewpoint. Rubber elasticity, mechanical properties, rheology and solution behaviour are quantitatively treated.

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Aspects of electronic vibrational and rotational spectroscopy of atoms, molecules, and the solid state. Relevant aspects of quantum mechanics, Dirac notation, and angular momentum will be discussed. Group Theory will be presented and its implications for spectroscopy introduced.

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Discussion of specialized topics related to the research interests of the members of the Centre. Special topics could include for example: theory of intermolecular forces; density matrices; configuration interaction; correlation energies of open and closed shell systems; kinetic theory and gas transport properties; theory of the chemical bond.


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CHEM*7720 Polymerization and Polymer Reactions  Unspecified [0.50]
The reactions leading to the production of polymers are considered with emphasis on emulsion and suspension polymerization and polymerization reaction engineering. Polymer degradation, stabilization and modification reactions are also considered in depth.
Prerequisite(s): CHEM*7700
Department(s): Department of Chemistry
Location(s): Waterloo Campus

CHEM*7730 Selected Topics in Polymer Chemistry  Unspecified [0.50]
Discussion of specialized topics of polymer chemistry related to the research interests of the faculty or prominent scientific visitors. Special topics could include, for example: polymer stabilization and degradation; mechanical properties; polymer principles in surface coatings; organic chemistry of synthetic high polymers; estimation of polymer properties; reactions of polymers; polymerization kinetics.
Department(s): Department of Chemistry
Location(s): Guelph, Waterloo Campus

CHEM*7840 Foundations of Chemistry and Biochemistry Research Literature Review  Fall and Winter [0.50]
Students will prepare a written literature review on a topic relevant to their research proposal. Incoming MSc thesis students are required to take this course within the first two semesters of their program and are strongly encouraged to take it in their first semester.
Department(s): Department of Chemistry
Location(s): Guelph

CHEM*7940 Master's Seminar  Summer, Fall, and Winter [0.50]
A public seminar and defence of a research proposal, required to be given by all MSc thesis students within two terms of entering this program.
Co-requisite(s): CHEM*7840
Department(s): Department of Chemistry
Location(s): Guelph

CHEM*7950 PhD Seminar  Unspecified [0.00]
Department(s): Department of Chemistry
Location(s): Guelph

CHEM*7970 MSc Research Paper  Unspecified [0.50]
An experimental project normally based on the CHEM*7940 research proposal, supervised by the advisor, taking three to four months to complete. This project may be completed at any time during the student's program, but it must follow CHEM*7940. A written report is required, and a seminar based on the content of the report will be presented. The report must be completed as per the project/thesis guidelines of the University campus on which the student is registered. This course normally will follow the course CHEM*7940 Master's Seminar.
Department(s): Department of Chemistry
Location(s): Guelph

CHEM*7980 MSc Thesis  Unspecified [0.00]
Department(s): Department of Chemistry
Location(s): Guelph

CHEM*7990 PhD Thesis  Unspecified [0.00]
Department(s): Department of Chemistry
Location(s): Guelph