
ENGINEERING SUBJECT DESCRIPTIONS

CIVL899 Advanced Topics in Engineering

Annual Wollongong On Campus

Credit Points: 48

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

Credit Points: 6

Not on offer in 2005

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.

CIVL903 Concrete Technology

Credit Points: 6

Not on offer in 2005

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

Spring Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

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

Credit Points: 6

Not on offer in 2005

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

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 4CL

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

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

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

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

Subject Description: General principles concerning selection of foundation type on different types of soil; Bearing capacity theoris, 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.

CIVL911 Finite Elements Methods

Credit Points: 6

Not on offer in 2005

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

Spring Wollongong On Campus

Credit Points: 6**Contact Hours:** 2L, 2T, 2CL

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 hydrographics; hydrograph synthesis by runoff - routing; design floods for rural and urban catchments.

CIVL916 Research Topics in Civil Engineering

Autumn Wollongong On Campus

Spring Wollongong On Campus

Credit Points: 6**Contact Hours:** 2L, 2T

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.

CIVL920 Civil Engineering Hydraulics**Credit Points:** 6**Not on offer in 2005**

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**Credit Points:** 6**Not on offer in 2005**

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

Spring Wollongong On Campus

Credit Points: 6**Contact Hours:** 2L, 4CL

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

Autumn Wollongong On Campus

Spring Wollongong On Campus

Credit Points: 6

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

CIVL982 Special Topic B

Spring Wollongong On Campus

Autumn Wollongong On Campus

Credit Points: 6

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

ENGG901 Introduction to Welding and Joining Processes

CRC Intake -

January Wollongong Flexible

CRC Intake -

March Wollongong Flexible

CRC Intake -

May Wollongong Flexible

CRC Intake -

July Wollongong Flexible

CRC Intake -

September Wollongong Flexible

CRC Intake -

November Wollongong Flexible

Credit Points: 3**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

CRC Intake -

January Wollongong Flexible

CRC Intake -

March Wollongong Flexible

CRC Intake -

May Wollongong Flexible

CRC Intake -

July Wollongong Flexible

CRC Intake -

September Wollongong Flexible

CRC Intake -

November Wollongong Flexible

Credit Points: 3**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

CRC Intake -		
January	Wollongong	Flexible
CRC Intake -		
March	Wollongong	Flexible
CRC Intake -		
May	Wollongong	Flexible
CRC Intake -		
July	Wollongong	Flexible
CRC Intake -		
September	Wollongong	Flexible
CRC Intake -		
November	Wollongong	Flexible

Credit Points: 3

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

CRC Intake -		
January	Wollongong	Flexible
CRC Intake -		
March	Wollongong	Flexible
CRC Intake -		
May	Wollongong	Flexible
CRC Intake -		
July	Wollongong	Flexible
CRC Intake -		
September	Wollongong	Flexible
CRC Intake -		
November	Wollongong	Flexible

Credit Points: 3

Pre-requisites: ENGG901, ENGG902

Co-requisites: Nil

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

CRC Intake -		
January	Wollongong	Flexible
CRC Intake -		
March	Wollongong	Flexible
CRC Intake -		
May	Wollongong	Flexible
CRC Intake -		
July	Wollongong	Flexible
CRC Intake -		
Sept	Wollongong	Flexible
CRC Intake -		
Nov	Wollongong	Flexible

Credit Points: 3

Pre-requisites: ENGG901

Co-requisites: Nil

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

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

Credit Points: 3

Pre-requisites: ENGG905

Co-requisites: Nil

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

CRC Intake -		
January	Wollongong	Flexible

Subject Descriptions

CRC Intake -		
March	Wollongong	Flexible
CRC Intake -		
May	Wollongong	Flexible
CRC Intake -		
July	Wollongong	Flexible
CRC Intake -		
September	Wollongong	Flexible
CRC Intake -		
November	Wollongong	Flexible

Credit Points: 3

Pre-requisites: ENGG906

Co-requisites: Nil

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

CRC Intake -		
January	Wollongong	Flexible
CRC Intake -		
March	Wollongong	Flexible
CRC Intake -		
May	Wollongong	Flexible
CRC Intake -		
July	Wollongong	Flexible
CRC Intake -		
September	Wollongong	Flexible
CRC Intake -		
November	Wollongong	Flexible

Credit Points: 3

Pre-requisites: ENGG907

Co-requisites: Nil

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

CRC Intake -		
January	Wollongong	Flexible
CRC Intake -		
March	Wollongong	Flexible
CRC Intake -		
May	Wollongong	Flexible
CRC Intake -		
July	Wollongong	Flexible
CRC Intake -		
September	Wollongong	Flexible
CRC Intake -		
November	Wollongong	Flexible

Credit Points: 3

Pre-requisites: ENGG908

Co-requisites: Nil

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

CRC Intake -		
January	Wollongong	Flexible
CRC Intake -		
March	Wollongong	Flexible
CRC Intake -		
May	Wollongong	Flexible
CRC Intake -		
July	Wollongong	Flexible
CRC Intake -		
September	Wollongong	Flexible
CRC Intake -		
November	Wollongong	Flexible

Credit Points: 3

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

Co-requisites: Nil

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 - Part 2

CRC Intake -		
January	Wollongong	Flexible
CRC Intake -		
March	Wollongong	Flexible
CRC Intake -		
May	Wollongong	Flexible
CRC Intake -		
July	Wollongong	Flexible
CRC Intake -		
September	Wollongong	Flexible
CRC Intake -		
November	Wollongong	Flexible

Credit Points: 3

Pre-requisites: ENGG910

Co-requisites: Nil

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

CRC Intake -		
January	Wollongong	Flexible
CRC Intake -		
March	Wollongong	Flexible
CRC Intake -		
May	Wollongong	Flexible
CRC Intake -		
July	Wollongong	Flexible
CRC Intake -		
September	Wollongong	Flexible
CRC Intake -		
November	Wollongong	Flexible

Credit Points: 3**Pre-requisites:** ENGG905, ENGG906, ENGG907**Co-requisites:** Nil**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

CRC Intake -		
January	Wollongong	Flexible
CRC Intake -		
May	Wollongong	Flexible

Credit Points: 3**Pre-requisites:** ENGG908, ENGG909**Co-requisites:** Nil**Subject Description:** Design case studies.**ENGG916 Fabrication Case Studies**

CRC Intake -		
January	Wollongong	Flexible
CRC Intake -		
May	Wollongong	Flexible

Credit Points: 3**Pre-requisites:** ENGG910, ENGG911, ENGG914**Co-requisites:** Nil

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

ENGG917 Processes, Equipment, Automation

CRC Intake -		
January	Wollongong	Flexible
CRC Intake -		
May	Wollongong	Flexible

Credit Points: 3**Pre-requisites:** ENGG901, ENGG902, ENGG903, ENGG904**Co-requisites:** Nil

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

ENGG918 Weldability and Wear

CRC Intake -		
January	Wollongong	Flexible
CRC Intake -		
May	Wollongong	Flexible

Credit Points: 3**Pre-requisites:** ENGG905, ENGG906, ENGG907**Co-requisites:** Nil

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

ENGG919 Dissertation

Annual	Wollongong	Flexible
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Credit Points: 12**Contact Hours:** Annual**Pre-requisites:** Nil**Co-requisites:** Nil**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**Credit Points:** 6*Not on offer in 2005***Pre-requisites:** Nil**Co-requisites:** Nil

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

Annual	Wollongong	On Campus
Spring2005/		
Autumn2006	Wollongong	On Campus

Credit Points: 12**Pre-requisites:** Nil**Co-requisites:** Nil

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

Subject Descriptions

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

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

Credit Points: 24

Pre-requisites: Nil

Co-requisites: Nil

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

Autumn	Wollongong	On Campus
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Credit Points: 6

Contact Hours: 3L

Assessment: Major design project, including individual and teamwork, other assignment, 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

Spring	Wollongong	On Campus
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Credit Points: 6

Contact Hours: 2L, 1T

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

Autumn	Wollongong	On Campus
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Credit Points: 6

Contact Hours: 2L, 2CL

Assessment: Computation exercises (six tasks) 60% of final mark; Final Examination 40% of final mark

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

Spring	Wollongong	On Campus
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Credit Points: 6

Contact Hours: 2L, 2T

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.

ENGG954 Strategic Management for Engineers and Technologists

Autumn	Wollongong	On Campus
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Credit Points: 6

Contact Hours: 2L, 2T

Assessment: Debate (Group Assignment) 10% Major project or assignment 40% Examination 50%

Subject Description: The subject introduces engineers and technologists to strategic management. This includes basic principles of analysis, decision-making and implementation. The aim is to create awareness of strategic issues in engineering and technology based organisations. This includes an appreciation of competitive leverage from technology decisions. A need for consciousness of these issues amongst engineers is crucial to their function in both

profit and not for profit organisations.

ENGG955 Engineering Research Methods

Autumn Wollongong On Campus
Spring Wollongong On Campus

Credit Points: 6

Pre-requisites: Nil

Co-requisites: Nil

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.

ENGG956 Financial Management for Engineered Assets

Credit Points: 6

Not on offer in 2005

Assessment: Project and assignments (objectives 1-6); Final examination (objectives 1-5)

Subject Description: Financial management principles, time value of money, discrete assets considerations, continuous assets considerations, identification of cost elements, cost prediction methods, regulatory economics, financial case development, engineered asset repair-replace decision making.

ENGG957 Project Implementation and Outsourcing

Credit Points: 6

Not on offer in 2005

Assessment: Project and assignments (objectives 1-4); Final examination (objectives 1-4)

Subject Description: Employment law, contract law, issues such as types of interface ie. contract types (cost plus, schedule of rates): HR structure and sourcing arrangements, management of the interface, performance measurement, monitoring and management, managing the client, managing the supplier, legal implications, employment law and safety law implications, duty of care, transmission of business, industrial relations, intellectual property, ownership and use of maintenance data and know-how.

ENGG958 Life-Cycle and Risk Management

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

Exclusions: Replaces MECH970

Assessment: Project and assignments (objectives 1-3); Final examination (objectives 1-3)

Subject Description: Framework, context and history of asset management, strategic management and engineered asset management in context. Application/adaptation of basic tools, costs and benefits of life cycle management, available models and standards. Possible uses of models business drivers, legal requirements, quality systems and configuration and documentation management, interfaces with other functions (departments and organisations).

ENGG959 Asset Management System Design

Credit Points: 6

Not on offer in 2005

Exclusions: Replaces MECH976

Assessment: Project and assignments (objectives 1-7) Final exam (objectives 1-5)

Subject Description: Topics that may be covered include: human aspects of asset management and reliability; ergonomics; work measurement, methods engineering and activity sampling applied to asset management activities; estimation of task time; facilities layout. Planning for shutdowns and overhauls; inventory selection and inventory control systems, configuration management, warehouse control, evaluation of asset management performance.

ENGG960 Maintenance Requirement Analysis

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

Exclusions: Replaces MECH971

Assessment: Project and assignments; Final exam

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.

ENGG961 Systems Engineering

Spring Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

Exclusions: Replaces MECH973

Assessment: Project and assignments (objectives 9, 10) Final exam (objectives 1-8, 10)

Subject Description: RAM studies, requirements flow down, cost estimation, analysis on design, probabilistic design, logistic support, maintainability, availability, interface control, system integration, reliability grown modelling, cost estimation, sparrings. Testing and performance evaluation, system safety modelling, installation procedures, asset management, disposal, asset purchase/replacement policies and decision-making.

ENVE899 Advanced Topics in Environmental Engineering

Annual Wollongong On Campus

Credit Points: 48

Subject Description: One or more advanced topics taken from the following: computer aided analysis and design; computer methods; environmental hydraulics; pollution

Subject Descriptions

control; erosion and land rehabilitation; waste management; environmental impact assessment; environmental modelling processes; environmental geotechnology; transport and the environment; ground and mine-water.

ENVE901 Project

Credit Points: 6

Not on offer in 2005

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

Credit Points: 6

Not on offer in 2005

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

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

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

Spring Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

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

Spring Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

Assessment: Mid session test, tutorial assignments, laboratory reports and 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

Spring Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

Assessment: Mid session test, tutorial assignments, laboratory reports and 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

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

Pre-requisites: ENVE925 Water Quality Engineering and Management

Assessment: Tutorial submissions, design project, exams and 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

Spring Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

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

Spring Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

Assessment: Assignment, field trip report, session quizzes and final exam.

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

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

Assessment: Tutorials, assignments and final exam.

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

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

Assessment: Literature review and group presentation, system design group exercise, oral presentation and 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

Autumn Wollongong On Campus

Spring Wollongong On Campus

Credit Points: 6

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

ENVE982 Special Topic B

Autumn Wollongong On Campus

Spring Wollongong On Campus

Credit Points: 6

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

ENVE985 Environmental Engineering

Autumn Wollongong On Campus

Credit Points: 8

Contact Hours: 2L, 2T

Assessment: Laboratory Reports and Examinations.

Subject Description: This subject takes an engineering approach to solving problems in air, noise and water pollution. It considers the sources, effects and methods of control of the pollutants, as well as legislative requirements. The lecture and tutorial components of this subject are complemented by extensive field and laboratory sampling, measuring and analysis.

MATL899 Advanced Topics in Materials Engineering

Annual Wollongong On Campus

Credit Points: 48

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

Autumn Wollongong On Campus

Spring Wollongong On Campus

Credit Points: 6

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

Autumn Wollongong On Campus

Spring Wollongong On Campus

Credit Points: 6

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

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

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

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

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

Spring Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

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

MATL907 Polymeric Materials

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

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

MATL908 Phase Transformations

Spring Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

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

Spring Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

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

MATL932 Surface Engineering of Materials

Credit Points: 6

Not on offer in 2005

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

Credit Points: 6

Not on offer in 2005

Co-requisites: MATH188

MATL937 Process Metallurgy

Credit Points: 6

Not on offer in 2005

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.

MATL952 Performance of Materials B

Spring Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

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.

MATL972 Selection and Design of Materials

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

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

Credit Points: 6

Not on offer in 2005

Pre-requisites: MATH202 and MATH203

MATL999 Advanced Topics in Materials

Credit Points: 48

Not on offer in 2005

Pre-requisites: MATH202 and MATH203

MECH899 Advanced Topics in Engineering

Annual Wollongong On Campus

Credit Points: 48

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

Credit Points: 6

Not on offer in 2005

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

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

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

Credit Points: 6

Not on offer in 2005

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

Autumn Wollongong On Campus

Spring Wollongong On Campus

Credit Points: 6

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

Credit Points: 6

Not on offer in 2005

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

Credit Points: 6

Not on offer in 2005

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

Credit Points: 6

Not on offer in 2005

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

Credit Points: 6

Not on offer in 2005

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

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

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

Spring Wollongong On Campus

Credit Points: 6

Contact Hours: 3L

Subject Description: As for MECH919.

MECH930 Mechanical Vibration and Condition Monitoring

Credit Points: 6

Not on offer in 2005

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

Credit Points: 6

Not on offer in 2005

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

Credit Points: 6

Not on offer in 2005

Subject Description: Principles and techniques applicable to

Subject Descriptions

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

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

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

Spring Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

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

Spring Wollongong On Campus

Autumn Wollongong On Campus

Credit Points: 6

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.

MECH941 Micro/Nano Robotic Systems

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

Pre-requisites: Nil

Co-requisites: Nil

Assessment: Mid term exam, assignments and research report and presentation, final exam - objectives i-iv

Subject Description: An overview of manipulation systems, comparison of macro-micro-nano worlds, micro/nano mechanics, actuation, sensing, design, manufacturing/fabrication, control and calibration issues in micro/nano robotic systems, examples of micro/nano robotic systems and their application areas.

MECH948 Sustainable Energy Technologies

Spring Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

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

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

Subject Description: Advanced modelling and control of multivariable systems: performance of multivariable control systems; optimal control theory; robust control systems; design, implementation and evaluation of digital control systems.

MECH950 Advanced Robotics

Spring Wollongong On Campus

Credit Points: 6

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

MECH972 Condition Based Maintenance

Intake D Wollongong On Campus

Autumn Wollongong Distance

Credit Points: 6

Contact Hours: 2L, 2T

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.

MECH977 Advanced Topics in Maintenance 1

Credit Points: 6

Not on offer in 2005

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

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T per week, plus 4Lab each session

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

Credit Points: 6

Not on offer in 2005

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

Credit Points: 6

Not on offer in 2005

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

Credit Points: 6

Not on offer in 2005

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)

Credit Points: 6

Not on offer in 2005

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

Credit Points: 6

Not on offer in 2005

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

Credit Points: 6

Not on offer in 2005

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

Credit Points: 6

Not on offer in 2005

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

Credit Points: 6

Not on offer in 2005

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

Credit Points: 6

Not on offer in 2005

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

Credit Points: 6

Not on offer in 2005

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

Credit Points: 12

Not on offer in 2005

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

Credit Points: 6

Not on offer in 2005

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

Credit Points: 6

Not on offer in 2005

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)

Credit Points: 6

Not on offer in 2005

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

Annual Wollongong On Campus

Credit Points: 48

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.

MINE902 Advanced Studies in Mining Engineering

Credit Points: 6

Not on offer in 2005

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

Credit Points: 6

Not on offer in 2005

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

Spring Wollongong On Campus

Credit Points: 6

Contact Hours: 2L 2T

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

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 2L 2T

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

Credit Points: 6

Not on offer in 2005

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.

MINE916 Mineral Valuation and Risk Analysis

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 2L, 2T

Assessment: Oral presentation (objectives 1-3), Assignments (objectives 1-3), Major assignment or mini-project (objectives 1-3) and Final examination (objectives 1-3).

Subject Description: This subject aims to provide resource

professionals with the analytical tools to assess and evaluate the financial viability of an exhaustible resource project at various stages from exploration into development. It provides the student with knowledge of the theory, principles and applications of probabilistic discounted cash flows to the risk analysis of resources projects. Monte Carlo and Latin Hypercube simulation methods are discussed in the evaluation of financial risks. The subject also surveys the effects of mining taxation and other government imposts on a mining project and the impact of inflation on cash-flow analysis.

MINE917 Mineral Economics

Spring Wollongong On Campus

Credit Points: 6

Assessment: Oral presentation (objectives 1-3), Assignments (objectives 1-3), Major assignment or mini-project (objectives 1-3) and Final examination (objectives 1-3).

Subject Description: This subject introduces the economics theory of exhaustible resources, including the geographic distribution, abundance and availability of mineral resources, the resource base concept and the definition, measurement and conversion resources and reserves; and the concepts of resources supply and demand.

MINE918 Commodity Analysis

Credit Points: 6

Not on offer in 2005

Assessment: Oral presentation (objectives 1-3), Assignments (objectives 1-3), Major assignment or mini-project (objectives 1-3) and Final examination (objectives 1-3).

Subject Description: This subject provides specialist skills for the analysis of mineral commodities, including the principles of commodity marketing, commodity price formation, the factors affecting supply and demand, the structure of commodity and metal markets, future trading in commodities, market behaviour and price response and commodity price forecasting.

MINE919 Mineral Resources Policy

Credit Points: 6

Not on offer in 2005

Assessment: Oral presentation (objectives 1-3), Assignments (objectives 1-3), Major assignment or mini-project (objectives 1-3) and Final examination (objectives 1-3).

Subject Description: This subject examines the social economic and political processes through which mineral resource policy is developed. Case studies will be used to understand the impacts of resources development. Theoretical perspectives may include the politics and sociology of resources development, global, national and regional developments in mineral resources regulation, theories of state regulation and intervention, and the choice and negotiation of different policy strategies.

PHYS910 Advanced Project in Physics A

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 6P

Pre-requisites: None

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

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 3L

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

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 3L

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

Autumn Wollongong On Campus

Credit Points: 6

Contact Hours: 3L 3P

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

Annual Wollongong On Campus

Credit Points: 18

Contact Hours: 6P

Pre-requisites: None

Co-requisites: None

Assessment: Substantial report and seminar.

Subject Description: The student will be required to undertake an applied research project on a topics of medical

Subject Descriptions

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

Autumn Wollongong On Campus

Credit Points: 8

Contact Hours: 3L 3P

Pre-requisites: None

Co-requisites: None

Assessment: Written examinations, assignments and 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 Electronics and data acquisition system, Nuclear Reactions and Production of Radioisotopes, Neutron Physics, Dosimetry of photons, electrons and neutrons, Solid State 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

Annual Wollongong On Campus

Credit Points: 8

Contact Hours: 2L 2P

Pre-requisites: Nil

Co-requisites: Nil

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

Subject Description: This subject is intended 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, edge enhancement, Fourier techniques and operator synthesis, nuclear magnetic resonances, Larmor frequency, basic imaging, slice selection, 3D data acquisition, chemical shift imaging, contrast 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

Spring Wollongong On Campus

Credit Points: 8

Contact Hours: 3L 3P

Pre-requisites: None

Co-requisites: None

Assessment: Written examinations, assignments and practical.

Subject Description: Topics covered 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

PHYS955 Transitional Medical Radiation Physics Program

Annual Wollongong On Campus

Credit Points: 8

Pre-requisites: None

Assessment: Examinations 40%, Problems 20%, Practical 20% and Seminar 20%

Subject Description: The Transitional Program will have the following structure: Radiation and Radiotherapy Physics - involving practical and clinical laboratory work in the following areas: QA and Simulator (10hrs), Advanced Pinnacle and Dose Planning (16hrs), Monte Carlo simulations (8hrs) and Brachytherapy (4hrs); Medical Imaging and Nuclear Medicine (60hrs) - no further work is required of Honours graduates in Medical Imaging. Students will be required to attend the Nuclear Medicine module of PHYS953. In addition students will be required to produce a paper and present a major seminar on an aspect of clinical medical radiation physics.

PHYS960 Advanced Project in Physics B

Spring Wollongong On Campus

Credit Points: 6

Contact Hours: 6P

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.

PHYS990 Applied Physics Project

Credit Points: 24

Not on offer in 2005

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

Spring Wollongong On Campus

Credit Points: 6

Contact Hours: 6P

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.

