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## SCIENCE SUBJECT DESCRIPTIONS

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**BIOL103 Molecules, Cells and Organisms**

Spring Wollongong On Campus

Spring Loftus On Campus

**Credit Points:** 6**Contact Hours:** Spring 2hrL, 1hrT, 3hrP, Spring**Assessment:** Continuous Practical assessment; Practical quizzes; Assignment; Mid session Quiz; final practical examination; final theory examination.**Subject Description:** Properties and characteristics of living systems. Cell structure and function. Micro-organisms and viruses. Cell division. Introductory biochemistry. Structure and function of the respiratory, digestive, excretory and muscular systems. Physiology of nervous and hormonal control systems and the immune system. Plant structure and function.**BIOL104 Evolution, Biodiversity and Environment**

Autumn Wollongong On Campus

Autumn Loftus On Campus

**Credit Points:** 6**Contact Hours:** Autumn 2hrs L,3hrs P, 1hr T, Autumn**Assessment:** Practical mini-quizzes; Insect collection; Project report - predation; Project report - seeds; Post-lecture mini-quizzes; Practical examination; Theory examination.**Subject Description:** Types of organisms, their classification and life styles. Genetics. Animal behaviour. Ecology of populations and communities. Evolutionary biology and the origin of species.**BIOL213 Principles of Biochemistry**

Autumn Wollongong On Campus

**Credit Points:** 6**Contact Hours:** Autumn 2 hrs L,4 hrs T/prac**Pre-requisites:** BIOL 103 and (CHEM 101) or (CHEM 104) and (CHEM 102) or (CHEM 105)**Assessment:** Practical reports; Dry practicals; Theory Quiz; Practical exam; Theory exam.**Subject Description:** Structure and biological functions of proteins, nucleic acids, carbohydrates and lipids and their subunits. Protein and nucleic acid synthesis in prokaryotes and eukaryotes. Membrane structure. Enzymes and their regulation. Intermediary metabolism.**BIOL214 The Biochemistry of Energy and Metabolism**

Spring Wollongong On Campus

**Credit Points:** 6**Contact Hours:** Spring 2hrs.L, 3hrs.P,1h T**Pre-requisites:** BIOL213**Assessment:** Practical assessment; Scientific report; Quiz; Practical exam; Theory exam.**Subject Description:** The generation and storage of metabolic energy. The major catabolic pathways. The biosynthesis of carbohydrates, lipids, proteins and nucleotides. The regulation of enzymes and of metabolic pathways and their role in cellular function. The integration of metabolism. Metabolic disorders.**BIOL215 Introductory Genetics**

Spring Wollongong On Campus

**Credit Points:** 6**Contact Hours:** Spring 3 hrs L, 3 hrs Prac**Pre-requisites:** BIOL213**Assessment:** 4 Practical reports; Practical assessment; Seminar; Theory exam.**Subject Description:** Genetic variation in eukaryotic populations. Source of variation and techniques of measurement. Regulation of gene activity. Microbial genetics including transformation, conjugation and phage replication. Mechanisms for the rearrangement and exchange of genetic material including plasmids, recombination, transposons and genetic engineering.**BIOL240 Functional Biology of Plants & Animals**

Autumn Wollongong On Campus

**Credit Points:** 6**Contact Hours:** Autumn 3hrs L &/or T,3hrs P**Pre-requisites:** BIOL103 and BIOL104**Assessment:** Written Assignments; Quiz; Practical exam; Theory exam.**Subject Description:** Functional morphology of plants and animals. Plant/environmental interactions. Physiological and behavioural responses of animals to various environments. Reproductive biology and life history patterns of plants and animals. Please note: This subject involves animal dissections. While direct participation is not mandatory, all students will be examined on the material.**BIOL241 Biodiversity: Classification and Sampling**

Spring Wollongong On Campus

**Credit Points:** 6**Contact Hours:** Spring 3 hrs L,3 hrs Prac**Pre-requisites:** BIOL103 and BIOL104**Assessment:** McClade report; Herbarium collection; Biodiversity paper; Theory exam; Practical exam.**Subject Description:** Introduction to biological diversity. Identifying biodiversity. The species concept. Principles of classification (numerical and biochemical tools). Pitfalls in classification (coevolution, physical and evolutionary constraints). Use of keys. Making and curating a collection of selected groups of organisms. Environmental surveys: quantification and importance of biological diversity. Loss of biodiversity.**BIOL251 Principles of Ecology and Evolution**

Autumn Wollongong On Campus

**Credit Points:** 6**Contact Hours:** Autumn 3 hrs L, 3 hrs P**Pre-requisites:** BIOL103 and BIOL104**Assessment:** Scientific writing; Competition experiment; Project progress; Seminar; Report; Practical examination; Theory examination.**Subject Description:** Definitions of a population. Sampling and estimating density. Population growth and regulation. Interactions between organisms and community structure and function. Variation among organisms & genetic and

environmental. Inheritance. Genetic structure of populations. Population size, breeding systems and selection, social evolution and evolution of life histories. Implications for human populations. Human ecology and ecological surveys.

**BIOL292 Special Biology Studies**

Spring Wollongong On Campus  
Autumn Wollongong On Campus

**Credit Points:** 6**Contact Hours:** Spring 5hrs lab/field, 1hrT, Autumn 5hrs lab/field 1hr T**Pre-requisites:** 48 cp; enrolment in BSc(Hons) - Adv Program**Assessment:** Literature review presentation (oral or poster) 10%; project reports 50%; project seminars 10%; final examination 30%.**Subject Description:** Students will undertake research projects, under the supervision of academic staff members, on design and execution of field and/or laboratory experiments and the analysis and interpretation of these data. Intending students must consult with the Head of Department prior to enrolment.**BIOL303 Biotechnology: Applied Cell & Molecular Biology**

Autumn Wollongong On Campus

**Credit Points:** 8**Contact Hours:** Autumn 2 hrs L,4 hrs T/Prac**Pre-requisites:** BIOL215**Assessment:** Practical project report; Oral presentation of tutorial topic; Research project report; Theory exam.**Subject Description:** Recombinant DNA technology and genetic engineering of micro-organisms, plant cells and animal cells. Expression, production and purification of recombinant proteins, cytokines and hormones. Fermentation technology and industrial scale-up. Applications of Biotechnology to the fields of human therapeutics, agriculture and diagnostics. Bioinformatics, ethical and patent issues of Biotechnology.**BIOL320 Molecular Cell Biology**

Autumn Wollongong On Campus

**Credit Points:** 8**Contact Hours:** Autumn 2 hrs L,4 hrs T/Prac**Pre-requisites:** BIOL 214 and BIOL 215**Assessment:** Poster; 2 Practical Reports; Theory exam; Practical exam.**Subject Description:** Biochemistry of major macromolecular components in eukaryotic cells including synthesis and regulation; assembly of molecular components into functional units in the cell; major cell functions - homeostasis, movement, energetics and recognition. Specific topics covered include proteins and nucleic acids, membranes, cytoskeleton, extracellular matrix, energetics. Practical work covers plant and animal cell culture and separation techniques - amino acid analysis, electrophoresis, flow cytometry, centrifugation and chromatography.**BIOL321 Cellular and Molecular Immunology**

Spring Wollongong On Campus

**Credit Points:** 8**Contact Hours:** Spring 2 hrs L,4 hrs T/Prac**Pre-requisites:** BIOL320**Assessment:** Antibody Purification/Conjugation Project; Antibody Production/ELISA Project; Written assignments; Oral presentation of tutorial topic; Practical exam; Theory exam.**Subject Description:** The immune system as a model for cellular division and differentiation. Role of factors and the cellular interactions required to generate antibodies and cell-mediated responses. Molecular basis of immunity. Molecular biology of viruses. Immuno-technology: Monoclonal antibodies, phage display antibodies, immuno-affinity chromatography, immuno-diagnostics, immunotherapies, flow cytometry.**BIOL332 Ecological and Evolutionary Physiology**

Autumn Wollongong On Campus

**Credit Points:** 8**Contact Hours:** Autumn**Pre-requisites:** BIOL240**Assessment:** Project reports; Quiz; Theory exam.**Subject Description:** Physiology and biochemistry of whole organisms with emphasis on response to environmental parameters and the development of physiological systems. Effect of body size on physiology. Water and salt regulation in aquatic, marine and terrestrial environments. Physiological responses of plants and animals to temperature, gas composition, light intensity, and pressure. Evolution of endothermy. Effects of hormones on physiology and behaviour.**BIOL351 Conservation Biology: Marine and Terrestrial Populations**

Autumn Wollongong On Campus

**Credit Points:** 8**Contact Hours:** Autumn 2 hrs L, 4 hrs T/Prac**Pre-requisites:** BIOL 241, BIOL 251, STAT 252**Assessment:** Spotlighting arboreal mammals; Practical workbook write-ups; teamwork contribution; Theory examination**Subject Description:** Field camps and are an integral part of this subject. Describing populations - demography, life tables, genetic structure. Factors regulating population growth - competition herbivory, predation, environmental disturbance. Natural selection. Frequency-dependence and density-dependence. Phenotypic plasticity. Sex, recombination and breeding systems. Localised adaptation. Sexual selection. Genetic basis of behaviour. Hybrids and hybrid zones. Mechanisms of evolution and speciation. Population biology in relation to conservation - minimum population sizes, inbreeding depression, genetic tolerance of extreme conditions.

**BIOL352 Biology For Environmental Engineers**

Autumn Wollongong On Campus

**Credit Points:** 6**Contact Hours:** Autumn 2hrs L,3hrs P, 1hr T**Assessment:** Same as BIOL 104.**Subject Description:** See BIOL 104. This subject includes a set of tutorials specifically designed for Environmental Engineers.**BIOL355 Marine and Terrestrial Ecology**

Spring Wollongong On Campus

**Credit Points:** 8**Contact Hours:** Spring 2 hrs L,4 hrs T/Prac**Pre-requisites:** BIOL 241, BIOL 251, STAT 252,**Assessment:** Project report, field camp report and seminar 60%; final examination 40%.**Subject Description:** Introduction to ecology - levels of organisation (individual, population, community, eco-system). Experiments in ecology - their design, analysis and interpretation. Biotic interactions: competition, herbivory, predation, mutualisms. Disturbance, catastrophe and community structure and function. Behavioural ecology: innate vs learned behaviours and their effects on individual fitness, demography and community structure. Applied ecology: rehabilitation and management.**BIOL356 Marine and Terrestrial Ecology (Environmental Science)**

Spring Wollongong On Campus

**Credit Points:** 8**Contact Hours:** Spring 2 hrs L,4 hrs T/Prac**Pre-requisites:** BIOL 251, STAT 252**Assessment:** Major project report and seminar, environmental report 60%; final examination 40%.**Subject Description:** Lecture content as for BIOL355. Tutorial and practical components of this subject provide professional experience for Bachelor of Environmental Science students. A substantial amount of the practical work will be environmental science projects conducted in the Illawarra region.**BIOL357 Field Methods in Ecology****Credit Points:** 8**Not on offer in 2005****Pre-requisites:** BIOL251 or equivalent**Assessment:** Seminar, Project Report, Final examination**Subject Description:** Techniques for estimating abundances of organisms - census, capture/recapture, indirect estimates. Shortcomings of various techniques. Radio telemetry of large vertebrates. Calculation of home range. Techniques for ecological survey and experiment in the field.**BIOL391 Advanced Biology**

Spring Wollongong On Campus

Autumn Wollongong On Campus

Annual Wollongong On Campus

**Credit Points:** 16**Contact Hours:** Spring 12 hrs P; seminars, Autumn 12 hrs P; seminars, Annual**Pre-requisites:** Four 200-level (distinction and above)**Co-requisites:** Two 300-level**Assessment:** Students will conduct 2 research projects; write 2 project reports; give 2 project seminars; critique 2 scientific papers; and sit a written examination.**Subject Description:** Two research projects are to be undertaken with different supervisors, designed and chosen in consultation with these academic staff members. Emphasis may be placed on developing competence in a range of laboratory and field techniques not already familiar to the student. Selection for Advanced Biology is based on merit, and intending students should consult the Coordinator before enrolment.**BIOL392 Advanced Biology**

Spring Wollongong On Campus

Autumn Wollongong On Campus

**Credit Points:** 8**Contact Hours:** Spring 6 hrs P; seminars, Autumn 6 hrs P; seminars**Pre-requisites:** Four 200-level (distinction and above)**Co-requisites:** Two 300-level**Assessment:** Students will conduct 1 research project; write 1 project report; give 1 project seminar; critique 1 scientific paper; and sit a written examination.**Subject Description:** One research project is to be undertaken, designed and chosen in consultation with an academic staff member. Emphasis may be placed on developing competence in a range of laboratory and field techniques not already familiar to the student. Selection for Advanced Biology is based on merit, and intending students should consult the Coordinator before enrolment.**BIOL401 Biology Honours**

Annual Wollongong On Campus

Spring2005/

Autumn2006 Wollongong On Campus

**Credit Points:** 48**Contact Hours:** Refer to Faculty**Pre-requisites:** Passing a major sequence in Biology at 300-level at a standard approved by the Head of the Department**Assessment:** Essay, literature review, scientific paper, poster, seminar, thesis.**Subject Description:** Students wishing to proceed to honours should consult the Honours Co-ordinator as soon as possible during their third year.**BIOL402 Biology Joint Honours**

Annual Wollongong On Campus

**Credit Points:** 24**Contact Hours:** Refer to Faculty**Pre-requisites:** Passing a major sequence in Biology at 300-level at a standard approved by the Head of the Department**Co-requisites:** Enrolment in a 24 credit point Honours subject offered by another Academic Unit.**Subject Description:** Students wishing to proceed to joint honours should consult the Honours Co-ordinator as soon as possible during their third year.

**BIOL421 Cells, Proteins and Nucleic Acid Technology**

Autumn Wollongong On Campus

**Credit Points:** 12**Contact Hours:** Autumn 5hrs**Pre-requisites:** Completion of the third year of the Bachelor of Biotechnology**Assessment:** Literature Report 40%, Examination 60%**Subject Description:** This subject deals with the latest developments and techniques in the broad field of cell and molecular biology. Topics include cell and tissue culture, antibody technology, protein purification, 3D protein structure and folding, ligand-receptor interactions, transgenic mice, Australian Biotechnology, ethics of Biotechnology, microbial bioremediation and genetic engineering, vaccine development, gene therapy, intellectual property and the patent system.**BIOL423 Biotechnology Project**

Spring Wollongong On Campus

Autumn Wollongong On Campus

**Credit Points:** 36**Contact Hours:** 30 hrs per wk**Prerequisites:** As specified for years 1-3 of B Biotech degree**Assessment:** Research seminar 5%, Final Seminar 7.5%, Research Manuscript 10%, and final thesis 70%, Research Poster 7.5%**Subject Description:** This subject is comprised of a research project performed under the supervision of one or more members of academic staff. The topic of research is initially proposed by the supervisor(s) but may be modified in consultation with the individual student. As part of this subject, apart from a final thesis, the student must present an initial Research Seminar and a final Seminar (on the topic of their research project), and submit a Research Manuscript and a Research Poster.**CHEM101 Chemistry IA: Introductory Physical & General Chemistry**

Autumn Wollongong On Campus

Autumn Loftus On Campus

**Credit Points:** 6**Contact Hours:** Autumn 2 x 1 hr L and 3 x 1 hr wks 1,2,3,6,8,10 & 12; 1 x 1 hr T; 1 x 3 hr P, Autumn**Pre-requisites:** NSW HSC Examination Chemistry**Exclusions:** Not to count for credit with CHEM104**Assessment:** Practical assignments, test, computer assignments, plus written examination.**Subject Description:** Atomic theory and structure. Periodic Table and Chemical periodicity. Chemical bonding and shapes of molecules. Stoichiometry. Oxidation-reduction reactions. Acids and bases. Properties of gases and liquids. Thermodynamics and thermochemistry. Chemistry of the environment and radioactivity. Completion of at least a 2 Unit Science course at NSW HSC recommended. Not to count with CHEM103, CHEM104.**CHEM102 Chemistry IB: Introductory Organic & Physical Chemistry**

Spring Wollongong On Campus

Spring Loftus On Campus

**Credit Points:** 6**Contact Hours:** Spring 2 x 1 hr L and 3 x 1 hr wks 1,2,3,6,8,10 & 12; 1 x 1 hr T; 1 x 3 hr P, Spring**Pre-requisites:** NSW HSC Examination Chemistry**Exclusions:** Not to count for credit with CHEM105**Assessment:** Practical assignments, test, computer assignment, plus written examination**Subject Description:** Chemical equilibria and equilibrium constants. Acid-base equilibria. Electrochemistry, galvanic cells, Nernst equation and Faraday's laws. Kinetics of chemical reactions. Introductory organic chemistry. Nomenclature, preparation and reactions of alkanes, alkenes, alkynes, and arenes. Chemistry of alcohols, amines, carbonyl, and other compounds. Reaction mechanisms. Synthetic polymers. Not to count for credit with CHEM105**CHEM103 Introductory Chemistry For Engineers**

Autumn Wollongong On Campus

Summer 05/06 Wollongong On Campus

**Credit Points:** 6**Contact Hours:** Autumn 39hrL, 12hrTut/Dem, 21hrP, Summer 2005 / 2006**Exclusions:** Not to count for credit with CHEM101 or CHEM104**Assessment:** Practical assignments, test, computer assignment, plus written examination.**Subject Description:** Atomic theory, chemical bonding, structure. Simple organic molecules and reactivity. Thermodynamics and thermochemistry. Gases, liquids and solutions. Chemical basis of engineering materials such as cement, adhesives, polymers, fuels, metals and semiconductors. Environmental chemistry-pollution and pollution control. Kinetics and radiation chemistry. Not to count for credit with CHEM101 or CHEM104**CHEM104 Chemistry 1D (Introductory Chemistry)**

Autumn Wollongong On Campus

**Credit Points:** 6**Contact Hours:** Autumn 3 x 1 hr L; 1 x 1 hr T; 1 x 3 hr P**Pre-requisites:** Nil. Students who satisfy the HSC pre-requisites for CHEM101 and CHEM102 are not permitted to enrol.**Exclusions:** Not to count for credit with CHEM101 or CHEM103**Assessment:** Practical assignments, test, computer assignment, plus written examination.**Subject Description:** Atomic theory and structure. Periodic Table and Chemical periodicity. Chemical bonding and shapes of molecules. Stoichiometry. Oxidation-reduction reactions. Acids and bases. Properties of gases and liquids. Thermodynamics and thermochemistry. Chemistry of the environment and radioactivity. Not to count for credit with CHEM101 or CHEM103**CHEM105 Chemistry 1E (Introductory Chemistry)**

Spring Wollongong On Campus

**Credit Points:** 6**Contact Hours:** Spring 3 x 1 hr L; 1 x 1 hr T; 1 x 3 hr P**Pre-requisites:** Nil. Students who satisfy the HSC pre-requisite for CHEM101 and CHEM102 are not permitted to

enrol

**Exclusions:** Not to count with CHEM102

**Assessment:** Practical assignments, test, computer assignment, plus written examination.

**Subject Description:** Chemical equilibria and equilibrium constants. Acid-base equilibria. Electrochemistry P galvanic cells, Nernst equation and Faraday's laws. Kinetics of chemical reactions. Introductory organic chemistry P nomenclature, preparation and reactions of alkanes, alkenes, alkynes and arenes. Chemistry of alcohols, amines, carbonyl, and other compounds. Reaction mechanisms. Synthetic polymers. Not to count with CHEM102

### CHEM211 Inorganic Chemistry II

Autumn Wollongong On Campus

**Credit Points:** 6

**Contact Hours:** Autumn 39hrL&T, 39hrPrac

**Pre-requisites:** CHEM101/104 and CHEM102/105

**Assessment:** Practical assignments 20% and quizzes 20%, plus written examination 60%.

**Subject Description:** Introduction to modern coordination chemistry; crystal field theory; magnetism; UV - visible spectra of transition metal complexes; symmetry; bioinorganic chemistry; medicinal inorganic chemistry and toxicology.

### CHEM212 Organic Chemistry II

Autumn Wollongong On Campus

**Credit Points:** 6

**Contact Hours:** Autumn 26hrL,13hrT,36hrP

**Pre-requisites:** CHEM101 / CHEM104 and CHEM102/ CHEM105

**Assessment:** Practical assignments 25%, quizzes 10%, assignments 15% and written examination 50%.

**Subject Description:** Modern organic synthetic methods, theory and practice. This includes: An introduction to organic chemical stereochemistry; fundamentals of molecular mechanism; synthetic transformations of organic molecular moieties; applications of spectroscopy.

### CHEM213 Molecular Structure, Reactivity and Change

Spring Wollongong On Campus

**Credit Points:** 6

**Contact Hours:** Spring 39hrL&T,39hrPrac

**Pre-requisites:** CHEM101/ CHEM104 and CHEM102/ CHEM105 & Faculty of Science minimum mathematics requirement

**Assessment:** Practical, mid-session quiz plus written examination.

**Subject Description:** When looking at chemical systems, three fundamental questions arise : to what extent will they react, how quickly will they react and what is their structure? This subject explores these topics through the key topics of thermodynamics and kinetics and provides an understanding of experimental studies and their relationship to theory. These macroscopically observed properties are then discussed in relation to fundamental molecular properties, including an introduction to simple quantum concepts and the rotational/vibrational spectroscopy of diatomic molecules. In addition, colloidal systems, including micellar phases, are

used as examples of molecular self-assembly, where intrinsically unstable phases are maintained by kinetic factors.

### CHEM214 Analytical and Environmental Chemistry

Spring Wollongong On Campus

**Credit Points:** 6

**Contact Hours:** Spring 39hr L/T, 39hr Pracs

**Pre-requisites:** CHEM101/CHEM104 and CHEM102/ CHEM105 or CHEM103 & Faculty of Science minimum mathematics requirement

**Assessment:** Practical assignments 30%, Tutorial assignments 15%, and written examination 55%.

**Subject Description:** This subject is an introduction to analytical chemistry and its application to environmental and biological systems. It provides an excellent introduction to the separation and quantification of various compounds through the application of a range of current analytical techniques. It will provide an understanding of sample compositions, sample preparation and analysis, and data interpretation using statistics. The material will be presented in lectures, workshops, and laboratory exercises.

### CHEM215 Food Chemistry

Autumn Wollongong On Campus

**Credit Points:** 6

**Contact Hours:** Autumn 39hrL&T, 18hrPrac

**Pre-requisites:** CHEM101 / CHEM104 and CHEM102 / CHEM105

**Assessment:** Practical assignments 20%, quiz 20%, written examination 50%, 10% essay on SFC Lecture Course

**Subject Description:** Only listed in the Health & Behavioural Sciences Schedule. This subject is designed as a core subject in the BSc (Nutrition) program. Description: Types of nutrients, energy value of food. Fats, carbohydrates, and proteins in foods. Colloidal systems. Essential trace elements, vitamins. Cooking, preservation and processing of food. Chemical additives and toxins in food.

### CHEM218 Special Chemistry Studies

Spring Wollongong On Campus

Autumn Wollongong On Campus

**Credit Points:** 6

**Contact Hours:** Spring 6hr Lab session week, Autumn 6hr Lab session week

**Pre-requisites:** Entry restricted to BSc(Hons) Adv. candidates

**Assessment:** Written report on student's project.

**Subject Description:** This subject will involve the study of specific research areas of chemistry under the guidance of a member of staff. This study may include research assistance, directed reading, computer-based studies, and library assignments.

### CHEM301 Advanced Materials and Nanotechnology

Spring Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Spring 3h L/T + 3h P

**Pre-requisites:** CHEM211

**Assessment:** Exam 60%, Literature Assignment 10%, Practical Work 30%

**Subject Description:** Nanotechnology is the design and fabrication of functional materials at the molecular level. It is one of the fastest growing areas of scientific research, spanning chemistry, physics, biology and materials science. This subject provides an introduction to polymers, ceramics, carbon nanotubes and other advanced materials that are the building blocks of nanotechnology. It also explores how supramolecular chemistry is used to synthesise assemblies of molecules for applications including sensing, catalysis, artificial photosynthesis and molecular electronics

#### CHEM314 Instrumental Analysis

Autumn Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Autumn 39hrL&T, 39hrPrac

**Pre-requisites:** CHEM214

**Assessment:** Practical work (35%), other coursework (20%) and final written exam (45%).

**Subject Description:** The principles underlying common instrumental methods will be discussed in lectures, specifically instrument development and components, operation and application, and their advantages and limitations. The accompanying laboratory course provides an opportunity for hands-on experience.

#### CHEM320 Bioinformatics: From Genome to Structure

Spring Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Spring 39hrL&T, 39hrPrac

**Pre-requisites:** BIOL213

**Assessment:** Practical work 35%, quiz 10%, and final written examination 55%.

**Subject Description:** The course will be divided into three strands of approximately equal length: (i) Bioinformatics, (ii) Biological macromolecules (proteins and nucleic acids) - structure and function, (iii) Proteomics. In the practical course, bioinformatics will be explored in computer-based tutorials and practicals. Databases for nucleic acid and protein sequences, structures and other parameters of biological molecules, plus linkages to the scientific literature, will be used to extract information and to compare and analyse these data. Proteomics and protein and nucleic acid structure will also be investigated via computer-based practicals. In the laboratory, the sequence of a dipeptide will be determined and structure/function aspects of the protein, lysozyme, will be analysed.

#### CHEM321 Organic Synthesis and Reactivity

Spring Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Spring 39hrL&T, 39hrPrac

**Pre-requisites:** CHEM212

**Assessment:** Practical 20%, 3 assignments (spectroscopy/spectroscopy-stereochemistry/molecular modelling) 15%, quizzes 15%, and written examination 50%.

**Subject Description:** Reactive intermediates: free radicals, carbenes, arenes: generation, determination, reactions. Stereochemistry: physical detection of stereochemistry by

n.m.r., C.D. etc; enantioselective synthesis and computer modelling. Synthesis: carbocyclic synthesis and theory and applications to natural product synthesis. Heterocycles: synthesis, reactions and applications of common heterocycles.

#### CHEM327 Environmental Chemistry

Autumn Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Autumn 39hrL&T, 39hrPrac

**Pre-requisites:** CHEM214

**Assessment:** Literature review/laboratory report 40%, written examination 50%, quiz 10%

**Subject Description:** The environment depends on complex interactions of chemical, physical and biological processes. These can be both natural and anthropogenic in origin. In this course the chemical aspects are highlighted in three strands: atmospheric chemistry, aquatic chemistry and soil chemistry. The subject also investigates methods for measuring and monitoring the chemical state of the environment.

#### CHEM330 Medicinal Chemistry

Spring Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Spring 39hrL&T, 39hrPrac

**Pre-requisites:** CHEM212 and BIOL214 and BMS202. Entry restricted to BMedChem candidates.

**Assessment:** Final examination 55%, practical work 20%, laboratory mini project 5%, literature assignment 5% and seminar based on assignment 5%, quiz 10%.

**Subject Description:** The concepts, principles and applications of medicinal chemistry are examined and include: drug lead discovery, investigation into the key molecular features necessary for medicinal action, drug metabolism, stereochemistry/chirality and drug action, modern methods in drug design including computer-aided molecular modelling. This course also has guest lecturers who are experts in the varying fields of medicinal chemistry. This could include speakers from pharmaceutical companies or from research institutes.

#### CHEM340 Chemistry Laboratory Project

Summer 05/06 Wollongong On Campus

Spring Wollongong On Campus

Autumn Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Summer 2005/2006 6 Hr practical / Week + Seminars etc, Spring 6Hr Practical / Week + Seminars etc, Autumn 6hrP/week+smnrs etc.

**Pre-requisites:** Four 200-level Chemistry subjects. Restricted entry. Admission by application to Head of Department of Chemistry

**Co-requisites:** Two 300-level Chemistry subjects

**Assessment:** Report on project and literature review 80%. Seminar on project 20%.

**Subject Description:** Research projects are undertaken under the direct guidance of an academic supervisor, chosen after consultation with academic staff and the Head of Department. The projects will introduce students to a range of advanced experimental techniques, and familiarise them with the scientific approach to research. Students must attend

Departmental seminars. Selection for this laboratory project is based on merit, and intending students should consult with the Head before enrolment.

### CHEM350 Principles of Pharmacology

Autumn Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Autumn 39hrL&T, 39hrPrac

**Pre-requisites:** (CHEM212 or BIOL214) and BMS202. CHEM350 is normally restricted to BMedChem candidates. Other students should contact the co-ordinator.

**Assessment:** Practical 20%, library assignment and seminar 20%, written examination and test 60%.

**Subject Description:** This course is designed to introduce students to the basic concepts of pharmacology. Topics covered will include, receptors and molecular basis of drug action, drug disposition and bioavailability, kinetics of drug action, factors affecting drug activity, in vitro and in vivo screening procedures, pharmacology of prototype drugs, and drug interactions.

### CHEM364 Molecular Structure and Spectroscopy

Autumn Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Autumn 39hrL&T, 39hrPrac

**Pre-requisites:** CHEM213

**Assessment:** Written final examination 60%, Practical & tutorial assignments 30%, mid-session quiz 10%.

**Subject Description:** Determining the structure of a molecule is the key to unlocking its chemistry. In the 21st century there are numerous approaches for determining molecular structure. These include, experimental spectroscopic techniques and theoretical predictions, which make use of the increasing power of computers. This combination of experimental and theoretical techniques, are powerful and complementary methods for determining molecular structure and reactivity. This multi-faceted course covers the fundamentals of computational chemistry and spectroscopy and their applications to problems of molecular structure determination. Students will gain experience in conducting and interpreting; electronic structure calculations, optical (infrared, visible and ultraviolet) spectroscopy, mass spectrometry, and nuclear magnetic resonance spectroscopy. A formal treatment of molecular symmetry is also included. Applications of these methods to organic, inorganic, biological and gas-phase systems are covered.

### CHEM401 Chemistry Honours

Autumn Wollongong On Campus

Annual Wollongong On Campus

Spring2005/

Autumn2006 Wollongong On Campus

**Credit Points:** 48

**Contact Hours:** Autumn, Annual, Spring2005/Autumn2006

**Pre-requisites:** Normally at least 32 credit points of 300-level Chemistry subjects at an appropriate standard (credit average). Not to count with CHEM402 or 403, 405.

**Assessment:** Coursework (10%); Research project, thesis and seminars (90%)

**Subject Description:** Coursework: advanced topics and skills for chemistry research including oral and written communication, project management, library techniques and OH&S. Research Project: each year, available projects are provided by the Department of Chemistry. See Co-ordinator or Head of Department

### CHEM402 Chemistry Honours Part I For Part-Time Students

Annual Wollongong On Campus

Spring2005/

Autumn2006 Wollongong On Campus

**Credit Points:** 24

**Contact Hours:** Annual, Spring2005/Autumn2006

**Pre-requisites:** Normally 32 credit points of 300-level Chemistry subjects at an appropriate standard. Not to count with CHEM401.

**Assessment:** Coursework (10%); Research project, thesis and seminars (90%).

**Subject Description:** Coursework: advanced topics and skills for chemistry research including oral and written communication, project management, library techniques and OH&S. Research Project: each year, available projects are provided by the Department of Chemistry. See Co-ordinator or Head of Department

### CHEM403 Chemistry Honours Part 2 for Part-Time Students

Annual Wollongong On Campus

Spring2005/

Autumn2006 Wollongong On Campus

**Credit Points:** 24

**Contact Hours:** Annual, Spring2005/Autumn2006

**Pre-requisites:** Normally 32 credit points of 300-level Chemistry subjects at an appropriate standard. Not to count with CHEM401

**Assessment:** Coursework (10%); Research project, thesis and seminars (90%)

**Subject Description:** Coursework: advanced topics and skills for chemistry research including oral and written communication, project management, library techniques and OH&S. Research Project: each year, available projects are provided by the Department of Chemistry. See Co-ordinator or Head of Department

### CHEM405 Chemistry Joint Honours

Annual Wollongong On Campus

**Credit Points:** 24

**Contact Hours:** Annual

**Pre-requisites:** Normally 24 credit points of 300-level Chemistry subjects at an appropriate standard. Entry is subject to the approval of the Head of Department of Chemistry. This subject is taken with 24 credit points at 400-level from another Department.

**Assessment:** Coursework (10%); Research project, thesis and seminars (90%)

**Subject Description:** A list of topics available will be provided by the Department. See Co-ordinator or Head of Department.

**CHEM430 Selected Topics in Medicinal Chemistry**

Annual Wollongong On Campus

**Credit Points:** 12**Contact Hours:** Annual 56 hrs L&T**Pre-requisites:** CHEM330. Entry restricted to BMedChem candidates.**Assessment:** Written examinations 60%, literature assignments 10%, project essay 20%, seminar 10%.**Subject Description:** Specialist courses in aspects of medicinal chemistry and related areas. Topics will include: structure-based ligand design (including computer-aided drug design); structure-pharmacological property relationships; synthesis and applications of radiopharmaceuticals; drug stability and formulation; toxicology and metabolism; advanced synthetic chemistry (including asymmetric synthesis and chiral drugs); bioactive natural products and drug development (including medicinal plant studies).**CHEM431 Selected Topics in Medicinal Chemistry Part 1**

Spring Wollongong On Campus

**Credit Points:** 6**Contact Hours:** Spring 28hrsL&T**Pre-requisites:** CHEM330. Entry restricted to BMedChem candidates who commence BMedChem(Hons) mid-year.**Assessment:** Written examinations 60%, literature assignments 10%, project essay 20%, seminar 10%.**Subject Description:** Specialist courses in aspects of medicinal chemistry and related areas. Topics will include: structure-based ligand design (including computer-aided drug design); structure-pharmacological property relationships; synthesis and applications of radiopharmaceuticals; drug stability and formulation; toxicology and metabolism; advanced synthetic chemistry (including asymmetric synthesis and chiral drugs); bioactive natural products and drug development (including medicinal plant studies).**CHEM432 Selected Topics in Medicinal Chemistry Part 2**

Autumn Wollongong On Campus

**Credit Points:** 6**Contact Hours:** Autumn 28hrsL&T**Pre-requisites:** CHEM330. Entry restricted to BMedChem candidates.**Assessment:** Written examinations 60%, literature assignments 10%, project essay 20%**Subject Description:** Specialist courses in aspects of medicinal chemistry and related areas. Topics will include: structure-based ligand design (including computer-aided drug design); structure-pharmacological property relationships; synthesis and applications of radiopharmaceuticals; drug stability and formulation; toxicology and metabolism; advanced synthetic chemistry (including asymmetric synthesis and chiral drugs); bioactive natural products and drug development (including medicinal plant studies).**CHEM440 Selected Topics in Medicinal Chemistry**

Annual Wollongong On Campus

**Credit Points:** 16**Contact Hours:** Annual 56 hrs Lectures and tutorials**Pre-requisites:** CHEM330. Entry restricted to BMedChem candidates.**Assessment:** 8 x 7hr Lecture topics 60%, Directed studies essay 10%, Introductory essay 20%, seminar 10%.**Subject Description:** Specialist courses in aspects of medicinal chemistry and related areas. Topics will include: structure-based ligand design (including computer-aided drug design); structure-pharmacological property relationships; synthesis and applications of radiopharmaceuticals; drug stability and formulation; toxicology and metabolism; advanced synthetic chemistry (including asymmetric synthesis and chiral drugs); bioactive natural products and drug development (including medicinal plant studies), toxicology and advanced proteomics.**CHEM450 Medicinal Chemistry Project**

Spring2005/

Summer2005 Wollongong On Campus

Annual Wollongong On Campus

**Credit Points:** 28**Contact Hours:** Refer to Faculty**Pre-requisites:** CHEM330 and CHEM350. Entry restricted to BMedChem candidates.**Assessment:** Based on a research project thesis 90% and research seminar 10%**Subject Description:** A list of research projects in medicinal chemistry available for study in any one year will be provided by the Department of Chemistry. The development of appropriate joint projects within or outside the University is actively encouraged.**CHEM451 Medicinal Chemistry Project Part 1**

Spring Wollongong On Campus

**Credit Points:** 14**Contact Hours:** Refer to Faculty**Pre-requisites:** CHEM330 and CHEM350. Entry restricted to BMedChem candidates.**Assessment:** Based on research project thesis 90% and research seminar 10%**Subject Description:** Research project in medicinal chemistry. For students commencing BMedChem research project in Session 2.**CHEM452 Medicinal Chemistry Project Part 2**

Autumn Wollongong On Campus

**Credit Points:** 14**Contact Hours:** Refer to Faculty**Pre-requisites:** CHEM330, CHEM350 and CHEM451. Entry restricted to BMedChem candidates.**Assessment:** Based on a research project thesis 90% and research seminar 10%**Subject Description:** Research project in medicinal chemistry.**CHEM460 Medicinal Chemistry Project**

Annual Wollongong On Campus

**Credit Points:** 32**Contact Hours:** Annual 66% of full time load

**Pre-requisites:** CHEM330 and CHEM350. Entry restricted to BMedChem candidates.

**Assessment:** Based on a research project thesis 90% and research seminar 10%

**Subject Description:** A list of research projects in medicinal chemistry available for study in any one year will be provided by the Department of Chemistry. The development of appropriate joint projects within or outside the University is actively encouraged.

### EESC101 Planet Earth

Autumn Wollongong On Campus

**Credit Points:** 6

**Contact Hours:** Autumn 2 x 1hr lecture, 1 x 3 hr practical

**Exclusions:** Not to count with GEOS251, GEOS252, GEOS111

**Assessment:** Short practice tests, multiple-choice tests 10%, Field tutorial test 5%, Practical Examination 35%, Theory Examination 35%

**Subject Description:** How does the solid planet Earth function and of what does it consist? This subject provides an introduction to earth sciences by considering topics such as geological time, the solar system; the interior of Earth; tectonics and structural geology; crystals; minerals; volcanoes and volcanic processes; and characteristics of igneous, sedimentary and metamorphic rocks.

### EESC102 Earth Environments and Resources

Spring Wollongong On Campus

**Credit Points:** 6

**Contact Hours:** Spring 2 x 1hr lectures, 1 x 3hr practical, 1 day field tutorial

**Exclusions:** Not to count with GEOS102

**Assessment:** Short practical Test 10%, Multiple choice tests 20%, Field Tutorial Test 5%, Practical Examination 25%, Theory Exam 40%

**Subject Description:** The frequent conflicts between resource utilisation and its environmental consequences are of major concern in modern societies. This subject considers the implications and environmental and geological aspects of resource utilisation on Earth. Topics include economic geology: gold, metals, water, coal, oil and gas; industrial minerals; geophysical exploration; mining and resources; sedimentary processes, products and environments of deposition; fossils and palaeoecology.

### EESC103 Landscape change and Climatology

Autumn Wollongong On Campus

**Credit Points:** 6

**Contact Hours:** Autumn 2 x 1hr lectures, 1 x 3hr practical

**Exclusions:** Not to count with GEOS112

**Assessment:** 1 examination, 2 essays, practical work

**Subject Description:** This subject examines the physical geography of our planet including the character of the oceans and their interaction with the land masses, the behaviour of the atmosphere, world-wide weather and climatic patterns, climatic change, major distributions of soil and biota, and the Earth's landforms. The latter includes information on weathering, theories of landform evolution, hillslope processes, glaciation, hydrology, river and coastal processes,

and deserts. Laboratory classes concentrate on map and air photograph interpretation.

### EESC104 The Human Environment: Problems and Change

Spring	Wollongong	On Campus
Spring	Shoalhaven	On Campus
Spring	Bega	On Campus
Spring	Batemans Bay	On Campus
Spring	Moss Vale	On Campus

**Credit Points:** 6

**Contact Hours:** Spring 2 x 1hr Lectures, 1 x 2hr practical per week, Spring 2 x 1hr lectures, 1 x 2hr practical per week, Spring 2 x 1hr lectures, 1 x 2hr practical per week, Spring 2 x 1hr lectures, 1 x 2hr practicals per week, Spring 2 x 1hr lectures, 1 x 2hr practical per week

**Exclusions:** GEOS142

**Assessment:** Mid-term exam 25%, final exam 25%, 5 practicals each worth 10%

**Subject Description:** This subject introduces students to the central themes of human geography. The themes introduced in this subject include cultural, tourism, social, population and development geographies. A number of questions are examined to introduce these themes. These questions include those that investigate cultures of nations, national identities, international migration, mechanisms of world population growth and global inequalities. Through introducing these themes this subject aims to increase awareness and understanding of the relationships between the environment and culture, tourism, population and economic growth. Practical classes introduce students to a range of analytical techniques used in human geography. These techniques including deconstruction, content analysis and participant observation are applied to a range of subject-relevant problems.

### EESC201 Earth Surface Processes and Products

Autumn Wollongong On Campus

**Credit Points:** 6

**Contact Hours:** Autumn 2hr L, 3 hrs lab/week, 2 days field work

**Pre-requisites:** 12 credit points of 100-level GEOS or EESC subjects

**Exclusions:** MARE218

**Assessment:** Macrofossil Exercise 1 10%, Macrofossil Exercise 2 10%, Seminar Presentation 5%, Sydney Basin Field report 25%, multiple choice quizzes 10% Theory Exam 40%

**Subject Description:** This subject provides an overview of volcanology, marine sediments, sedimentary environments and fossils using local field examples as a teaching platform. Topics include: styles and mechanisms of volcanic eruptions; distribution and characteristic features of erupted volcanic products; clastic high and low-energy shelf sediments; evaporates; reefs and cool water carbonates; deep ocean sediments; marine transport mechanisms; major marine invertebrate groups and their fossil records; palaeoecology; and application of stable isotopes in marine environments.

**EESC202 Soils, Landscapes and Hydrology**

Spring Wollongong On Campus

**Credit Points:** 6**Contact Hours:** Spring 2 x 1hr lectures, 1 x 2hr practical**Pre-requisites:** 12 credit points of 100-level EESC or GEOS subjects.**Exclusions:** GEOS214**Assessment:** Essays/field/practical assignments; final examination**Subject Description:** The interdependence of landform, hydrology and soil, together with time and place, are the major factors influencing landscape evolution. This subject examines denudation of highlands; survival of ancient landscapes; climatic and geomorphic controls on landforms; erosion; weathering processes and the formation of soils, desert dunes, laterites, silcretes and calcretes; soil surveying; environmental records of lakes; groundwater and surface-water processes and chemistry; dating of land-surfaces and groundwater; the hydrological cycle.**EESC203 Biogeography and Environmental Change**

Autumn Wollongong On Campus

**Credit Points:** 6**Contact Hours:** Autumn 2hrs L, 3 hrs practical/week**Pre-requisites:** EESC103 or BIOL104 or GEOS112**Exclusions:** Not to count with GEOS222**Assessment:** Essay 20%, practical/field reports 40%, Final Examination 40%**Subject Description:** The present environment of Australia is the legacy of interactions between geological, biological and hydrological processes and human impacts. This subject links the biogeographical study of the distribution of plants and animals and their interaction with the physical environment to long-term environmental change. Set within the context of long-term geological and climate change, topics include: the origins of Australian flora and fauna, the impact of long-term climatic change, anthropogenic effects on biota, and the impact of fire. Modern techniques used to reconstruct ecosystems and climates, map vegetation and human impact, and to analyse vegetation data are presented.**EESC204 Introductory Spatial Science**

Spring Wollongong On Campus

**Credit Points:** 6**Contact Hours:** Spring 2 hrs L, 3 hrs practical/week**Pre-requisites:** At least 30cp of 100 level subjects normally including EESC103 or GEOS112**Assessment:** Practical work 35%, Online quiz 10%, written assignment 15%, Final examination 40%**Subject Description:** This subject provides students with a comprehensive introduction to geospatial technologies. Students develop basic technical skills that can be used to support a wide variety of disciplinary work. Attention is focused on the applied aspects of spatial data acquisition, collection, processing and mapping. Students will become skilled in commonly used procedures such as air photo interpretation and mapping, GIS data input and manipulation, the enhancement of multi-spectral data and will obtain hands-on experience with a variety of forms of spatial data.**EESC205 Population Studies**

Autumn Wollongong On Campus

**Credit Points:** 6**Contact Hours:** Autumn 2 hr L/T, 3 hr workshops**Pre-requisites:** 12 credit points of 100-level GEOS or EESC subjects**Exclusions:** GEOS349**Assessment:** Exam, seminar presentation, tutorial papers**Subject Description:** This subject is designed to introduce students to a range of demographic issues that are globally, nationally and regionally/locally significant. The lecture content is designed to enable students to critically study how geographers analyse population issues and how this analysis overlaps with other disciplines. The objective is that students will learn skills in handling data, critical thinking, group work and presentation skills.**EESC206 Discovering Downunder: a Geography of Australia**

Spring Wollongong On Campus

**Credit Points:** 6**Contact Hours:** Spring 2 x 1hr lectures, 1 x 2hr practical per week**Pre-requisites:** 12 credit points of any 100-level subjects**Co-requisites:** None**Exclusions:** GEOS233**Assessment:** Critical analysis 10%, Tutorial Participation 20% (4 tutorials @ 5%), Census assignment 30%, Final Exam 40%**Subject Description:** This is a broad yet coherent overview of the physical and human environments of contemporary Australia. How did Uluru and the Great Barrier Reef form? Why is Sydney particularly vulnerable to bushfires? Which is the most multicultural Australian city? Where is the Back of Bourke? Within individual topics we emphasise the importance of spatial and temporal scale, interactions between people and the environment, and key research questions. Topics include landforms; climate; vegetation; coasts; rivers and deserts; indigenous Australia; population; industry and agriculture; cities, suburbs and rural settlement; and interactions with Australia's near neighbours.**EESC208 Environmental Impact of Societies**

Spring Wollongong On Campus

**Credit Points:** 6**Contact Hours:** Spring 2 x 1hr lectures, 1 x 3hr practical**Pre-requisites:** 12 credit points of any 100-level subjects**Exclusions:** GEOS231**Assessment:** Major assignments, presentation, assessment, theory exam**Subject Description:** Humans have been transforming the Earth for many thousands of years. This subject provides an overview of those long term impacts as a context for better understanding contemporary environmental concerns. Topics include: global environmental issues, atmospheric and aquatic pollution, the biological ramifications of contamination, post-European impacts in Australia (vegetation changes, species extinction, land clearance, salinity). The environmental impacts of mining and of cities and urban expansion will be outlined. Students will be introduced to the practical techniques of Environmental Impact Assessment.

**EESC210 Social Spaces: Rural and Urban**

Spring	Wollongong	On Campus
Spring	Bega	On Campus
Spring	Shoalhaven	On Campus
Spring	Batemans Bay	On Campus
Spring	Moss Vale	On Campus

**Credit Points:** 6**Contact Hours:** Spring 1x 2hr lecture/workshop and 1x 2hr practical, Spring 1 x 2hr lecture/workshop, 1 x 2 hour practical, Spring 1 x 2hr lecture/workshop, 1 x 2hr practical, Spring 1 x 2hr lecture/workshop, 1 x 2hr practical, Spring 1 x 2hr lecture/workshop, 1 x 2hr practical**Pre-requisites:** 12 credit points of any 100-level subjects**Exclusions:** GEOS242 and GEOS243**Assessment:** Exam 40%, Census analysis assignment 30%, Critical Analysis Exercise 10%, workshops 20%**Subject Description:** This subject examines the global and national processes that shape the social, economic and spatial characteristics of Australian cities and regions. Students will study issues such as urbanisation, economic restructuring, population dynamics, and urban and regional policy to explore how contemporary urban and rural landscapes have been formed and how they are being constantly reshaped. Recent examples, such as dairy industry restructuring and the development of Sydney, will be used to make connections between these broader influences and specific aspects of Australian urban and rural life. Through workshops and assignments, students will develop practical skills and knowledge in areas such as media analysis and the use of census and other data sources.**EESC250 Field Geology**

Summer 05/06	Wollongong	Flexible
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**Credit Points:** 6**Contact Hours:** Refer to Faculty**Pre-requisites:** GEOS111 or EESC101, or satisfactory progress in EESC102**Exclusions:** GEOS301, GEOS205**Assessment:** Field exercises (55%), Field attitude and competence (10%), Field report (35%)**Subject Description:** The subject is taught and assessed on the basis of work completed during a 12 day field tutorial to view, describe and interpret well-exposed, coastal, rock sequences on the south coast of New South Wales. A variety of techniques will be used for measurement of stratigraphic sections, description and interpretation of geological structures, detailed sedimentary and volcanic facies assessment, and the organisation and production of geological maps, field mapping exercises and reports.**EESC252 Geology for Engineers I**

Spring	Wollongong	On Campus
Spring	Shoalhaven	On Campus

**Credit Points:** 6**Contact Hours:** Spring 2 x 1hr lectures, 1 x 3hr practical, Spring 2 x 1hr lectures, 1 x 3hr practical/week**Exclusions:** Not to count for credit with: GEOS251, GEOS111, GEOS102, EESC101, EESC102**Assessment:** Field Tutorial tests (2) 20%, Mid-session practical test 15%, Practical examination 25%, Theory examination 40%**Subject Description:** This subject provides an introduction to geology applied to engineering. Topics include rock-forming minerals; petrology and physical properties of igneous, sedimentary and metamorphic rocks; weathering and erosion; basic geological structures and identification of unstable rock masses; geological mapping and three-point problems; geological controls on groundwater flow and chemistry; geophysics; site investigations; relationship between geology and various engineering works such as excavations, tunnels, dams and foundations.**EESC260 Earth and Environmental Sciences Research Project**

Spring	Wollongong	On Campus
Autumn	Wollongong	On Campus

**Credit Points:** 6**Contact Hours:** Refer to Faculty**Pre-requisites:** 12 credit points of 100-Level GEOS or EESC subjects. Enrolment in BSc(Advanced) degree**Co-requisites:** Nil**Exclusions:** Not to count with GEOS292**Assessment:** Project report 70%, literature review presentations/seminars/examinations 30%**Subject Description:** This subject involves the study of specific research topics in Geosciences under the guidance of a member of staff. The study may include research assistance, directed reading, computer-based studies, library assignments. Emphasis will be placed on the appropriate design and execution of field or laboratory experiments and/or studies involving the analysis and interpretation of data. Students will develop skills in the acquisition and presentation of data in verbal and written form.**EESC300 Directed Studies in Earth & Environmental Sciences A**

Autumn	Wollongong	On Campus
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**Credit Points:** 8**Contact Hours:** Refer to Faculty**Pre-requisites:** Restricted Entry. Admission by application to Head of School of Earth and Environmental Sciences**Exclusions:** GEOS381**Assessment:** seminar presentation, essays, research report**Subject Description:** This subject consists of directed reading, field and laboratory work (as required) and writing leading to the production of a major research essay/project report or reports in a field selected by the student and approved by the Supervisor.**EESC301 Plate Tectonics, Macrotopography and Earth History**

Autumn	Wollongong	On Campus
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**Credit Points:** 8**Contact Hours:** Autumn 2hr L/week Tutorials/practicals up to 2 hrs/week, 5 days field work**Pre-requisites:** 12 cp of 200-level EESC or GEOS subjects, normally including either EESC201 or EESC202**Assessment:** Assignment and seminar 20%, Field trip report 1 15%, Field trip report 2 15%, Final examination 50%**Subject Description:** This subject outlines the theory of plate tectonics and evaluates its role as the dominant control of

## Subject Descriptions

macrotopography on Earth. Large-scale long-term and short-term processes that control landforms and bathymetry are examined in relation to plate boundaries, ocean basins, continental margins, continental interiors and sedimentary basins. Earth structure is examined along with earthquakes and deformation (stress, strain, faulting and folding). Aspects of Earth history are considered in relation to past mountain belts, continents and oceans. Practicals are a series of tutorials designed to reinforce the material covered in lectures. Field work consists of two field trips.

### **EESC302 Coastal Environments: Process and Management**

Spring Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Refer to Faculty

**Pre-requisites:** 12 cps of 200-level GEOS or 12 cp of 200 level EESC subjects

**Assessment:** Essays, practical/field reports, final examination

**Subject Description:** This subject examines sedimentary and ecological processes on the coast and explores coastal management issues in the context of these processes. Topics include the morphology, evolution and morphodynamics of coastal landforms, particularly beaches, estuaries, deltas, coastal barriers, dunes and coral reefs. The role of different wave regimes, tectonic processes, sea-level change and extreme events in shaping the coast is examined.

### **EESC303 Fluvial Geomorphology, Sedimentology**

Autumn Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Autumn 3 x 1hr lectures, 1 x 3hr practical

**Pre-requisites:** 18 cps of 200 level GEOS or EESC subjects normally including EESC201 and EESC202

**Exclusions:** GEOS321

**Assessment:** Essay 10%, Bundeena Field trip report 10%, Scarborough field trip report 10%, Kangaroo Valley-Shoalhaven field trip report 20%, Local creeks report 10%, Final examination 40%

**Subject Description:** Rivers play a dynamic role in shaping the Earth's landforms (geomorphology), constructing sedimentary sequences of economic importance (sedimentology), and presenting flood and erosion hazards, all of which greatly influence human use of the Earth's surface. This subject examines processes forming and modifying contemporary drainage basins, interprets fluvial sedimentary records and relates changes in these records to variations in climate and depositional environment. Particular attention is given to human modification and the management of river systems.

### **EESC304 Geographic Information Science**

Spring Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Spring 2 x 1hr lectures, 1 x 3hr practical

**Pre-requisites:** 18 credit points of 200-Level GEOS or EESC subjects

**Exclusions:** GEOS339

**Assessment:** Practicals, minor assignment, short test, major assignment, final exam

**Subject Description:** Geographical Information Science is concerned with the theory and analysis of spatial data, particularly using GIS. GIS can be used to model past and future scenarios, such as the effects of climate change, population growth or bushfire distribution. This course examines the principles of GIS, with an emphasis on natural resource management. It covers data acquisition, spatial databases, vector and raster systems, georeferencing, digital terrain modelling, analysis of errors and accuracy standards, and applications of GIS.

### **EESC305 Remote Sensing of the Environment**

Autumn Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Autumn 2 x 1hr lectures 1 x 3hr practical

**Pre-requisites:** 18cp of 200 level GEOS or EESC subjects

**Exclusions:** GEOS239

**Assessment:** RSCAL modules (5%) Short Answer Theory Test (15%) Practical Test (15%) Project report (25%) Final Exam (40%)

**Subject Description:** This subject introduces the principles and techniques for identifying and mapping environmental features using images obtained from satellites and aircraft. Satellite imagery from Landsat 7 ETM, SPOT, and EO-1 Hyperion, in addition to airborne hyperspectral imagery from Hymap and CASI will be examined. Case studies will be used to illustrate the multidisciplinary scope of remote sensing. Topics include environmental monitoring, vegetation analysis, geological exploration and urban planning. Practical work involves the development of interpretation skills as well as computer-based digital analysis.

### **EESC306 Resources and Environments**

Spring Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Spring 2hr lectures, 4 hrs laboratory and 4-5 days field work

**Pre-requisites:** 12cp of 200-level EESC or GEOS subjects, normally including either EESC201 or EESC202

**Exclusions:** GEOS302 and GEOS307

**Assessment:** Written examination 40%, Seminar 10%, Class exercises 20%, Assignments 30%

**Subject Description:** This subject covers the major concepts in metalliferous deposits and coal resources. Topics include the types and genesis of ore in igneous, metamorphic and sedimentary rocks, the formation and properties of coal, assessment of coal rank and type. The applications of geochemical methods and geophysical methods such as seismic, magnetic, gravity electrical and radiometric to the discovery and evaluation of deposits will be introduced. Professional matters such as the calculation of reserves, code of ethics and mining techniques will be introduced.

### **EESC307 Spaces, Places and Identities**

Autumn Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Autumn 2hr L/T and 3hr workshops

**Pre-requisites:** 12cp of any 200-level subjects

**Assessment:** Exam 40%, Seminar Presentation 20%, Research Report 20%, Interview Transcript 10%, Literature Review 10%

**Subject Description:** The lecture content is designed to enable students to critically study how geographers have conceptualised space/place. Different geographical approaches will be introduced in this subject that investigate the connections that have been made between place making processes and identity. Drawing on case studies, the relationships between place and identity will be explored in the context of places of the nation, resistance, pleasure and fantasy. Underpinning the design of workshops is the objective that students will learn skills to transfer into their career paths. Proficiency in three areas is concentrated upon in the subject: qualitative research, team-work and presentation skills. Employers often seek graduates with demonstrated skills in team-work, critical thinking, oral communication and report writing. This subject is designed to enable students to develop these skills.

### **EESC308 Environmental and Heritage Management**

Spring Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Spring 2 x 1hr lectures, 1 x 3 hr practical

**Pre-requisites:** 12cp of 200-level EESC or GEOS subjects

**Exclusions:** GEOS331 and GEOS333

**Assessment:** Essay 20%, Practical reports 20%, Research report 20%, Final examination 40%

**Subject Description:** This subject presents geographic perspectives on environmental and heritage management. We examine environmental and cultural values and how they are translated into practice to protect and manage landscapes, places, resources and ecosystems. Consequently, the subject will consider definitions of concepts such as environment, nature and heritage as well as legislative and policy frameworks in Australia and overseas. These themes will be pursued through studies of issues such as indigenous land and heritage management, wilderness identification and management, catchment management and restoration of ecosystems and the built environment. The subject is relevant for students specialising in any of the EESC strands.

### **EESC310 Water Resources and Management**

Spring Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Spring 5 hrs per week

**Pre-requisites:** 18cps of GEOS or EESC 200 level subjects, normally including EESC202 and EESC208, and 8cp of EESC 300 level, normally including EESC303

**Assessment:** Report and essay writing 20% Field work 20% Weekly practical work 20% Examination 40%

**Subject Description:** There is little doubt that water is now the world's most seriously threatened essential resource and it is the most important environmental issue in the minds of the Australian public. It is an essential subject area for investigation and understanding by students in Earth and Environmental Sciences, and it has increasing employment potential. It will provide a capstone to introductory hydrology provided in EESC 202, introductory salinity and land-clearance issues discussed in EESC 208, to fluid mechanics and river process in EESC 303, and it will interface with issues of environment, heritage and the restoration of ecosystems in EESC 308.

### **EESC350 Directed Studies in Earth & Environmental Sciences B**

Spring Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Refer to Faculty

**Pre-requisites:** Restricted entry. Admission by application to Head of School of Earth and Environmental Sciences

**Exclusions:** GEOS382

**Assessment:** Seminar presentations, essays, research reports

**Subject Description:** This subject consists of directed reading, field and laboratory work (as required) and writing leading to the production of a major research essay/project report or reports in a field selected by the student and approved by the Supervisor.

### **EESC401 Earth and Environmental Sciences Honours**

Spring2005/  
Autumn2006 Wollongong On Campus  
Annual Wollongong On Campus  
Autumn Wollongong On Campus

**Credit Points:** 48

**Contact Hours:** Refer to Faculty

**Assessment:** Based upon thesis examination

**Subject Description:** Final-year Honours students are required to write a thesis of approximately 20-25,000 words on an approved topic embodying the results of a piece of supervised research and to participate in a seminar program.

### **EESC402 Geosciences Joint Honours**

Annual Wollongong On Campus

**Credit Points:** 24

**Contact Hours:** Refer to Faculty

**Assessment:** Seminar papers, examinations, thesis

**Subject Description:** Students enrolling in this subject must: (1) have completed a program meeting the requirements for admission to Honours in Geosciences and a cognate discipline; (2) write a thesis on a topic acceptable to and supervised by each academic unit; (3) complete such course work as shall be determined by the Chairperson of each academic unit.

### **EESC403 Geoinformatics Honours**

Annual Wollongong On Campus

**Credit Points:** 36

**Contact Hours:** Refer to Faculty

**Pre-requisites:** Completion of 144cp of BComp Geoinformatic degree, with WAM greater than or equal to 67.5

**Co-requisites:** None

**Assessment:** Research Project thesis (100%)

**Subject Description:** The subject consists of a research project supervised by an academic in the School of Geosciences or School of Information Technology and Computer Science, in the area of Geographic Information Systems analysis, spatial information technology or computer programming related to spatial analysis. The research project is presented as a thesis that is both internally and externally assessed. As much as possible projects will be linked to

topics of interest to government, independent agencies or industry.

### ENVE385 Environmental Engineering

Autumn Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Refer to Faculty

**Subject Description:** (a) Causes and control of air pollution, water pollution and noise pollution. (b) Experiments on water characteristics determination, waste water characteristics determination, oxygen capacity of water, noise pollution and air pollution.

### ENVI391 Environmental Science

Spring Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Spring 2hrsL 1hrT 3hrsP

**Pre-requisites:** Enrolment in BSc (Environment) and completion of BIOL251, CHEM214 and GEOS222 or EESC203

**Co-requisites:** None

**Exclusions:** Not to be counted with ENVI491

**Assessment:** Assignments 25%; major project report 35%; final examination 40%.

**Subject Description:** This subject builds on the interdisciplinary knowledge gained through the first and second year BSc(Environment) program. Focus is on interactions between biological, chemical, geological and geographical factors and processes in major ecosystems including coral reefs, coasts, estuaries, rivers, lakes, alpine, forests, and grasslands. Existing and potential impacts that influence environmental management will also be investigated such as water and waste management, climate change, population growth, and social and political factors.

### ENVI403 Research Report

Autumn Wollongong On Campus

Annual Wollongong On Campus

Spring2005/

Autumn2006 Wollongong On Campus

**Credit Points:** 24

**Contact Hours:** Refer to Faculty

**Pre-requisites:** Enrolled in final year of BEnvSc.

**Assessment:** Major report 100%.

**Subject Description:** A research project for an organisation involved with solving environmental problems will be allocated to candidates in consultation with the Professor of Environmental Science.

### ENVI491 Environmental Science and Systems

Spring Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Spring 2hrsL 1hrT 3hrsP

**Pre-requisites:** Enrolment in BEnvSc and completion of BIOL251, CHEM214, GEOS222 or EESC203 and GEOS214 or EESC202

**Co-requisites:** None

**Exclusions:** Not to be counted with ENVI391

**Assessment:** Assignments 25%; major project report 35%; final examination 40%.

**Subject Description:** This subject builds on the interdisciplinary knowledge gained through the first and second year BEnvSc program. Focus is on interactions between biological, chemical, geological and geographical factors and processes in major ecosystems including coral reefs, coasts, estuaries, rivers, lakes, alpine, forests, and grasslands. Existing and potential impacts that influence environmental management will also be investigated such as water and waste management, climate change, population growth, and social and political factors.

### MARE200 Introduction to Oceanography

Autumn Wollongong On Campus

**Credit Points:** 6

**Contact Hours:** Autumn 2 x 1hr lecture, 1hr tutorial, 3hr practical

**Pre-requisites:** BIOL104 & CHEM102 or CHEM105 & GEOS102 or GEOS112 or EESC102 or EESC103

**Assessment:** Biology Practical Report 15%, Geosciences Essay 15%, Chemistry Practical Report 10%, Final Examination 60%

**Subject Description:** This subject forms a basic introduction to oceanography. Topics covered include physical attributes of oceans; circulation and currents; tides and waves; marine organisms and biodiversity; environmental controls on organisms; processes of transport and behaviour of organisms in their life cycles; food webs and nutrient cycling; chemistry of seawater; sources and sinks of chemicals; carbon and carbonate cycles, chemical reactions in seawater, chemical exchange with sediments, stable isotopes and climate change.

### MARE300 Fisheries & Aquaculture

Spring Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Refer to Faculty

**Pre-requisites:** STAT252 and (BIOL351) or (BIOL355)

**Co-requisites:** Nil

**Assessment:** Examination (60%); Literature review (20%); Project Report & Lab reports (20%)

**Subject Description:** This subject will provide an overview of fisheries biology and aquaculture (vertebrate and invertebrate) including: the diversity of Australian and international fisheries and their key challenges; relevant ecological issues (population dynamics, transport processes, stock identification); predictive modelling, fisheries management; secondary impacts of fisheries; the diversity of aquaculture; case studies in aquaculture; ecological impacts, potential for enhancement of fisheries.

### MARE357 Advances in Molluscan Biology

Summer 05/06 Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Summer 2005/2006 10hrs Lect/Tut p/w for 2wks; 20hrs prac&field excursions per wk for 2 wks

**Pre-requisites:** BIOL241 (or equivalent)

**Co-requisites:** Nil

**Assessment:** Theory examinations; research project reports

and presentation; literature review/critique

**Subject Description:** One research project will be undertaken after consultation with academic staff. Students will attend and participate in a seminar/tutorial program in either the Department of Biological Sciences or the School of Geosciences. Research may be a discrete component of a larger project in which the emphasis will be on solving a larger problem as part of a research team. Projects will focus on developing competence in a laboratory and/or field techniques. Intending students should consult the Coordinator before enrolment.

#### **MARE393 Advanced Marine Science Project**

Spring	Wollongong	On Campus
Summer 05/ 06	Wollongong	On Campus
Autumn	Wollongong	On Campus

**Credit Points:** 8

**Contact Hours:** Refer to Faculty

**Pre-requisites:** Distinction average in relevant 2nd year Marine Science subjects

**Co-requisites:** Nil

**Assessment:** Literature review 25%; project report 55%; tutorial report/presentation 10%; seminar 10%.

**Subject Description:** One research project will be undertaken after consultation with academic staff. Students will attend and participate in a seminar/tutorial program in either the Department of Biological Sciences or the School of Geosciences. Research may be a discrete component of a larger project in which the emphasis will be on solving a larger problem as part of a research team. Projects will focus on developing competence in a laboratory and/or field techniques. Intending students should consult the Coordinator before enrolment.

#### **NANO101 Current Perspectives in Nanotechnology**

Spring	Wollongong	On Campus
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**Credit Points:** 6

**Contact Hours:** Spring 1 hr lecture; 1 hr seminar; 2 hr tutorial; 2 hr lab.

**Assessment:** Major Essay 25%, Written Exam 50%, Practical Assessment 25%

**Subject Description:** Series of case studies from the main application areas of nanotechnology (electronics, micro- and nano-electromechanical systems; biomimetics; nanostructured materials) illustrating the reasons why the nano-dimension offers advantages. Each case study will provide an overview of the importance of design, synthesis and characterisation in the realisation of the end-products. Guest lectures, web resources and tours of nanotechnology laboratories will be a feature as will demonstrations of the synthesis and characterisation of nano-materials (eg. AFM and nano-manipulation).

#### **NANO201 Research Topics in Nanotechnology**

Spring	Wollongong	On Campus
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**Credit Points:** 6

**Contact Hours:** Spring 2h Lecture; 3h Workshops/Prac; 1h Seminar

**Pre-requisites:** Nano101

**Assessment:** Literature Report 20%, Laboratory Report 20%, Seminar 10%, Exam 50%

**Subject Description:** Series of case studies illustrating the development of understanding of materials behaviour at the nano-dimension; the methods for preparing nano-scale materials and the design, fabrication and testing of nano-devices. Emphasis in this subject is on the nanoscience and how the basic studies in chemistry, physics and materials provides the basis for understanding the current research in nanotechnology. A feature will be the laboratory demonstration of specific nano-phenomena (eg. tuned optical absorbance of nanoparticles).

#### **NANO301 Research Topics in Nanomaterials**

Autumn	Wollongong	On Campus
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**Credit Points:** 8

**Contact Hours:** Autumn Lab based project - Seminar Program

**Pre-requisites:** Nano201

**Assessment:** Major report 80%, Seminar 10%, Poster 10%

**Subject Description:** Students will carry out a research project within a Materials based research group under the supervision of one or more members of staff. A list of possible projects will be provided and students will give a number of preferences. This includes work with the Intelligent Polymers Research Institute (IPRI), Institute for Superconducting and Electronic Materials (ISEM) and Institute for Steel Processing & Products (ISPP). This way the students may be distributed around the various groups. The research is equivalent to about 120 hours lab time plus analysis, and report writing. Students will also attend seminar/lecture series (1 hour per week)

#### **NANO401 Honours Project in Nanomaterials/Nanotechnology**

Annual	Wollongong	On Campus
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**Credit Points:** 24

**Contact Hours:** Annual 28hr Week

**Pre-requisites:** Nano301

**Assessment:** Major Thesis 70%, Two seminars 20%, Poster 10%

**Subject Description:** Students will carry out a research project within a Materials based research group under the supervision of one or more members of staff. A list of possible projects will be provided and students will give a number of preferences. Students write a major thesis based on their work that is examined by two independent examiners.

#### **SCIE101 Modern Perspectives in Science**

Summer 05/ 06	Wollongong	Flexible
Spring	Wollongong	On Campus
Spring	Loftus	On Campus

**Credit Points:** 6

**Contact Hours:** Summer 2005/2006 5 hours per week web-based delivery of lectures and practicals, Spring

**Assessment:** Written practical reports (60%, project (40%)

**Subject Description:** This subject aims to address some of the major topical issues in modern science and their impact on our society as well as demonstrating the value of a cross-disciplinary approach to problem solving. The content is presented in four modules from Physics, Chemistry, Biology and Geosciences. The topics initially proposed are: Planetology; Smart Chemistry; Genetic Engineering; How

## Subject Descriptions

long? How hot? Each of the four modules provides examples of areas of science that are currently of widespread interest or importance. The way in which science has been used to solve technological and human problems will be illustrated in each module. The fourth module also includes a section on global warming. To demonstrate the need for a collaborative approach when solving major issues, the same problem will be studied from the viewpoint of different disciplines. These modules are examples of current research topics and modules may be interchanged to reflect contemporary topics.

### SCIE122 Biology For Nursing

Spring Wollongong On Campus

**Credit Points:** 6

**Contact Hours:** Refer to Faculty

**Exclusions:** Not to count with BIOL 103

**Assessment:** Practical class attendance and reports; Practical and theory examinations

**Subject Description:** Provides an introduction to biological structure and function at the biochemical, genetic, cellular, and tissue levels, and how interactions between these levels of organisation vary during health and disease. Examines the interactions between micro-organisms of medical relevance and their hosts.

### SCIE292 Science Research Internship

Autumn Wollongong On Campus

Spring Wollongong On Campus

Summer 05/ 06 Wollongong On Campus

Annual Wollongong On Campus

**Credit Points:** 6

**Contact Hours:** Autumn 100 hours total lab or field work plus seminar attendance, Spring 100 hours total lab. or field work plus seminar attendance, Summer 2005/2006 100 hours total lab. or field work plus seminar attendance, Annual 100 hours total lab. or field work plus seminar attendance

**Pre-requisites:** 24 credit points of Science Schedule subjects with a credit average greater than or equal to 65%

**Assessment:** 10% Completion of OH&S induction, 70% completion of 100 hours lab/field work, 15% end of project paper, 5% attendance at six seminars

**Subject Description:** This internship subject will provide students who have an interest in research with the opportunity to learn how research is done by working alongside researchers in an active research group. Emphasis will be on Occupational Health and Safety management and risk assessment, learning practical skills in the selected discipline, working as part of a team, achieving research objectives in laboratory or field work, accurately recording methods and results, and critically evaluating the research methods of others.

### SCIE301 Directed Studies in Science

Annual Wollongong On Campus

Autumn Wollongong On Campus

Spring Wollongong On Campus

Summer 05/ 06 Wollongong On Campus

**Credit Points:** 8

**Contact Hours:** Annual 3 hrs per week, Autumn 3 hrs per week, Spring 3 hrs per week, Summer 2005/2006 3 hrs per week

**Pre-requisites:** Admission with approval of subject coordinator

**Assessment:** Oral Presentation 20% Class participation 10% Minor essays x 3 (10% x 3=30%) Major Research Paper (40%)

**Subject Description:** The subject deals with topics in Science that are at the cutting edge of research and are interdisciplinary in nature. These topics are tailored each year to the interests and background of participants in the study group. For example, topics may include nanotechnology, intelligent polymer applications, the ethics of genetic modification of plants and animals, the ethics of human cloning, the causes of modern climate change, or wildfire management in Australia.