Offered by the School of Engineering. For contact details consult the Faculty of Engineering, Physical Sciences and Architecture entry in the Faculties, Schools and Departments chapter.

Subjects marked (EMC) are coordinated by the Environmental Management Centre (Professor Tor Hundloe, Coordinator). Those marked (TMC) are coordinated by the Technology Management Centre (Dr S Liyanage, Coordinator). Those marked (CMR) are coordinated by the Centre for Magnetic Resonance (Dr G Galloway, Coordinator).

9E801 Classical Theory of Magnetic Resonance (CMR)
[For Magnetic Resonance Technology students only]
#12 2;Sum
Assessment: Examination, assignments, online tutorials.
Physical principles of nuclear magnetic resonance (MR). Underlying mechanisms of relaxation in MR & descriptions of way in which pulse sequences are able to exploit relaxation to produce contrast.

9E802 Magnetic Resonance Instrumentation (CMR)
[For Magnetic Resonance Technology students only]
#12 2;Sum
Assessment: Examinations, assignments, online tutorials.

9E803 MR Safety & Monitoring (CMR)
[For Magnetic Resonance Technology students only]
#12 2;Sum
Assessment: Examination, assignment, online tutorials.
Principal hazards of MRI environment & its effects on the human body & equipment. Physiological monitoring strategies examined from the origin of signals to integration with the imaging system. Considerations in planning for MR installations are reviewed.

9E804 Standard Imaging Sequences, Image Reconstruction, Applications
[For Magnetic Resonance Technology students only]
#12 2;Sum
Assessment: Examination, assignments, online tutorials.
Fundamentals of standard clinical magnetic resonance imaging sequences (gradient echo & multiecho). Basics of image reconstruction, sources of artifact & types of contrast. Selection of the most appropriate sequence for specific application is reviewed.

9E810 Minor Project (CMR)
[For Magnetic Resonance Technology students only]
#12 2;Sum
Assessment: Assignment, online tutorials.
Minor research project. Literature surveys, data analysis & interpretation. For students with access to an MRI system, data acquisition.
E9402 Environmental Management (EMC)
#10 (2L2T) 1st
Assessment: Final examination & four x 2,000-word assignments.
Environmental management issues including introduction to concepts of risk assessment; economics of pollution control; environmental management by sector; introduction to environmental impact assessment; waste management; occupational health & safety issues.

E9403 Laboratory Management (TMC)
#10 (3L1T) 2nd
Assessment: Final examination & practical program.
Quality assurance (QA), quality control (QC), LIMS (laboratory information management systems), reporting structures, chain of custody, time management, concepts of staff management; data management; occupational health & safety in modern laboratories, financial management.

E9808 Project Management (TMC)
#10 (3C) 1:2
Inc: E2890
Project management, including organisation theory & structures; project management information systems & procedures; management practices & techniques required for successful management & coordination of projects from inception to client handover, including design, construction & commissioning phases.

E9809 Principles of Technology & Engineering Management (TMC)
#10 (3C) 1st
Assessment: Web-based assignments, essay, final project.
Different notions of technology development, utilisation & diffusion: firm, national & international perspectives; technological changes & impact; technology management & innovation, strategic & operational levels; organisations as embodiments of technology; case studies involving technology management at firm, industry & national levels.

E9811 Social & Cultural Environmental Management (EMC)
#10 (3C) 1st
How relationships to environment are shaped by society & culture; factors affecting management of environmental resources & problems; principles & strategies for solving environmental management problems; case studies.

E9812 Environmental Problem Solving (EMC)
#10 (2L4P) 2nd
Coordinator: Mr R. Beeton.
Development of problem solving framework for environmental management. Appreciation of disciplines which define dimensions of environment problem decision space & its relevance to other studies.

E9813 Professional Ethics
#8 1:2

E9814 Principles of Sustainable Development (EMC)
#10 (3C) 1:2 EX
History of sustainable development (UN Stockholm conference, World Conservation activity) & natural environment; poverty & affluence; intergenerational & intergenerational
equity; precautionary principle; safe-minimum standards; ethics; international conventions & law; institutional responses. Attempts to operationalise concept at global & national level.

**E9825 Special Topics in Environmental Management I (EMC)**
#10 (3C) 1;2;Sum EX
Topics relating to specific issues of environmental management.

**E9831 Management of Research & Development (TMC)**
#10 (3C) 1st
Principles of competitive advantage; technology strategies for competitive advantage; product cycles; product related R & D; process related R & D; risk assessment & minimisation; learning curve effects; goal setting & measurement techniques; team building; budget control; intellectual property, patents, licensing.

**E9842 Marketing of Technology (TMC)**
#10 (3C) 2nd
Assessment: Web-based assignments, essay, final project.
General marketing; marketing industrial products & process; similarities & differences; buyer decision processes; single v. group decision buying; market research; marketing technology strategies; case studies.

**E9846 Theoretical Foundations of Sustainable Development (EMC)**
#10 (2L1T) 1;2;Sum EX
Pre: E9814
Assessment: Two x 3,000-word assignments.
Sustainable development draws on inputs of ecology, economics, other social sciences & moral philosophy. Traces historical developments in these fields & compares & contrasts different perspectives.

**E9847 Sustainable Development Practice (EMC)**
#10 (1L1T1P) 1;2 EX
Pre: E9814 + EC856
Assessment: Two x 3,500-word assignments.
Real world case studies used to illustrate application of sustainable development/ecological-economics principles.

**E9848 Principles of Cleaner Production (EMC)**
#10 2nd
Assessment: Examinations, two x 2,000-word assignments & case study.
Provides practical, in-depth coverage of field of cleaner production. Demonstrates theoretical & conceptual underpinning of other cleaner production subjects & allows students to develop their own initiatives for cleaner production issues & attitudes to be applied in practice.

**E9849 Principles of Wastewater Treatment (EMC)**
#10 2nd (Winter School)
Pre: approval of Head of Dept
Means of meeting even more stringent environmental regulations as they pertain to effluent discharges & wastewater. Processes suitable for treatment of municipal & industrial wastewater to all levels of effluent quality. Intensive subject. Additional fees payable.

**E9850 Advanced Computation**
#10 (2L1T) 1;2
Advanced methods for odes, e.g. variable step Runge Kutta. Multigrid & boundary elements; large sparse linear algebra & optimisation; pipelining, vectorisation &
parallelisation; optimising codes; parallel algorithms for numerical analysis, e.g. linear equations, eigensolvers.

**E9851 Finite Element Analysis**
#10 (2L1T) 1:2

**E9852 Solid Mechanics**
#10 (2L1T) 1:2

**E9853 Nonlinear System Analysis**
#10 (2L1T) 1:2
Modelling nonlinear phenomena in engineering; static & dynamic formulation; analytical methods for qualitative & quantitative analysis; perturbation methods, asymptotic methods; bifurcation theory; chaotic behaviour of deterministic systems; numerical methods; applications.

**E9854 Principles of Modern Control**
#10 (2L1T) 1:2
Classical & internal model control theory; robust control: stability, performance & uncertainty descriptions; adaptive control; nonlinear systems analysis; state & parameter estimation; system identification; optimal control; dynamic modelling & simulation; discrete time systems analysis.

**E9855 Stochastic Processes: Theory & Application**
#10 (2L1T) 1:2
Markov & non-Markov processes; queuing theory; classification theory; analysis techniques; estimation problems; applications in image analysis, signal processing, computer networking, communication systems, process modelling, operation of unreliable systems & servicing.

**E9856 Design of Wastewater Treatment Plants (EMC)**
#10 2nd (Winter School)
Pre: approval of Head of Dept

**E9857 Environmental Management Systems (EMC)**
#10 2nd
Assessment: Two x 2,500-word assignments.
Theory & practice of formulating environmental management systems & environmental auditing. Intensive subject held during the mid-semester break in September.

**E9859 Principles of Air Pollution Control (EMC)**
#10 2nd (Winter School)
Pre: approval of Head of Dept
Covers various technologies for air pollution control & their operation. Emission monitoring & testing, ambient air quality management, health & regulatory issues pertaining to toxic components, odour measurement & control, & theory, application & operation of precipitators & fabric filter. Intensive subject. Additional fee payable.

**E9863 Strategic Management of Technology (TMC)**

#10 (2L1T) 1st
Assessment: Web-based assignment, essay, final project.
Technology strategy — concept & role; detailed study of different elements of technology strategy; formulating & implementing technology strategy for a business.

**E9864 Technological Innovation & Business Competitiveness (TMC)**

#10 (2L1T<1P) 2nd
Assessment: Web-based assignments & final project.
Theories & models of innovation management; assessment of business competitiveness; competitive analysis of technology transfer experience; technology-based product cycle analysis; network theory & technology foresight; managing multifunctional teams & organisational issues for business competitiveness. Case studies relating to Asian-Pacific region.

**E9865 International Project Management (TMC)**

#10 (2L1T) 2nd
Assessment: Web-based assignments, final project.
Methods of project management; project management information systems; management practices from inception to client handover; project organisation; customer interface & project quality assessment; international tendering & proposal assessment & evaluation; project monitoring & control; case studies relating to Asia-Pacific region.

**E9866 Technology Valuation & Commercialisation (TMC)**

#10 (2L1T) 2nd
Assessment: Web-based assignments, essay, final project.
Metrics, concepts & models from accounting, auditing & evaluating to measure technology commercialisation processes. Technology selection techniques; commercialisation risk assessment; legislation & intellectual property issues; licensing; formation of new ventures; the role of entrepreneur; case studies relating to Asia-Pacific region.

**E9867 International Project Evaluation (TMC)**

#10 (2L1T) 1st
Assessment: Mid-semester examination, web-based assignments, final project.
Economic & non-financial techniques for evaluation of projects & project selection with particular reference to international project evaluation. Methods of project evaluation, evaluation & selection of investment projects, risk analysis, feasibility studies, project optimisation & decision analysis techniques, public sector projects, environmental impact assessment.

**E9870 Mining Technology & Equipment Seminars (TMC)**

#5 (<2L) Year
Assessment: Seminar preparation & participation.
Participation in seminars related to research projects in mining technology & development of mining equipment. Attendance at seminars given by others & presentation of seminar on topic approved by subject coordinator.

**E9871 Fundamentals of Engineering Analysis (TMC)**

#10 (3C) 1;2
P: Undergrad engineering maths subjs + introd FORTRAN or C
Assessment: Assignments.
Introduction to dimensional analysis, solid & rock mechanics, plasticity, tensor analysis &
transformations, material modeling, vibration analysis, fluid mechanics, numerical
methods (boundary, finite-element, & finite-difference methods) & probability & statistics.

**E9892 Research Project (TMC)**
#20 1;2;Sum;Year
Pre: E9809 Comp: E9810 + #80 Inc: E9840
Project on topic approved by Course Director. Report to be submitted.

**E9893 Environmental Management Project (EMC)**
#20 1;2;Sum;Year EX
Inc: E9894 or 895
Project on issue related to particular industry or industry sector.

**E9896 Research Project II (TMC)**
[For Master of Technology Management students only]
#20 1;2;Sum;Year
Project on topic approved by Director of Studies. Report to be submitted.

**E9897 Research Project II (EMC)**
[For Master of Environmental Management students only]
#20 1;2;Sum;Year EX
Project on topic approved by Director of Studies. Report to be submitted.

**Endnote**
a. Subject to availability of staff. Consult Head of Department prior to enrolling.