
ENGINEERING SUBJECT DESCRIPTIONS

CIVL899 Advanced Topics in Engineering 48cp

Annual Wollongong On Campus

Subject Description: Students will normally take a selection of topics at advanced level from the following: computer aided analysis and design; computer methods; concrete design; civil engineering materials; finite element techniques; hydrology; hydraulics; numerical techniques; reliability; rock mechanics, soil mechanics; simulation; structural analysis and design; structural topology; town planning; traffic planning; traffic engineering; transportation; highway engineering; urban investigations; structural dynamics; continuum mechanics.

CIVL901 Project 6cp

Not on offer in 2004

Subject Description: First stage of a comprehensive study concerning a specific topic; formulation of problem and literature study, critical examination of current work; planning of solution methods; presentation of results.

CIVL902 Reliability in Geotechnical Engineering 6cp

Not on offer in 2004

Subject Description: Conventional safety factor and its limitations in representing safety or reliability; geotechnical predictions and associated degree of confidence; variability of soil and rock deposits; uncertainties in material parameters, geotechnical models and failure mechanisms; statistical data and probabilistic approaches; failure probabilistic approaches compared; reliability of geotechnical systems; recent developments in probability of failure propagation and initiation, most probable extent of embankment or slope failure.

CIVL903 Concrete Technology 6cp

Not on offer in 2004

Subject Description: Mix design theories; design of high performance and lightweight concrete, elastic behaviour; strength, creep, shrinkage; concreting operations; durability; significance of tests and properties of constituent materials; analysis of results; non-destructive tests; special concrete applications.

CIVL904 Highway Materials 6cp

Autumn Wollongong On Campus

Subject Description: Soil and roadmaking aggregate surveys; compaction of soil; road construction with soil and low-grade aggregates; mechanical, cement, bituminous, and resinous stabilisation; constructional methods in soil stabilisation. The origin, preparation, constitution and rheology of bituminous binders; mechanical and physical properties of bituminous materials. Close and open textured materials. Surface dressing. Plant. Sampling and testing. Maintenance. Concrete construction. Materials; mixing; laying; sampling and testing. Maintenance. Pavement design and evaluation - a review of current Australian, European and North American Practice.

CIVL905 Transportation Engineering 6cp

Not on offer in 2004

Subject Description: Transport problems; urban travel demands; the transport planning process; travel-demand forecasting; trip generation analysis; model split analysis; trip distribution analysis; route assignment analysis; economic analysis; employment and population forecasts; evaluation of transport plans; airport engineering; classification, design standards, layout and development, terminal facilities, city-airport transport systems; urban transportation; railroad engineering; light rail rapid transit; pipeline transportation; belt conveyors - freight and passengers.

CIVL907 Civil Engineering Computations 6cp

Autumn Wollongong On Campus

Subject Description: This subject will concentrate on software packages which are designed for application to a wide range of structural types, both two and three dimensional, including trusses, frames, plates and shells. Any combination of these components may be used with a variety of analysis and design procedures including linear elastic analysis, nonlinear optimization, steel frame member design, and design and checking of reinforced concrete building frames including beams, columns, slabs, steel quantity and location, material take-off etc.

CIVL908 Advanced Soil Mechanics 6cp

Not on offer in 2004

Subject Description: The principle of effective stress and its implications; stress paths in soil mechanics; problems of shear strength and failure; peak, residual and softened shear strengths for soil; pore pressure parameters A and B; the use of pore pressure parameters in practice; selected problems of stability and settlement; the analysis and performance of slopes; the factor of safety concept; stress analysis approaches; introduction to soil dynamics.

CIVL909 Advanced Foundation Engineering 6cp

Autumn Wollongong On Campus

Subject Description: General principles concerning selection of foundation type on different types of soil; Bearing capacity theory, shallow and deep footings, difficult ground conditions including collapsing and swelling soils; performance observations in geotechnical engineering; preventative and remedial measures against ground movement and slope failure; buoyancy rafts and basements; selected problems of foundation analysis and design; dam foundations; stress distribution and stress analysis; soil sampling and exploration; soil stabilisation including drainage.

CIVL910 Vibration of Structures 6cp

Not on offer in 2004

Subject Description: Static and dynamic stabilities of continuous systems. Analyses of lumped mass systems with various degrees of freedom. Vibration of beams and other continuous structures. Modal analysis of discrete and

Subject Descriptions

continuous systems. Vibrations of buildings and bridges. Earthquake, blast and wind loadings.

CIVL911 Finite Elements Methods 6cp

Not on offer in 2004

Subject Description: Variational principles; element shape functions, "displacement" and "stress" formulations, curved and isoparametric elements; computer programming techniques; analysis of plates, shells and axisymmetric structures; analysis of slab- and box-type bridge superstructures.

CIVL912 Engineering Hydrology 6cp

Spring Wollongong On Campus

Subject Description: Storm models, storm maximisation, extreme precipitation estimates, intensity-frequency duration analysis, design storms; rainfall losses, infiltration models, design losses; advanced unit - hydrograph theory, synthetic unit hydrographs; hydrograph synthesis by runoff - routing; design floods for rural and urban catchments.

CIVL914 Analysis and Design of Bridge Structures 6cp

Not on offer in 2004

Subject Description: Types of bridges; similarities between bridges and some plate- and shell-type building structures; loadings; analytical methods: load distribution technique, orthotropic plate theory, grillage and space frame methods, finite element method; computer program suites; design codes; design of super-structures; design of foundations.

CIVL916 Research Topics in Civil Engineering 6cp

Autumn/Spring Wollongong On Campus

Subject Description: Topics will be selected from those areas of Civil Engineering in which staff members or visiting staff members to the Faculty, are engaged in active research.

CIVL918 Steel Structures 6cp

Not on offer in 2004

Subject Description: Steel behaviour. Hot rolled and cold-formed sections. Behaviour of hollow sections. Plastic design. Local and lateral buckling. Elastic and inelastic buckling of elements and frames.

CIVL919 Earth Structures 6cp

Not on offer in 2004

Subject Description: Location of earth structures such as embankments and earth dams; basic design considerations; analytical procedures including limit equilibrium methods and stress analysis; soft ground tunnelling; problems associated with earth structures including settlement cracking and subsidence; prevention and control of sub-surface erosion and piping; risk studies; maintenance and improvement of earth structures.

CIVL920 Civil Engineering Hydraulics 6cp

Not on offer in 2004

Subject Description: Uniform flow in rivers and flood plains; open channel roughness and flow resistance; non-uniform open channel flow; backwater curve computation; unsteady open channel flow. Flood wave routing; hydraulics of spillways; hydraulics of bridges and culverts; retarding basin hydraulics; urban stormwater drainage design; sediment transport in open channel flow.

CIVL923 Advanced Reinforced Concrete 6cp

Not on offer in 2004

Subject Description: Strength and behaviour of reinforced concrete members in flexure, shear, torsion and compression; bond and anchorage; non-rectangular sections; numerical and semi-graphical methods. Short and long-term deflections of beams; effect of repeated loading and impact. Analysis and design of deep beams. Yield line method for slabs. Design code provisions.

CIVL980 Advanced Computer Applications 6cp

Spring Wollongong On Campus

Assessment: Compulsory assignments (reports) Mid-session Exam (Parts A and B) Final Project (including Oral presentation)

Subject Description: The subject content will comprise a selection from the following topics: Finite element modelling and simulation, system analysis, optimal design of civil and environmental engineering systems, advanced statistical techniques, advanced spreadsheet applications, case studies selected from civil and environmental engineering practice, use of MATLAB, EXCEL and similar computer packages.

CIVL981 Special Topic A 6cp

Autumn/Spring Wollongong On Campus

Subject Description: Specialist topic in civil engineering offered by members of staff, professional engineers or visitors to the Faculty.

CIVL982 Special Topic B 6cp

Autumn/Spring Wollongong On Campus

Subject Description: Specialist topic in civil engineering offered by members of staff, professional engineers or visitors to the School.

ENVE899 Advanced Topics in Environmental Engineering 48cp

Annual Wollongong On Campus

Subject Description: One or more advanced topics taken from the following: computer aided analysis and design; computer methods; environmental hydraulics; pollution control; erosion and land rehabilitation; waste management; environmental impact assessment; environmental modelling processes; environmental geotechnology; transport and the environment; ground and mine-water.

ENGG901 Introduction to Welding and Joining Processes 3cp

CRC Intake Jan/ Wollongong Flexible
 March/ May/ July/
 Sept/ Nov

Assessment: Assignments and Examination

Subject Description: Classification of welding processes, applications; typical problems, health and safety issues. Introduction to fusion and pressure welding processes; adhesive bonding, soldering and brazing; joining process physics. Review of basic electrics and electronics; arc characteristics and control. Introduction to behaviour of metals during welding, mechanical testing and NDT. Basic joint design and testing. Quality assurance of joining techniques. Introduction to reclamation repair by welding, advanced welding technology and fracture mechanics.

ENGG902 Fusion Welding Processes Part 1 3cp

CRC Intake Jan/ Wollongong Flexible
 March/ May/ July/
 Sept/ Nov

Pre-requisites: ENGG901

Assessment: Assignments and Examination

Subject Description: Introduction to gas shielded welding; process principles of GTAW welding; shielding gases; effect of gases on arc characteristics; filler metals; standards; typical problems; health and safety issues. Tungsten inert gas (TIG) welding; power sources; process factors; joint design; specifications; applications and typical problems; health and safety factors. Plasma, electron beam, laser welding and cutting. Advanced TIG welding.

ENGG903 Other Joining Processes 3cp

CRC Intake Jan/ Wollongong Flexible
 March/ May/ July/
 Sept/ Nov

Pre-requisites: ENGG901, ENGG902

Assessment: Assignments and Examinations

Subject Description: Cold pressure, ultrasonic and explosive welding and diffusion bonding; stud welding and mechanical fasteners; resistance welding, weld-bonding, ERW and flash butt welding; oxy-fuel welding; cutting and other edge preparation processes; friction welding and friction stir welding; MIAB welding; brazing; soldering; and pre-heating, fuel gas, electric equipment and techniques.

ENGG904 Fusion Welding Processes Part 2 3cp

CRC Intake Jan/ Wollongong Flexible
 March/ May/ July/
 Sept/ Nov

Pre-requisites: ENGG901, ENGG902

Assessment: Assignments and Examination.

Subject Description: Gas metal arc welding (GMAW); metal inert gas (MIG) welding; metal active gas (MAG) welding; power sources; process factors; special techniques; joint design; specifications; applications; typical problems; health and safety issues. Metal transfer. Manual metal arc (MMA) welding; (SMAW, MMAW); power sources; process factors;

electrode coatings; joint design; specifications; applications and typical problems; health and safety factors. Submerged arc welding (SAW); power sources; process factors; joint design; specifications; applications; typical problems; health and safety issues. Advanced GMAW, FCAW. Electroslag welding; process factors; applications and limitations.

ENGG905 Behaviour of Metals During Welding - Part 1 3cp

CRC Intake Jan/ Wollongong Flexible
 March/ May/ July/
 Sept/ Nov

Pre-requisites: ENGG901

Assessment: Assignments and Examination

Subject Description: Structures and properties of metals; alloys and phase diagrams; iron-carbon alloys; heat-treatment of steels; microstructures of welded joints; embrittlement and cracking in steels. Structural steels; fine grained steels; thermomechanically processed steels.

ENGG906 Behaviour of Metals During Welding - Part 2 3cp

CRC Intake Jan/ Wollongong Flexible
 March/ May/ July/
 Sept/ Nov

Pre-requisites: ENGG905

Assessment: Assignments and Examination

Subject Description: High temperature creep resistant steels; high alloy stainless steels; cryogenic steels; low temperature steels; stainless steels; H/R steels; creep resistant steels; nickel-based alloys; other metals and alloys; welding of ferrous and non-ferrous castings; introduction to corrosion and wear; welding of castings.

ENGG907 Welding of Non Ferrous Metals and Non Metals 3cp

CRC Intake Jan/ Wollongong Flexible
 March/ May/ July/
 Sept/ Nov

Pre-requisites: ENGG906

Assessment: Assignments and Examination

Subject Description: Copper and copper-based alloys; aluminium and aluminium-based alloys; joining dissimilar alloys; structures and properties of non-metallic materials and composites; joining of polymers; joining of polymers to metals; joining of ceramics; ceramic-metal joints; methods used for joining of composites and composites to other materials.

ENGG908 Construction and Design - Part 1 3cp

CRC Intake Jan/ Wollongong Flexible
 March/ May/ July/
 Sept/ Nov

Pre-requisites: ENGG907

Assessment: Assignments and Examination

Subject Description: Fundamentals of the strength of materials; basics of weld design; design principles of welded structures; joint design; fracture mechanics.

ENGG909 Construction and Design - Part 2 3cp

CRC Intake Jan/ Wollongong Flexible
 March/ May/ July/
 Sept/ Nov

Pre-requisites: ENGG908

Assessment: Assignments and Examination

Subject Description: Behaviour of welded structures under load; design of welded structures for static loading; effects of dynamic loading; thermodynamically loaded welded structures; reinforced steel welded joints; design of welded aluminium alloy structures.

ENGG910 Fabrication/Applications Engineering - Part 1 3cp

CRC Intake Jan/ Wollongong Flexible
 March/ May/ July/
 Sept/ Nov

Pre-requisites: 901,902,903,904,905,906,907,908,909

Assessment: Assignments and Examination

Subject Description: Cutting and other edge preparation processes. Quality assurance in welded structures; quality control during manufacture; total quality management. Plant facilities; welding jigs and fixtures. Fume and radiation hazards from welding; health and safety issues.

ENGG911 Fabrication/Applications Engineering - Part2 3cp

CRC Intake Jan/ Wollongong Flexible
 March/ May/ July/
 Sept/ Nov

Pre-requisites: ENGG910

Assessment: Assignments and Examination

Subject Description: Welding stresses and distortion; control of welding restraint; stress relieving of weldments. Repair welding; fitness for purpose considerations; economic aspects of weld fabrication; economic considerations of high productivity welding; automatic and robotic welding.

ENGG914 Fabrication/Applications Engineering - Part 3 3cp

CRC Intake Jan/ Wollongong Flexible
 March/ May/ July/
 Sept/ Nov

Pre-requisites: ENGG905, ENGG906, ENGG907

Assessment: Assignments and Examination

Subject Description: Practical exercises in weld defect testing using ultrasonics and radiography. Metallographic examination of commercially important metals and alloys, and the microstructures of steel and aluminium weldments. Measurement control and recording.

ENGG915 Design of Structures 3cp

CRC Intake Jan/ May Wollongong Flexible

Pre-requisites: ENGG908, ENGG909

Subject Description: Design case studies.

ENGG916 Fabrication Case Studies 3cp

CRC Intake Jan/ May Wollongong Flexible

Pre-requisites: ENGG910, ENGG911, ENGG914

Subject Description: NDT, practical, welding procedures, tutorials.

ENGG917 Processes, Equipment, Automation 3cp

CRC Intake Jan/ May Wollongong Flexible

Pre-requisites: ENGG901, ENGG902, ENGG903, ENGG904

Subject Description: Mechanisation and robotics, case studies and tutorials.

ENGG918 Weldability and Wear 3cp

CRC Intake Jan/ May Wollongong Flexible

Pre-requisites: ENGG905, ENGG906, ENGG907

Subject Description: Wear, hardfacing, metallography, surfacing, mechanical testing.

ENGG919 Dissertation 12cp

Annual Singapore On Campus

Spring 04/Aut 05 Wollongong Distance

Annual Wollongong Flexible

Autumn/Spring Wollongong On Campus

Spring 04/Aut 05 Wollongong On Campus

Assessment: Thesis

Subject Description: A thesis is required based on project work and/or an interpretative literature review on a topic.

ENGG923 Advanced Digital Sound and Imaging Techniques 6cp

Not on offer in 2004

Assessment: Final examination, Mid-session quizzes, Tutorial assessment and laboratory work on digital sound and imaging techniques

Subject Description: Physics of sound, propagation of sound in air, interference and resonances, harmonics and musical instruments, acoustics; frequency response, digital sound recording and playback, digital filters, digital audio data compression and extraction and audio streaming; sound system design, frequency response curves, sound cards, audio systems, microphones, amplifiers and speakers. Introduction to digital image fundamentals: resolution, bit depth, compression, colour, image enhancement and geometric manipulations; noise reduction; image compositing; time and temporal manipulations, image tracking and stabilization; file formats: quality and efficiency; case studies.

ENGG940 Dissertation 12cp

Annual Wollongong On Campus

Autumn/Spring Wollongong On Campus

Contact Hours: Annual 1 hour/week nominally, Autumn 1 hour/week nominally, Spring 1 hour/week nominally, Spring 2004/Autumn 2005 1 hour/week nominally

Assessment: Written dissertation report assessed against objectives 1-5

Subject Description: The dissertation is a project allowing you to pursue a particular area in depth and solve a specific practical engineering problem. Students complete a dissertation in their area of interest. The dissertation develops skills in information retrieval, project planning and organisation, analysis, problem solving and effective communication of results. Involves the undertaking of an individual supervised project focused on solving a problem relevant to the discipline area of the degree. The student would normally be required to do a literature survey, analysis, and develop suitable solutions to the selected problem. This will allow the students to apply the knowledge and skills acquired in the structured coursework and thus gain valuable confidence in their ability to practice engineering at a high professional standard. Two bound copies of the final report must be submitted for assessment, together with an electronic version.

ENGG945 Dissertation 24cp

Annual Wollongong On Campus

Autumn/Spring Wollongong On Campus

Assessment: Written dissertation report assessed against objectives 1-4

Subject Description: The dissertation typically requires rigorous research in a limited area - normally in the area of coursework components undertaken. It comprises a research project based on a problem in the discipline of the degree. The student would normally be required to do a detailed literature survey, analysis, modelling and develop suitable solutions to a selected problem. Students will be able to choose a suitable investigation within the current and relevant research activities associated with the Faculty of Engineering. The dissertation is individually supervised. Two bound copies of the final report must be submitted.

ENGG950 Innovation and Design 6cp

Autumn Wollongong On Campus

Assessment: Major design project, including individual and teamwork; Other assignments; Final examination

Subject Description: Topics will be selected from: The creative and innovative process, aesthetics in design, life cycle design and planning. Design for economy, maintenance, disassembly, recycling, repair and rehabilitation. Designing with materials. Durability of materials, components, systems and structures. Intellectual property, patents and technology transfer. The international marketplace. Constraints on design: standards, specifications and codes of practice. Feasibility studies and costing Teamwork in design. Case studies.

ENGG951 Engineering Project Management 6cp

Spring Wollongong On Campus

Assessment: Assignment 1 (Individual Assignment) 15%, Assignment 2 (Group Assignment), 35% (Including 10% for presentation), Final Examination (2 hours) 50%

Subject Description: Topics will cover: Scope Management, Time Management, Human Resource Management, Risk Management, Financial Management, Project Plans, Project

Quality Management and Procurement & Contract Management.

ENGG952 Engineering Computing 6cp

Spring Wollongong On Campus

Assessment: Computation exercises (six tasks) 60%, Final Examination 40%

Subject Description: Software applications, programming development environments, application areas, mathematical techniques, and approaches to problem solving are explored from a wide variety of possible areas. Topics will be selected from the following list: Windows-based compilers and software libraries such as C/C++, fortran, and visual basic; Numerical and mathematical libraries such as Matlab, Mathematica, and Mathcad; Advanced spreadsheet programming; Data acquisition techniques and software libraries such as NiDaq, LabTek, and LabView; 3D Graphics programming using OpenGL; Advanced engineering graphics using Autocad; Database principles and techniques; Principles of internetworking systems; Mesh Generation for finite element and finite difference modelling; Numerical solution of the equations of physical and engineering systems; Operations research, project management, and reliability simulation; Artificial neural networks.

ENGG953 Modelling of Engineering Management Systems 6cp

Spring Wollongong On Campus

Assessment: Projects, assignments and final examination.

Subject Description: Concentrating on the search of appropriate operations research techniques to assist in the solution of engineering management problems and basic experimental design. Topics include:- the basic principles of modelling, decision support models, modelling failure processes, search methods, scheduling models, queuing theory and its application, data collection and design, introduction to experimental design, principles of design, importance of randomisation, simple comparative experiments, experiments with a single factor, randomized blocks and related designs, introduction to factorial designs, Taguchi's philosophy of design.

ENGG955 Engineering Research Methods 6cp

Autumn/Spring Wollongong On Campus

Assessment: Presentation of a research report (orally and in a written research proposal). Undertaking of an experiment in a laboratory, after initial design.

Subject Description: The overall objective is to develop a structured approach to research in engineering. The focus is on the development of skills in framing a research problem, developing a research design, design of data collection analysis and interpretation frameworks. Literature research skills will be developed. An understanding of the selection and use of measurement sensors and engineering data collection and analysis tools will also be developed. Hands on experience in an engineering laboratory will be a feature. Ethical issues in research will be reviewed. Students will work on a selected project to develop a properly structured research proposal, including a research plan. The plan is to be presented orally and in written form.

Subject Descriptions

ENVE901 Project 6cp

Not on offer in 2004

Subject Description: First stage of a study on a selected topic, including formulation of the problem, literature study, development of study plan, and presentation of results.

ENVE916 Research Topics in Environmental Engineering 6cp

Not on offer in 2004

Subject Description: Topics will be selected from the areas of environmental engineering in which staff members are engaged in research.

ENVE923 Industrial Waste Engineering and Cleaner Production 6cp

Spring Wollongong On Campus

Subject Description: Issues covered include industrial waste minimisation and treatment, industrial processes and control techniques. Waste auditing of an industry will be illustrated using a case study.

ENVE924 Solid and Hazardous Waste Management 6cp

Spring Wollongong On Campus

Subject Description: Two areas are covered: Generation, characterisation, collection and minimisation of solid waste; and classification, treatment and final disposal of hazardous waste.

ENVE925 Water Quality Engineering and Management 6cp

Spring Wollongong On Campus

Assessment: Mid session test, Tutorial assignments, Laboratory reports Final examination.

Subject Description: The main aim is to introduce concepts relating to water resources and global water problems, water quality characteristics, water quality processes and guidelines, water quality management, water supply and sanitation, natural treatment processes, various municipal water and wastewater treatment processes and wastewater reuse and recycling that will lead to sustainable development. The lecture components will be supplemented with relevant tutorials and weekly assignments. A number of laboratory classes will give students hands on exposure to determination.

ENVE926 Air and Noise Pollution Management 6cp

Spring Wollongong On Campus

Assessment: Mid session test, Tutorial assignments, Laboratory reports, Final examination

Subject Description: This subject covers the occurrence and consequence of air and noise pollution to modern society. The subject commences with an overview of the problem, identifies sources of pollution, deals with methods to measure and analyse the extent of the pollution, and concludes with methods to control the pollution.

ENVE927 Environmental Engineering Processes Design 6cp

Autumn Wollongong On Campus

Pre-requisites: ENVE925 Water Quality Engineering and Management

Assessment: Tutorial submissions, Design project, Exams, Field trip reports

Subject Description: This subject is designed to introduce system design using unit processes encountered in environmental engineering. The subject will cover design concepts, detailed and advanced design of water supply and treatment systems, advanced solid -liquid separation processes, design of wastewater collection systems, design of advanced wastewater treatment plant design, ocean outfall systems, design of land based systems, network design. The subject also includes design of air pollution and control systems. The lecture components will be complemented with design classes and field trips.

ENVE928 Design of Urban Water Systems 6cp

Spring Wollongong On Campus

Assessment: Design projects on urban stormwater drainage, urban and river water quality, and onsite systems.

Subject Description: This design subject will focus on several group design projects in urban storm water management in terms of quality and quantity, river water quality and onsite waste management systems. In urban drainage design, you will use rational design and DRAINS model. In stormwater quality, pollutant build up - washoff relationships will be developed, the river water quality using QUALIIE model and design of onsite systems using Australian standards.

ENVE929 Site Contamination and Remediation Technologies 6cp

Spring Wollongong On Campus

Assessment: Assignment, Field trip report, Session quizzes, Final examination

Subject Description: The course describes the chemistry of soils, interactions of pollutants with soils and organic matter and their fate in the environment. Saturation of soils with contaminants through various sources has led to groundwater contamination. Characterisation of such sites, monitoring parameters, decision making and regulation will be included in this subject. The remediation of such contaminated soils and groundwater will be described with selected technologies, options of site containment, which is currently the most common technique will also be covered. The course will give an overview of the options and tools to assess and select the appropriate technology. This will also involve the revision of chemical parameters and students without the expected pre requisites are required to revise chemical principles independently.

ENVE930 Coastal, River and Groundwater Engineering 6cp

Autumn Wollongong On Campus

Assessment: Tutorials, Assignments, Final examination

Subject Description: Coastal Engineering - wave forecasting; wave refraction; diffraction and breaking; wave forces on structures; beach erosion and beach protection. Water

Resources - the hydrologic cycle; distribution of the world's water resources; surface water resources; groundwater resources; computer models of catchment water balances; storage reservoir yield analysis. River Engineering - fluvial hydraulics; morphology of natural channels; soil erosion, sediment transport in streams; re-naturalising streams; Groundwater Hydraulics - groundwater quality and contaminants - reservoir sedimentation; hydraulic structures.

ENVE931 Membrane Processes and Applications 6cp

Autumn Wollongong On Campus

Assessment: Literature review and group presentation, System design group exercise, Oral presentation, Final examination

Subject Description: The subject intends to demonstrate to students how nature works (biological membranes) and how such principles (membrane processes) can be used for medical, water and wastewater, processing and other industries by engineering appropriate materials and systems. The subject hence leads from nature to material science and engineering, fundamental transport principles to applications and process design with immediate relevance to the water and wastewater treatment industry where membranes are becoming a predominant process choice worldwide. The subject aims to bring science and engineering together on a number of levels such as in terms of learning from nature, applying engineering solutions to medical applications and using scientific principles to obtain engineering solutions. Both engineering and science students will be exposed to the thinking in the other discipline.

ENVE981 Special Topic A 6cp

Autumn/Spring Wollongong On Campus

Subject Description: Specialist topic in environmental engineering offered by members of staff, professional engineers or visitors to the department.

ENVE982 Special Topic B 6cp

Autumn/Spring Wollongong On Campus

Subject Description: Specialist topic in environmental engineering offered by members of staff, professional engineers or visitors to the department.

MATL899 Advanced Topics in Materials Engineering 48cp

Annual Wollongong On Campus

Subject Description: A program approved by the Discipline Adviser of project work and studies of advanced topics in materials selected from the fields of processing, physical and mechanical behaviour, microstructure and observational methods.

MATL901 Special Topic in Materials 1 6cp

Autumn/Spring Wollongong On Campus

Subject Description: There are no set syllabi for these subjects. It is intended that they will be offered on a specialised materials engineering topic.

MATL902 Special Topic B 6cp

Autumn/Spring Wollongong On Campus

Subject Description: There are no set syllabi for these subjects. It is intended that they will be offered on a specialised materials engineering topic by members of the School, or visitors to the School.

MATL903 Recent Developments in Materials 6cp

Autumn Wollongong On Campus

Subject Description: Considerations of the structures, properties, technology and applications of advanced materials with emphasis on materials important to the Australian economy.

MATL905 Metallic Materials 6cp

Autumn Wollongong On Campus

Subject Description: Commercial metals and alloys. Relationships between structure and industrially significant properties. Control of structure by processing. Thermal and mechanical treatment. Recovery and recrystallization. Metal-matrix composites.

MATL906 Ceramic Materials 6cp

Spring Wollongong On Campus

Subject Description: Ceramics - traditional and advanced. Microstructure-property relationships. Processing, solid state and liquid phase sintering. Applications. Ceramic matrix composites.

MATL907 Polymeric Materials 6cp

Autumn Wollongong On Campus

Subject Description: Polymers, formation and classification. Effects of structure and additives on properties. Composite materials with polymeric matrices.

MATL908 Phase Transformations 6cp

Spring Wollongong On Campus

Subject Description: Analysis and theories of solid state phase transformations, nucleation phenomena, diffusional and diffusionless growth; application to precipitation, eutectoid, proeutectoid, martensitic and other processes.

MATL911 Mechanical Behaviour of Materials 6cp

Spring Wollongong On Campus

Subject Description: Behaviour of ceramics, metals and polymers under stress, stress-strain relationships, time and temperature dependent phenomena.

MATL921 Formability of Sheet Materials 6cp

Not on offer in 2004

Subject Description: Flow behaviour of sheet materials under uniaxial and biaxial stress; analyses of industrial forming processes.

Subject Descriptions

MATL932 Surface Engineering of Materials 6cp

Not on offer in 2004

Subject Description: Surface coating processes, coating of materials with ceramics, metals and polymers; quality and performance of the product; surface heat treatment processes.

MATL936 Chemical Reaction Engineering 6cp

Not on offer in 2004

Co-requisites: MATH188

MATL937 Process Metallurgy 6cp

Not on offer in 2004

Subject Description: Ironmaking. Sintering and pelletising; time-temperature effects; phase composition; strength-reducibility relationships; mix selection; cokemaking; fundamental relations; coke strength and reactivity; blast furnace process; Rist and Reichert diagrams; burden design and distribution; stack, bosh and hearth processes; DRI.

MATL951 Performance of Materials A 6cp

Not on offer in 2004

Subject Description: Mechanical behaviour. Elastic, plastic, anelastic and viscoelastic responses. Fracture-brittle and ductile. Fracture toughness and crack growth. Effects of temperature, strain rate and geometry. Griffith equation and fracture mechanics. Creep and stress relaxation. Fatigue.

MATL952 Performance of Materials B 6cp

Spring Wollongong On Campus

Subject Description: Environmental behaviour. Thermodynamic aspects. Oxidation, processes and kinetics. Oxidation resistance. Aqueous corrosion, types of reaction, avoidance and restraint. Degradation of polymers and ceramics. Wear and abrasion. Stress corrosion and corrosion fatigue.

MATL961 Materials Analysis A 6cp

Not on offer in 2004

Subject Description: Advanced techniques. Theory and practice of X-ray, neutron and electron diffraction. Compositional analysis by X-ray fluorescence at macro and micro levels. Image contrast in electron microscopy. Field ion microscopy. Auger and Mossbauer spectroscopy.

MATL972 Selection and Design of Materials 6cp

Autumn Wollongong On Campus

Subject Description: General classifications and properties of materials. Standards, codes and specifications. Property requirements for specific applications. Bases for choice of materials, testing and evaluation. Constraints imposed by environmental, manufacturing and economic considerations. Use of computers and data banks. Case studies.

MATL988 Metallurgical Processing 2 6cp

Not on offer in 2004

Pre-requisites: MATH202 and MATH203

MATL999 Advanced Topics in Materials 48cp

Not on offer in 2004

Pre-requisites: MATH202 and MATH203

MECH899 Advanced Topics in Engineering 48cp

Annual Wollongong On Campus

Subject Description: Students will normally take a selection of topics at advanced level. The selection of the topics will be subject to the approval of the Head of the Department in which the student wishes to enrol and subsequently specialise.

MECH903 Biomechanical Engineering 6cp

Not on offer in 2004

Subject Description: This subject introduces a selection of advanced quantitative methods used in biomechanical assessment of human movements. Topics include three-dimensional dynamics, modelling techniques (including finite element, simulation and optimisation).

MECH913 Pneumatic Transport of Bulk Solids 6cp

Autumn Wollongong On Campus

Subject Description: Classification and selection of transport systems; flow patterns; pressure drop, minimum transport velocities; design parameters and examples; feeding and disengaging methods.

MECH918 Sustainable Energy in Buildings 6cp

Not on offer in 2004

Subject Description: Advanced topics in: performance of buildings with particular regard to thermal comfort and ventilation; analysis and design of conventional air conditioning systems to appropriate standards; passive solar design of buildings; energy conservation in buildings; embodied energy in buildings; natural ventilation systems; and refrigeration systems.

MECH919 Advanced Topics in Mechanical Engineering 1 6cp

Autumn/Spring Wollongong On Campus

Subject Description: There is no set syllabus for this subject. It is intended that it normally be offered on a specialised mechanical engineering topic given by members of the Department, visiting academic staff or engineering consultants.

MECH920 Numerical Methods in Mechanical Engineering 6cp

Not on offer in 2004

Assessment: Final examination and Assignments

Subject Description: The subject consists of two main areas: a. Computational fluid dynamics which includes a selection of computer techniques applied to aerodynamics and hydrodynamics; and b. A study of industrial fluid mechanics which includes a selection of the following topics; principles of turbo machinery; pipe networks; control and suppression of pressure surges in pipelines; causes and avoidance of flow induced vibration in engineering systems.

MECH925 Advanced Fluid Power 6cp

Spring Wollongong On Campus

Subject Description: Fluid power components; circuit design; analysis of transmission, valve-controlled and feedback systems; electronic controls; vibration and transient response.

MECH926 Applied Fluid Mechanics 6cp*Not on offer in 2004*

Subject Description: A study of applied fluid mechanics which will include the analysis, design and control of a selection of fluid flow systems in industry.

MECH927 Physical Processing of Bulk Solids 6cp*Not on offer in 2004*

Subject Description: Bulk solids description and characterisation; crushing, grinding, thickening, separation, precipitation, filtration, blending, tableting, briquetting and agglomeration, sizing and classification; introduction to beneficiation; drying; intermediate processing and handling; control and instrumentation; dust generation and abatement.

MECH928 Finite Element Techniques in Mechanical Engineering 6cp

Autumn Wollongong On Campus

Subject Description: Introduction to finite element method. Application of finite element technique to stress analysis, fluid mechanics, heat transfer, vibration. Computer packages.

MECH929 Advanced Topics in Mechanical Engineering 2 6cp

Autumn Wollongong On Campus

Subject Description: As for MECH919.

MECH930 Mechanical Vibration and Condition Monitoring 6cp*Not on offer in 2004*

Subject Description: Balancing of machinery. Vibrations, Energy Method and Rayleigh Principle. Two degrees of freedom system, free vibration, transient response, steady state response, damping. Multimass system, free vibration, forced vibration, damping. Vibration of beams. Torsional vibration in rotating machinery. Conditions monitoring of machinery: vibration measurement and analysis.

MECH931 Friction Lubrication and Wear 6cp

Spring Wollongong On Campus

Subject Description: Navier-Stokes and Energy equation of viscous fluid flow and their application to hydrodynamic journal and thrust bearings. Characteristics of hydrodynamic and hydrostatic bearings. Bearings selection and design. Rolling bearings and Elasto-hydrodynamic lubrication. Friction and wear processes. Boundary lubrication. Properties of lubricants and bearing materials and their interaction. Application in industry.

MECH933 Solar Energy 6cp*Not on offer in 2004*

Subject Description: Principles and techniques applicable to the analysis and design of solar thermal energy systems. Solar radiation; transmission and absorption by collectors; analysis and design of collectors; energy storage; system thermal calculations; solar process economics.

MECH934 Advanced Manufacturing Processes 6cp

Autumn Wollongong On Campus

Subject Description: Modelling of advanced manufacturing processes; manufacturing cost analysis; productivity and quality methods and measurements in manufacture; computer-assisted process planning; manufacturing optimisation; trends in advanced manufacturing processes, recycling aspects.

MECH935 Integrated Manufacturing Systems 6cp

Spring Wollongong On Campus

Assessment: Assignments and Final examination

Subject Description: Concurrent engineering, its application and benefits; computer integrated manufacturing concepts and applications; CAD/CAM, CNC programming, FMC, FMS; computer-process interfacing; process and tool condition monitoring; computer-aided quality control; assembly systems, assembly lines, assembly line balancing; design for manufacture - casting, forming, machining and selected examples; human interface in manufacturing systems; future trends.

MECH939 Advanced Topics in Mechatronic Engineering 6cp

Autumn/Spring Wollongong On Campus

Subject Description: There is no set syllabus for this subject. It is intended that it normally be offered on a specialised mechatronic engineering topic given by members of the Faculty, visiting academic staff or engineering consultants.

MECH948 Sustainable Energy Technologies 6cp

Spring Wollongong On Campus

Assessment: Case study or laboratory work Analytical/descriptive written assignment Oral presentation Final exam

Subject Description: This subject covers a number of Sustainable Energy Technologies including the following: solar thermal systems; photovoltaics; wind energy; hydroelectricity generation; wave power systems; biomass; remote area power supplies; energy conservation/auditing. The environmental and social impact of these technologies as compared to conventional energy sources will be considered. Students will undertake a laboratory/field experiment or project, and/or carry out a case study.

MECH949 Advanced Computer Control of Machines and Processes 6cp

Autumn Wollongong On Campus

Subject Description: Advanced modelling and control of multivariable systems: performance of multivariable control

Subject Descriptions

systems; optimal control theory; robust control systems; design, implementation and evaluation of digital control systems.

MECH950 Advanced Robotics 6cp

Spring Wollongong On Campus

Assessment: Project reports, Mid session examination, Laboratory report, Final examination

Subject Description: The subject provides the knowledge and skills required to design appropriate robotic systems. Topics covered include: industrial robots as a component of automation, mathematical modelling of a robotics arm, direct and inverse kinematics model, direct and inverse dynamics model, trajectory planning, robot control, design and selection of drives and motors, industrial vision systems, position sensors, force sensors, ultrasonic sensors and other sensors

MECH970 Maintenance Management 6cp

Not on offer in 2004

Subject Description: 1. Approaches to maintenance, 2. The Systems Approach, Life cycle considerations for systems, 3. Finish maintenance-A maintenance model, 4. Analysing Maintenance Requirements: The Process, 5. The Business Environment, 6. Safety and Quality Standards, 7. System Analysis, 8. Failure Behaviour, Condition Monitoring, 9. Maintenance Planning & Control, 10. Inventory selection and control, 11. Human factors and organisational aspects for maintenance, 12. The information flows, documentation & computer control in maintenance

MECH971 Systems Analysis For Maintenance 6cp

Intake B Wollongong On Campus

Subject Description: Maintenance Concept Design Methodology, Reliability Theory, Data Recordings and Analysis, Identification and Analysis of Failure Modes, Maintenance Rule Selection, Preventative Replacement Policies, Optimisation of Inspection Frequencies, Clustering of Tasks, Opportunity Maintenance, Specification of Resource Requirements.

MECH972 Condition Based Maintenance 6cp

Intake D Wollongong On Campus

Assessment: Assignments and Final examination assessing all of the objectives

Subject Description: Overview of fault diagnosis techniques (electrical-mechanical-computer); Identification of critical plant, failure types-modes. Diagnosis documentation; Maintenance strategies; Target areas for successful applications; Sensor technology overview; Condition monitoring strategy, techniques and organisation; Automation aspects in condition monitoring; Expert-AI systems; Costs and problems; Decisions on the periodicity of condition monitoring; Case studies.

MECH973 Systems Engineering and Life Cycle Management 6cp

Intake D Wollongong On Campus

Subject Description: Phases of the Life Cycle of Products and Industrial Equipment, Life Cycle Costing, Economics and Models, Cost Estimation, Analysis on Design, Logistic Support, Maintainability, Availability, Interface Control, System Integration. Testing and Performance Evaluation, Installation Procedures, Asset Management, Disposal, Asset Purchase/Replacement Policies and Decision-making.

MECH976 Maintenance System Design and Management 6cp

Intake C Wollongong On Campus

Subject Description: This subject introduces participants to typical problems encountered in designing and in managing what may be termed the 'maintenance system; in doing so participants will have the opportunity to explore some of the following areas of knowledge: Human aspects of maintenance and reliability; ergonomics; work measurement, methods engineering and activity sampling applied to maintenance activities; estimation of maintenance times; maintenance facilities layout. Planning for shutdowns and overhauls; inventory control for maintenance, inventory control systems, configuration management, warehouse control, evaluation of maintenance performance, improving maintenance performance, TPM.

MECH977 Advanced Topics in Maintenance 1 6cp

Not on offer in 2004

Subject Description: There is no set syllabus for this subject. It is intended that it normally be offered on a specialised maintenance topic given by members of the Department, visiting academic staff or engineering consultants.

MECH979 Sustainable Transport and Engine Technology 6cp

Autumn Wollongong On Campus

Contact Hours: 4 hours per week

Assessment: Assignment 1, Assignment 2, Seminar/Report, Engine Lab, Final Examination

Subject Description: Advanced topics in: human powered transport, conventional and novel engine technology and design; strategies for reducing emissions; alternative fuels; solar vehicles; fuel cells and hybrid vehicles.

MECH980 Functional Analysis and Risk Management 6cp

Not on offer in 2004

Subject Description: Requirement analysis of systems and components: functional requirements and constraints analysis. Functional analysis and allocation. Parametric analysis and decision trees. Sensitivity analysis and control. Risk trade-offs.

MECH981 Concurrent Design Management 6cp
Not on offer in 2004

Subject Description: System integration from the functional to the physical stage. Project planning. Risk management. Management of configuration, interface. Human engineering: task, operational sequencing, personnel requirements, error and safety analysis.

MECH982 Bulk Solids Characterisation and Particulate Mechanics 6cp
Not on offer in 2004

Subject Description: Concepts of particle mechanics (failure criteria, models to represent such criteria as particle size and distributions, particle shape, compressibility, permeability, internal friction, cohesion, adhesion, wall friction); concepts of flow properties of bulk solids for equipment design; flow property measurement techniques; use of computer software to analyse and present experimental data for use in design.

MECH983 Bulk Solids Handling(Storage and Flow) 6cp
Not on offer in 2004

Subject Description: Basic concepts of storage; flow and feeding of bulk solids; use of flow properties to determine hopper geometrics; bin wall loads; feeding and discharge systems, feeder loads; chute design; flowrate prediction; segregation and blending; dust suppression systems; stock pile systems; case studies.

MECH984 Belt Conveying 6cp
Not on offer in 2004

Subject Description: Belt conveying systems; properties of conveyor belting; tension analyses (static and dynamic); drive systems; loading and unloading belts; trajectory prediction; transfer chute design novel belt systems; economic analyses.

MECH985 Dust and Fume Systems 6cp
Not on offer in 2004

Subject Description: Basic concepts; terminology and problems; health and safety regulations; dust characterisation; fan performance characteristics; capture velocities and minimum transport velocities; hood and enclosure design; duct design; dust generation and its minimisation; filtration systems; design of dust handling and disposal systems; occupational health and safety; dust explosion; case studies.

MECH986 Instrumentation and Control Systems For Bulk Solids 6cp
Not on offer in 2004

Subject Description: Transducer types and their specification and applications; dynamic response of systems; speed measurement and control; mass flow rate measurement; belt weighing; weigh belt feeders; continuous and batch weighing systems; bin weighing systems and structural implications; system accuracy; interfacing with PLC's and computers; case studies.

MECH987 Advanced Topics in Bulk Solids and Particulate Technologies 1 6cp
Not on offer in 2004

Subject Description: There is no set syllabus for this subject. It is intended that it normally be offered on a specialised topic relating to some aspect of modern technologies relating to bulk solids and/or particulate technologies by staff members/visiting specialists and/or engineering practitioners.

MECH988 Advanced Topics in Bulk Solids and Particulate Technologies 2 6cp
Not on offer in 2004

Subject Description: There is no set syllabus for this subject. It is intended that it normally be offered on a specialised topic relating to some aspect of modern technologies relating to bulk solids and/or particulate technologies by staff members/visiting specialists and/or engineering practitioners.

MECH989 Advanced Topics in Bulk Solids and Particulate Technologies 3 6cp
Not on offer in 2004

Subject Description: There is no set syllabus for this subject. It is intended that it normally be offered on a specialised topic relating to some aspect of modern technologies relating to bulk solids and/or particulate technologies by staff members/visiting specialists and/or engineering practitioners.

MECH990 Bulk Solids and Particulate Technologies Project 12cp
Not on offer in 2004

Subject Description: Prepare a thesis on an approved topic related to bulk solids and/or particulate technologies. Normally the thesis will cover work performed in the workplace and additional supervision by an industry representative.

MECH993 Maintenance Management of Bulk Handling Systems 6cp
Not on offer in 2004

Subject Description: Maintenance function principles and objectives; reliability and maintainability; maintenance planning; maintenance strategy for plant - a systems approach; maintenance and information support; failure analysis; maintenance organisation; maintenance control and documentation; human resource management; total production maintenance; auditing industrial maintenance systems.

MECH994 Mechanical Handling Systems 6cp
Spring Wollongong On Campus

Subject Description: Loss factor of transport; economic analysis of conveying and transportation systems; aspects of particulate mechanics in relation to mechanical handling systems; design concepts and performance criteria of mechanical conveying and feeding equipment employed in process plants. Performance analysis and evaluation of mechanical loading and unloading systems such as used in ship transport.

MECH995 Bulk Solids Handling (Systems and Design) 6cp

Not on offer in 2004

Subject Description: Bin wall loads for symmetric and eccentric discharge; analysis of dynamic effects, the 'silo quaking' problem; wall roughness, friction and wear; feeder design principles; performance analysis of a range of feeders for bulk solids; flow promotion; blending and mixing; flow of fine powders; transfer chutes; vibration of bulk solids.

MINE899 Advanced Topics in Mining Engineering 48cp

Annual Wollongong On Campus

Subject Description: Computer aided analysis and design; computer methods; ore reserve estimation finite element techniques; hydrology; hydraulics; numerical techniques; reliability; rock mechanics; simulation; structural analysis and design; structural topology; mine planning.

MINE901 Transportation of Minerals and Personnel 6cp

Not on offer in 2004

Subject Description: Transport of minerals from initial winning to stockpile and to distribution points; safety problems, hygiene, the environment; transport of personnel, equipment, safety, regulations; cost involved; current research.

MINE902 Advanced Studies in Mining Engineering 6cp

Not on offer in 2004

Subject Description: Topics will be selected from those areas of Mining Engineering in which staff members or visiting staff members to the Department are engaged in active research.

MINE903 Simulation of Mining Operations and Problems 6cp

Not on offer in 2004

Subject Description: Including coal reserves, mining dimensions, surface effects, cost benefit effects of operation and management and economic evaluation and feasibility of a mining enterprise.

MINE904 Rock Mechanics 6cp

Not on offer in 2004

Subject Description: Fundamentals of strata mechanics together with advanced topics including engineering technology and rock mechanics aspects of coal mining strata control. Design aspects of mine structures, such as mine pillars, gate roads and longwall mining. Instrumentation in providing for the safe design of the mine opening. Rock and cable bolting techniques and powered support design.

MINE905 Environmental Control in Mines 6cp

Not on offer in 2004

Subject Description: Mine climate and its control, ventilation planning, ventilation network analysis and simulation; fan selection, booster fans; ventilation of long headings,

recirculation; exhaust from diesel engines and their control; methane and its control in underground coal mines, dust in mine air and its control.

MINE906 Mining Engineering Techniques 6cp

Not on offer in 2004

Subject Description: A selection of advanced laboratory and field exercises in mine support, temporary and long term; in situ testing, laboratory testing, rock properties and parameters; mine design and plant related to extraction areas.

MINE908 Fires, Explosions & Mine Gases 6cp

Not on offer in 2004

Subject Description: Formation of coal dust; explosibility of coal dust; initiation of explosions; methane accumulation; development and propagation of explosion wave front; pressure pulse and flame front; prevention and control of coal dust formation; barriers, active and passive; experimental galleries; rescue and recovery of both mine and personnel; resultant fires; computer modelling of resulting crisis situations in ventilation; current research; relevant legislation.

MINE909 Mine Subsidence 6cp

Not on offer in 2004

Subject Description: Causes of mine subsidence; continuum mechanics theories; determination of trough subsidence; subsidence calculations and prediction; measurement techniques; design of structures in mine subsidence active area; methods of reducing subsidence damage; application of computers for subsidence modelling; relevant legislation.

MINE953 Mine Water-Origin, Inflow Predictions and Control 6cp

Not on offer in 2004

Subject Description: Water problems in surface and underground mining; hydro geological factors affecting mine water inflow; hydrological considerations in origin of mine water; hydro geological characterisation of rock mass and pumping tests; pumping test calculations; effects of ground water on surface mining stability; ground water control in surface mining; calculation of mine water inflow to surface mining; water problems in underground mining; under-ground mine dewatering techniques; pumps and pumping systems; under-ground pumping stations and pump design; mine inundation; working under the body of water; inflow prediction by chemical analysis method; mine water pollution control; treatment of mine water pollution; biotechnical approach; constructed wetlands and lagoons.

PHYS910 Advanced Project in Physics A 6cp

Autumn Wollongong On Campus

Assessment: Satisfactory operation and written descriptions of completed experiments

Subject Description: The student will be required to design and construct several self-contained experiments at the level of those encountered in Advanced Experimental Physics. OR After successfully completing this subject, the student will * have gained experience in contributing to the work of a small research group * be able to keep detailed working records of

the progress of experiments * have gained a variety of intermediate practical and analytical level skills related to the specific area of research in which they have been involved * be able to present a short seminar on the research in which they were engaged.

PHYS946 Advanced Solid State Physics 6cp

Autumn Wollongong On Campus

Assessment: Assignment problems, Tests and sessional examinations

Subject Description: Crystal Symmetries; Groups of Linear Transformation; Abstract Groups; Theory of Group Representations; Group of the Schrodinger Equation; Selection Rule Theorem; Groups of Physical Interest; Rotation Operations; Double-Valued Representations; Direct Products; Crystal Fields; Adiabatic Approximations; Bloch's Theorem; The Effective Mass Expansion; Spin-Orbit Interaction; Time-reversal Symmetry; Symmetry Properties of Wave Vectors; Band Theory; Impurities in Semiconductors.

PHYS947 Special Topics in Physics A 6cp

Autumn Wollongong On Campus

Assessment: Project Work and Seminar

Subject Description: A special topic to be selected from any area of Physics. The selection to be made by the Physics Academic Adviser.

PHYS948 Physics of Imaging 6cp

Autumn Wollongong On Campus

Subject Description: Photographic processes and interpretation; Optical and infrared arrays; Image digitising systems; Radio synthesis imaging and fourier optics; Image analysis; Applications in industry, medicine and astrophysics.

PHYS951 Medical Physics Research Project 18cp

Annual Wollongong On Campus

Assessment: Substantial report and Seminar

Subject Description: The student will be required to undertake an applied research project on a topics of medical radiation physics under the supervision of one of the staff members working in the area of medical radiation physics. The area of research will be selected from the following fields: Nuclear Medicine, Medical Imaging, Radiobiology, Radiation Protection, Diagnostic Radiology, Radiotherapy, Instrumentation and Imaging Physics. All the above research topics may not be available every year.

PHYS952 Radiation and Radiotherapy Physics 8cp

Autumn Wollongong On Campus

Assessment: Written examinations, Assignments, Practical

Subject Description: This subject is intended to lead to an understanding of the instrumentation and techniques involved in diagnostic and therapeutic uses of radiation in medicine. Topics covered will include Interactions of Radiation with Matter, Sources of Radiation, Detecting Radiation, Nuclear Elect4ronics and data acquisition system, Nuclear Reactions

and Production of Radioisotopes, Neutron Physics, Dosimetry of photons, electrons and neutrons, Soliid Sate Dosimetry, TLD and film dosimetry, Introduction to Radiation Therapy, Medical Linear Accelerators, X-ray Modeling Methods, Brachytherapy and Radiosurgery, Clinical Radiotherapy, Linear Accelerators X-ray and Electron Beam Properties.

PHYS953 Medical Imaging and Nuclear Medicine 8cp

Annual Wollongong On Campus

Assessment: Written examinations, Assignments, Presentation and practical pass/fail. Students are required to pass the practical.

Subject Description: This subject is indended to lead to an understanding of the instrumentation and techniques involved in medical imaging and an appreciation of the part played by image analysis in medical physics specifically. Topics covered will include - the photographic process, solids state detectors and CCDs, the hardware of image processing; film digitisers and plate scanners, software techniques, histograms, enhancements, convolution, eduge enhancement, fourier techniques and operature systhesis, nuclear magnetic resonances, larmour frequency, basic imaging, slice selection, 3D data acquisition, chemical shift imaging, contract agents, image artefacts and distortion. The evolution and basic physics of radionuclide imaging, the tracer principle in Nuclear Medicine. the ideal properties for radioactive agents for diagnostic studies, the ideal properties for therapeutic radioactive agents, basic physiology of body organs pertinent of Nuclear Medicine,

PHYS954 Radiobiology and Radiation Protection 8cp

Spring Wollongong On Campus

Assessment: Written examinations, Assignments, Practical

Subject Description: Topics covers in this subject include - Interaction of radiation with living cells and tissue; clinical fractionation; clinical radiation syndromes; radiobiological modelling; experimental radiation oncology; local control vs system control; radionuclide therapy; binary therapy; new radiotherapy modalities and their radiobiology; dosimetry; natural background radiation; principles of radiation protection; instrumentation for radiation protection; Radiation protection in radiation therapy and diagnostic

PHYS960 Advanced Project in Physics B 6cp

Spring Wollongong On Campus

Assessment: Satisfactory operation and written descriptions of completed experiments

Subject Description: The student will be required to design and construct several self-contained experiments at the level of those encountered in Advanced Experimental Physics. OR After successfully completing this subject, the student will * have gained experience in contributing to the work of a small research group * be able to keep detailed working records of the progress of experiments * have gained a variety of intermediate practical and analytical level skills related to the specific area of research in which they have been involved * be able to present a short seminar on the research in which they were engaged.

Subject Descriptions

PHYS990 Applied Physics Project 24cp

Not on offer in 2004

Assessment: Minor Thesis

Subject Description: The student will undertake a research project and present a minor thesis and seminar on an applied physics topic selected after discussion with the Department Head.

PHYS997 Special Topic in Physics B 6cp

Spring Wollongong On Campus

Contact Hours: 28

Assessment: Project work and Seminar

Subject Description: A special topic to be selected from any area of physics. The selection to be made by the Physics Academic Adviser.