Bachelor of Engineering (Civil) (EN40)

Year offered: 2010
Admissions: Yes
CRICOS code: 056529D
Course duration (full-time): 4 years
Domestic fees (indicative): 2010: CSP $3,800 (indicative) per semester
International Fees (indicative): 2010: $12,000 (indicative) per semester
Domestic Entry: February and July
International Entry: February and July
QTAC code: 412502
Past rank cut-off: 79
Past OP cut-off: 11
OP Guarantee: Yes
Assumed knowledge: English (4, SA) and Maths B (4, SA)
Preparatory studies: For information on acquiring assumed knowledge visit http://www.studentservices.qut.edu.au/apply/ug/info/knowledge.jsp
Total credit points: 384
Standard credit points per full-time semester: 48
Course coordinator: Dr R.Mahalinga-Iyer
Discipline coordinator: Fraser McGregor
Campus: Gardens Point

Why choose this course?
The Faculty of Built Environment and Engineering at QUT is dedicated to quality teaching and learning. The Faculty's interactions with industry and high academic standard make it a unique place to study.

Career outcomes
The contemporary focus of this degree results in strong career opportunities. Salaries for graduate engineers start at $40,000 and up to $100,000 for project engineers and senior engineers.

You will join graduates like Jason Langer who works for Robert Bird and Partners. Jason has worked on large construction sights in places such as London, Sydney, Melbourne and Dubai.

Practical teaching
You will graduate with generic skills in leadership, teamwork, communication, and creative thinking. You will study project-based learning units focusing on design and construction.

Industry links
You will be exposed to ideas and experience of guest lecturers and industry professionals. Graduates include many industry leaders in Australia. Our academic staff are industry experienced and also members of international networks and collaborative research projects.

Course structure
You will have the opportunity to work with other students and staff in the student-run laboratory classes and on real world projects which will enhance your knowledge and develop your problem solving skills. While enrolled in the course you will also undertake industrial experience making you work ready and giving you an employment edge.

Facilities / technology
You will use specialist computer software to solve difficult problems such as structural frame analysis, ground water flow and transport networks. Our programs are responsive and relevant to the changing needs of the industry and the society we live in. Experiential and practical learning opportunities are provided through specially designed learning environments and traditional laboratory areas. Facilities that integrate virtual and web based material with physical equipment ensure that you will get the opportunity to learn by doing which is an important part of engineering education.

Convenience
You will study at QUT's Gardens Point campus in the centre of Brisbane, within easy walking distance to public transport, including buses, trains and ferries.

Who should do this course?
If you are interested in any of the following, you may enjoy a career in Civil Engineering:

- technology and construction.
- how things work.
- the environment.

Recommended Study
Chemistry, Maths C and Physics.

Career Outcomes
Civil engineers plan, design, construct, operate and maintain roads, bridges, dams, water supply schemes, sewerage systems, transportation, harbours, canals, dockyard facilities, airports, railways, factories and large buildings. Civil engineers may gain employment with Local, State and Commonwealth Governments, semi-government agencies, construction firms, power generating authorities, mining firms, property developers and consulting engineering firms. A small number are employed in research activities and teaching. After obtaining suitable experience there is also the opportunity to establish their...
own consulting engineering practice.

Overview
This course allows you to develop your knowledge in a number of areas such as: Structural Analysis and Design, Computer Applications, Transport Engineering, Environmental Engineering, Geotechnical Mechanics, Water Engineering, Construction Management, Waste Management. Environmental major; Sustainable development, waste management, toxic site rehabilitation, water & wastewater.

Professional Recognition
Full professional accreditation from Engineers Australia has been given for this course.

Second Majors and Minors
You will have the opportunity to undertake either a 2nd major or two minors. For professional recognition you will undertake an Applications minor which consists of a Work Place Integrated Learning unit, a project unit and two specialised civil engineering units. The second minor must be taken from an approved list outside your discipline.

Please refer to the rules at the following location before making your selection:

CIVIL ENGINEERING Second Major and Minor Options
Second Major:
Structural Engineering
Transport Engineering and Planning

Minors:
BEE Applications Minor
plus
A minor from anywhere in QUT that is outside of the course.

International Student Entry
International students must maintain an enrolment program that will allow them to complete their course within the specified timeframe of their eCoE (electronic Confirmation of Enrolment).

Special Course Requirements
A candidate for the degree of Bachelor of Engineering (Civil) must obtain at least 60 days of industrial experience/practice in an engineering environment as part of the Work Integrated Learning unit.

Further Information
School of Urban Development - Phone +61 7 3138 2678, Fax +61 7 3138 1515, email: bee.enquiries@qut.com

Deferment
All domestic applicants offered admission to undergraduate award courses may apply to defer commencement of their study. A deferment application will not normally be considered for courses where specific admission requirements apply, for example submission of folios or undertaking auditions. Applicants are not entitled to hold a deferred place and hold a place in another QUT course for the same period.

Find out more on deferment.

Full-time Course structure – Students commencing February 2010 onwards (Years 2 – 4)

Please Note:
For 1st year enrolment program please refer to EN40 Bachelor of Engineering course entry.

Year 2 - Semester 1 (to be introduced in 2011)
ENB270 Engineering Mechanics of Materials
ENB272 Geotechnical Engineering 1
ENB273 Civil Materials
MAB233 Engineering Mathematics 3

Year 2 - Semester 2 (to be introduced in 2011)
ENB274 Design of Environmentally Sustainable Systems
ENB275 Project Engineering 1
ENB276 Structural Engineering 1
ENB280 Hydraulic Engineering

Year 3 - Semester 1 (to be introduced in 2012)
ENB372 Design and Planning of Highways
ENB375 Structural Engineering 2
ENB378 Water Engineering
Second Major/Minor unit

Year 3 - Semester 2 (to be introduced in 2012)
ENB371 Geotechnical Engineering 2
ENB376 Transport Engineering
ENB377 Water and Waste Water Treatment Engineering
Second Major/Minor unit

Year 4 - Semester 1 (to be introduced in 2013)
BEB701 Work Integrated Learning 1
BEB801 Project 1
ENB471  Design of Concrete Structures and Foundations  
Second Major/Minor unit  

Year 4 - Semester 2 (to be introduced in 2013)  

ENB472  Project Engineering 2  
ENB476  Civil Engineering Design Project  
Second Major/Minor unit  
Selective  

Civil Engineering Selectives  
BEB802  Project 2  
ENB373  Design and Construction of Steel Structures  
ENB379  Transport Engineering and Planning Applications  
ENB380  Environmental Law and Assessment  
ENB383  Environmental Resource Management  
ENB384  Design of Masonry Structures  
ENB473  Design and Construction of Multi-storey Buildings  
ENB474  Finite Element Methods  
ENB475  Structural Engineering 3  
ENB478  Advanced Water Engineering  
ENB481  Civil Engineering Project Management  
ENB485  Advanced Geotechnical Engineering Practice  

Full-time Course structure – Students commencing Mid-Year 2010 onwards (Years 2 – 5)  

Please Note:  
For 1st year enrolment program please refer to EN40 Bachelor of Engineering course entry.  

Year 2 - Semester 1 (to be introduced in 2011)  

ENB270  Engineering Mechanics of Materials  
ENB272  Geotechnical Engineering 1  
ENB273  Civil Materials  

Year 2 - Semester 2 (to be introduced in 2011)  

ENB150  Introducing Engineering Design  
ENB200  Introducing Sustainability  
ENB274  Design of Environmentally Sustainable Systems  
ENB276  Structural Engineering 1  

Year 3 - Semester 1 (to be introduced in 2012)  

ENB372  Design and Planning of Highways  
ENB375  Structural Engineering 2  
MAB233  Engineering Mathematics 3  

Year 3 - Semester 2 (to be introduced in 2012)  

ENB275  Project Engineering 1  
ENB280  Hydraulic Engineering  
ENB371  Geotechnical Engineering 2  
ENB376  Transport Engineering  

Year 4 - Semester 1 (to be introduced in 2013)  

ENB378  Water Engineering  
ENB471  Design of Concrete Structures and Foundations  
Second Major/Minor unit  
Second Major/Minor unit  

Year 4 - Semester 2 (to be introduced in 2013)  

ENB377  Water and Waste Water Treatment Engineering  
ENB472  Project Engineering 2  
ENB476  Civil Engineering Design Project  
Second Major/Minor unit  

Year 5 - Semester 1 (to be introduced in 2014)  

BEB701  Work Integrated Learning 1  
BEB801  Project 1  
Selective  
Second Major/Minor unit  

Civil Engineering Selectives  
BEB802  Project 2  
ENB373  Design and Construction of Steel Structures  
ENB379  Transport Engineering and Planning Applications  
ENB380  Environmental Law and Assessment  
ENB383  Environmental Resource Management  
ENB384  Design of Masonry Structures  
ENB473  Design and Construction of Multi-storey Buildings  
ENB474  Finite Element Methods  
ENB475  Structural Engineering 3  
ENB478  Advanced Water Engineering  
ENB481  Civil Engineering Project Management  
ENB485  Advanced Geotechnical Engineering Practice
Potential Careers:
Civil Engineer, Engineer, Environmental Engineer.

UNIT SYNOPSES

BEB701 WORK INTEGRATED LEARNING 1
This unit aims to provide you with the opportunity to learn in a workplace environment. It will involve attendance, participation, observation, critical reflection, and report writing on workplace activities. The emphasis of your critical reflection and report writing will be on identifying and describing aspects of professional relevance incorporating: collaboration and teamwork; work place, health and safety; professional conduct; ethical responsibility, and other aspects of your work place experience. This unit may form part of your (compulsory) course core (as required by professional accrediting bodies e.g. Engineers Australia, Australian Institute of Building, Royal Institution of Chartered Surveyors), or it may be one of several work integrated learning (WIL) units (selected as part of a Minor).
Prerequisites: 192cp of completed studies Credit points: 12 Campus: Gardens Point Teaching period: 2010 SEM-1, 2010 SEM-2 and 2010 SUM

BEB801 PROJECT 1
This unit is usually taken in the final year of study. Students complete an individual project involving the application of skills and knowledge attained during the earlier years of their degree program. For some students, this unit will be taken one of two 'project' units related to the same student project; in such cases this unit may be a pre-requisite or co-requisite to the second unit (or a follow-on from the first unit). The final 'deliverable' for this unit may vary for each discipline and details will be provided in lectures/tutorials and on the Blackboard website.
Equivalents: CEB411, CEB420, CNB434, EEB781-1, EEB889-1 Credit points: 12 Contact hours: 2 per week Campus: Gardens Point Teaching period: 2010 SEM-1 and 2010 SEM-2

BEB802 PROJECT 2
This unit is usually taken in the final year of study, and is only taken by students completing a two unit project. Students complete an individual project involving the application of skills and knowledge attained during the earlier years of their degree program. This unit will be taken as the second of two 'project' units related to the same student project.
Equivalents: CEB415, EEB782-2, EEB889-2 Credit points: 12 Contact hours: 2 Campus: Gardens Point Teaching period: 2010 SEM-1 and 2010 SEM-2

ENB150 INTRODUCING ENGINEERING DESIGN
Assumed knowledge: ENB110 is assumed knowledge. Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2010 SEM-2

ENB200 INTRODUCING SUSTAINABILITY
This unit will enable you as a graduating Built Environment and Engineering professional to take active and positive steps to transform professional practice in ways that promote the sustainability of our planet, our economy and our society. As future professionals in the fields of Design, Urban Development and Engineering Systems, you will need to understand and apply the concepts of sustainability in your professional practice if we are to achieve sustainable development in the 21st Century.
Credit points: 12 Campus: Gardens Point

ENB270 ENGINEERING MECHANICS OF MATERIALS
This unit introduces calculating the stress produced in various members of a structural system due to the forces applied to them, and how to determine the design specifications (size and shape) of the members to withstand the forces to prevent the structural system failing.
Prerequisites: ENB101 or ENB110 Credit points: 12 Contact hours: 4 per week Campus: Gardens Point

ENB272 GEOTECHNICAL ENGINEERING 1
Soil mechanics is a part of geotechnical engineering, soil types, their description, classification and engineering properties. The unit includes the following: granular and cohesive soil classification systems; volume and mass components; density and air voids; determination of soil geostatic vertical pressures; pore water pressures and effective stress; permeability theory and fluid seepage in soil, with erosion and piping analysis; soil shear strength assessment and application to retaining wall lateral pressures; retaining wall design; slope stability analysis and stabilisation. Computer simulation and analysis programs are used where appropriate.
Assumed knowledge: ENB102 or ENB270 are assumed knowledge Equivalents: CEB209, CEB232 Credit points: 12 Contact hours: 6 per week Campus: Gardens Point Teaching period: 2010 SEM-1

ENB273 CIVIL MATERIALS
The unit provides students with a sound and practical approach to material properties and selection so that they may adapt to scientific and technological changes in the variety of products entering the market. They understand where the engineer fits in a quality assurance program and become aware of the numerous components of quality assurance and the costs generated by quality control and assurance. Students become aware of the effect of the working environment on different engineering materials.
Among other things, they study the behaviour of concrete from the time it is manufactured to the end of its life, and develop knowledge of the parameters involved in manufacturing good concrete, and the consequences of delivering poor concrete.

**Prerequisites:** ENB270 or ENB102. ENB270 can be studied concurrently. **Credit points:** 12 **Contact hours:** 5 per week **Campus:** Gardens Point **Teaching period:** 2010 SEM-1

**ENB274 DESIGN OF ENVIRONMENTALLY SUSTAINABLE SYSTEMS**

This unit extends and applies the knowledge developed in CEB200 Introducing Sustainability to important issues such as site investigation, development of site planning criteria, site planning, environmental management and quality, pollution prevention and control, and resources and waste management. CEB200 and ENB274 form the foundations of the civil and environmental degree. This unit builds upon generic competencies acquired in CEB100 Introducing Professional Learning and ENB271 Design of Structural Timber and Earthworks. It also provides transport planning fundamentals, which will be built upon in ENB372 Design and Planning of Highways and ENB379 Transport Engineering and Planning Applications.

**Prerequisites:** CEB200 or ENB200 or ENB100 or UDB100 or SCB110 **Assumed knowledge:** ENB271 is assumed knowledge. **Equivalents:** CEB214 **Credit points:** 12 **Contact hours:** 4 per week **Campus:** Gardens Point **Teaching period:** 2010 SEM-2

**ENB275 PROJECT ENGINEERING 1**

The unit commences with the development of the construction techniques common to site investigation, earthworks, pile driving, deep foundations, reinforced and prestressed concrete and steel erection. This operational understanding is extended into a study of the practices used to estimate cost and to administer contracts, including planning and the legal implications of operating in a commercial environment. The unit concludes with the issues surrounding the uncertainty of weather and of operating in remote environs.

**Assumed knowledge:** ENB271 and ENB273 are assumed knowledge. **Equivalents:** CEB216 **Credit points:** 12 **Contact hours:** 4 per week **Campus:** Gardens Point **Teaching period:** 2010 SEM-2

**ENB276 STRUCTURAL ENGINEERING 1**

This unit includes the following: development of the method of moment distribution and its application in analysis of continuous beams and frames; theory of influence lines and its application to determine the effects of moving loads on beams and trusses; ‘pattern loading’ on frames and continuous beams; behaviour of reinforced concrete members; applications in the design of beams and columns.

**Prerequisites:** ENB102 or ENB270 **Assumed knowledge:** ENB273 and ENB271 is assumed knowledge. **Equivalents:** CEB215 **Credit points:** 12 **Contact hours:** 4 per week **Campus:** Gardens Point **Teaching period:** 2010 SEM-2

**ENB280 HYDRAULIC ENGINEERING**

This unit primarily provide a basic understanding of hydraulic (fluid) principles and an understanding of the use of these principles in engineering applications. The main topics to be covered are: Units and properties of fluids, Forces in static fluids, Buoyancy, Kinematics and continuity, The energy equation and the momentum equation; Similitude and dimensional analysis, Lift and drag, Frictional flow in pipes, Application of pipe resistance formulae, Fitting.

**Assumed knowledge:** MAB126 or MAB180 or MAB131, and ENB101 or ENB110 are assumed knowledge. **Credit points:** 12 **Contact hours:** 4 per week **Campus:** Gardens Point

**ENB371 GEOTECHNICAL ENGINEERING 2**

This unit includes: further study on the behaviour of soil and rocks; determination of subsurface pressures from surface loadings; soil settlement including time related clay consolidation settlement and immediate settlements on sand and clay as related to shallow foundations; assessment of bearing capacity and allowable bearing pressures under shallow foundations; pile foundation systems and analysis for capacity and settlement; rock mass behaviour, classification and joint shear strength applied to slope stability assessment and stabilisation measures.

**Prerequisites:** ENB272 **Equivalents:** CEB322 **Credit points:** 12 **Contact hours:** 5 per week **Campus:** Gardens Point **Teaching period:** 2010 SEM-2

**ENB372 DESIGN AND PLANNING OF HIGHWAYS**

Civil engineers as professionals are responsible for the delivery of major transport infrastructure items through the stages of inception, planning, design, development, maintenance and management. The purpose of such projects is to improve the quality of life of the community by offering safe and efficient access to activity locations and mobility between locations. In delivering such infrastructure it is imperative that social, economic, and environmental impacts and benefits are considered and addressed. This unit offers students an opportunity to explore the role of the civil engineer in the preparation of a feasibility design study for a road as a major transport infrastructure item.

**Assumed knowledge:** ENB271 and ENB274 are assumed knowledge. **Equivalents:** CEB317 **Credit points:** 12 **Contact hours:** 4 per week **Campus:** Gardens Point **Teaching period:** 2010 SEM-1
ENB373 DESIGN AND CONSTRUCTION OF STEEL STRUCTURES
This unit includes the study of steelwork: design and construction; structural systems; load paths; rules of thumb; building layout; function and form; cladding; element and wind loading evaluation; idealisation, analysis, design action effects; space gas, columns and rafters; trusses and bracing; connections; knee ridges; base plate design; procurement and fabrication; scheduling and erection.
Prerequisites: ENB375 Assumed knowledge: ENB271 is assumed knowledge. Equivalents: CEB329 Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2010 SEM-2

ENB375 STRUCTURAL ENGINEERING 2
This unit considers the following: limit states design of steel structures; buckling and ultimate strength behaviour of steel structures; tension members, compression members; local and global buckling (flexural and flexural torsional buckling modes) concepts as applied to compression members and beams; effective lengths of compression members and beams; design of beams; effect of lateral restraints on buckling; web stresses including web crippling and buckling; beam-columns; bolted and welded connections; unsymmetric bending of beams including principal second moments of area; shear stresses in beams of thin-walled open cross-sections and their shear centres. Most cold-formed steel sections are unsymmetric and hence the latter topics are useful in steel design.
Prerequisites: ENB102 or ENB270 or ENB276 Assumed knowledge: ENB273 is assumed knowledge. Equivalents: CEB318 Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2010 SEM-1

ENB376 TRANSPORT ENGINEERING
The transport system is an essential part of our physical infrastructure. It is imperative that civil engineers are able to undertake typical road and traffic engineering investigations, analyses and designs. These require an understanding of the intent of individual road system elements, how they operate, and how they are delivered and managed: this understanding is developed in this unit. Further, it is important that civil engineers are able to undertake multimodal transport surveys to gain an understanding of the operation of a particular transport system.
Assumed knowledge: ENB274 and ENB372 are assumed knowledge. Equivalents: CEB323 Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2010 SEM-2

ENB377 WATER AND WASTE WATER TREATMENT ENGINEERING
The provision of a safe, wholesome and adequate supply of water and the proper treatment, disposal, and reuse of wastewater are essential for protecting human health and well-being. Water and wastewater treatment are required for the control of water-born diseases and the provision of proper sanitation for urban, rural, and recreational areas. Water and wastewater treatment engineering is a major field of civil and environmental engineering and is manifested by sound principles and practice in terms of solving sanitation problems.
Prerequisites: ENB201 or ENB280 Assumed knowledge: ENB274 is assumed knowledge. Equivalents: CEB321 Credit points: 12 Contact hours: 3 per week Campus: Gardens Point Teaching period: 2010 SEM-2

ENB378 WATER ENGINEERING
The main topics to be covered in this unit follow: the hydrologic cycle and its application to the estimation of runoff from small catchments; probability and risk and the selection of design floods; hydrologic data; estimation of peak runoff using the Rational Formula estimation of runoff hydrographs using rainfall-runoff routing models; the hydraulic characteristics of open channels; uniform flow, gradually varied flow and rapidly varied flow; the hydraulic characteristics of culverts and retention basins; the operation of urban drainage systems.
Prerequisites: ENB201 or ENB280 Equivalents: CEB319 Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2010 SEM-1

ENB379 TRANSPORT ENGINEERING AND PLANNING APPLICATIONS
The environmental engineer must be familiar with the role of each transport mode in the overall transport task, along with current issues associated with each mode. This must be overarched by an understanding of the system for planning and management of transport projects and systems, particularly in context with economic, environmental and social attributes. This unit provides students who wish to pursue a career in environmental engineering with an understanding of these areas. The unit also includes case studies covering the environmental impacts for some of the urban and rural transport and infrastructure projects especially in the area of community consultation.
Assumed knowledge: ENB274 and ENB372 are assumed knowledge. Equivalents: CEB419 Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2010 SEM-1

ENB380 ENVIRONMENTAL LAW AND ASSESSMENT
The adverse consequences of human activity have resulted in the adoption of various international treaties, enactment of stringent legislative requirements, and a growing demand for improved management practices. Engineers need to be
aware of the way in which the law works, to be able to communicate with lawyers, and to recognise the legal and political implications of their projects. An understanding of the local, state, and federal governments’ power to regulate development and the legal and planning requirements and assessment procedures is essential for professional engineering practice.

**Prerequisites:** ENB383  Assumed knowledge: BEB200 or ENB200 are assumed knowledge.  **Equivalents:** CEB416  **Credit points:** 12  **Contact hours:** 4 per week  **Campus:** Gardens Point  **Teaching period:** 2010 SEM-2

**ENB383 ENVIRONMENTAL RESOURCE MANAGEMENT**

This unit addresses management of solids and hazardous wastes generated from domestic, commercial, and industrial sources. It includes the following: waste minimisation; promotion of efficient use of resources; promotion the use of waste through recycling and energy production; viewing waste as a resource; reducing the mass, volume and toxicity of the waste; disposing of waste in a socially and environmentally acceptable manner; waste avoidance; recycling; energy production; treatment; disposal. Waste management is an important aspect of civil and environmental engineering education.

**Assumed knowledge:** ENB274 or ENB200 or BEB200 is assumed knowledge  **Equivalents:** CEB418  **Credit points:** 12  **Contact hours:** 4 per week  **Campus:** Gardens Point  **Teaching period:** 2010 SEM-1

**ENB384 DESIGN OF MASONRY STRUCTURES**

Historic development & Modern Masonry; Constituent Materials – testing standards; Design for durability; Limit state design principles – capacity & serviceability; General design aspects of walling, Fire design provisions; Out-of-plane behaviour of unreinforced masonry walling; Design of facades, ties & accessories; Unreinforced masonry – in-plane behaviour, shear walls & construction detailing; Reinforced masonry – design for flexure, in-plane and out-of-plane shear; Design for compression & slender walls; Novel designs – prestressed masonry, dry-stack masonry, thin bed masonry, geometrical sections, cavity walls and diaphragm walls; Case study - industrial building / medium rise apartment building.

**Prerequisites:** ENB102 or ENB270  **Equivalents:** CEB516  **Credit points:** 12  **Contact hours:** 4 per week  **Campus:** Gardens Point  **Teaching period:** 2010 SEM-1

**ENB471 DESIGN OF CONCRETE STRUCTURES AND FOUNDATIONS**

Concrete design and construction; roles of building professionals; current structures; structural systems; load paths; rules of thumb; building layout, function and form, design effects; seismic and element loads; formwork and placement constraints; reinforced and prestressed concrete slabs, beams and columns; architectural issues, connections and detailing; site investigation, spread and pile footings and foundations; retaining walls.

**Prerequisites:** ENB276 and ENB371  **Equivalents:** CEB424  **Credit points:** 12  **Contact hours:** 4 per week  **Campus:** Gardens Point  **Teaching period:** 2010 SEM-1

**ENB472 PROJECT ENGINEERING 2**

The unit builds on the understanding of the physical aspect of construction gained in Project Engineering 1 to develop the skills needed to manage a project. Further studies in estimating, contracts administration and cost control provide support for a major computer simulation exercise based on the construction management of a complex industrial project. This experiential component provides a framework for the exploration of issues in the legal, managerial and technical areas which form the basis for the professional presentations that conclude the unit.

**Prerequisites:** ENB275  Assumed knowledge: ENB372 is assumed knowledge.  **Equivalents:** CEB412  **Credit points:** 12  **Contact hours:** 4 per week  **Campus:** Gardens Point  **Teaching period:** 2010 SEM-2

**ENB473 DESIGN AND CONSTRUCTION OF MULTI-STORY BUILDINGS**

This unit builds on the structural, material, construction and design units of previous semesters, in particular Design of Steel and Concrete Structures, and applies that knowledge and skills to a multi-storey building on a real site to perform a real function. The unit covers a range of topics as applicable to multi-storey buildings, namely, structural systems, analysis techniques, design and construction methods, composite floor systems, steel framed buildings, construction, fire safety and durability. Using a realistic building project it enables QUT students to prepare themselves to pursue a career in structures and/or construction. There will be a special emphasis on the interdependency between construction and design. The aim of this unit is to help you to learn and develop professional engineering skills with special emphasis on analysis, design and construction of multi-storey buildings.

**Prerequisites:** ENB275 and ENB375  Assumed knowledge: ENB471 is assumed knowledge.  **Credit points:** 12  **Contact hours:** 4 per week  **Campus:** Gardens Point  **Teaching period:** 2010 SEM-1

**ENB474 FINITE ELEMENT METHODS**

The Finite Element Method (FEM) is 20th century’s answer for treating complex problems, which had hitherto remained impossible to solve, in several areas of engineering such as structural, geotechnical, electrical, heat conduction, etc. The applications of this powerful computer based method has rapidly extended to cover several areas of engineering. In the structures area, the displacements and stresses in complex concrete connections, dams, deep beams with openings, shell structures, etc., can only be obtained by
finite element analysis. Basic theory of FEM and its features such as engineering actions, modelling techniques, choice of elements, boundary conditions and input data will be covered in this unit. It aims in equipping engineers with skills to apply FEM effectively in structural, geotechnical and water engineering problems.

**Prerequisites:** ENB475 Assumed knowledge: ENB102 or ENB270 are assumed knowledge. **Credit points:** 12
**Contact hours:** 4 per week **Campus:** Gardens Point **Teaching period:** 2010 SEM-1

**ENB475 STRUCTURAL ENGINEERING 3**
This is an advanced structural engineering unit which builds up on previous knowledge in this area and covers applications. Load paths in structures and cable structures with applications in bridge engineering will be covered. The stiffness method, which is the basis of all structural analysis software packages will be covered in detail. The formation of plastic hinges (failure points) and failure mechanisms in structures will be treated with simple applications. Structural dynamics and vibrations in structures will be introduced and illustrated with applications. Application of structural dynamics will be extended to seismic engineering. The basics of seismic engineering and the use of the Australian code for analysing structures subjected to seismic loads will be covered.

**Prerequisites:** ENB276 and ENB375 **Credit points:** 12
**Contact hours:** 4 per week **Campus:** Gardens Point **Teaching period:** 2010 SEM-1

**ENB476 CIVIL ENGINEERING DESIGN PROJECT**
Through preparation of various civil engineering design elements of a major project, this final design strand unit builds upon the earlier units to polish students' professional capabilities as expected of a graduate civil engineer. Students will be expected to apply to their project the knowledge and experience gained in the civil engineering sub-disciplinary core units including: Geotechnical Engineering 2, Water Engineering, and Transport Engineering. The aims of this unit are to provide you with an understanding of the role of the civil engineer within a major project, including the various technical activities undertaken, overall project management, and an understanding of community expectations.

**Prerequisites:** (ENB371 and (( ENB372, ENB376, and ENB378) or EN40MJR-CVCOENG) **Credit points:** 12
**Contact hours:** 4.5 per week **Campus:** Gardens Point **Teaching period:** 2010 SEM-2

**ENB478 ADVANCED WATER ENGINEERING**
This unit primarily intended to provide detailed conceptual knowledge on river and coastal processes. The main topics to be covered under River Engineering are: catchment and flood plane management, river flow modelling, sediment transport and application of water sensitive urban design to urban systems. The main topics to be covered under Coastal Engineering are: wave theory, coastal inlets and canal systems, planning and design of coastal structures and coastal management and planning.

**Prerequisites:** ENB378 **Credit points:** 12
**Contact hours:** 4 per week **Campus:** Gardens Point **Teaching period:** 2010 SEM-1

**ENB481 CIVIL ENGINEERING PROJECT MANAGEMENT**
Engineers are invariably required to manage projects. This unit reinforces the student’s understanding of current management principles in the context of construction projects. Other topics include administration, cost control, claims, legal and insurance issues together with outsourcing, problem solving, communication and dispute resolution. The focus of the unit is to ensure students develop an appreciation of the commercial and non-technical issues associated with successful projects. The aim of this unit is to help the student understand the nature of the decisions required of an Engineer managing a project and practising making these decisions within the fast-moving commercial and economic environment for such projects.

**Prerequisites:** ENB275 Assumed knowledge: ENB372 is assumed knowledge. **Credit points:** 12
**Contact hours:** 4 per week **Campus:** Gardens Point **Teaching period:** 2010 SEM-2

**ENB485 ADVANCED GEOTECHNICAL ENGINEERING PRACTICE**
The aim of this unit is to firstly, develop the generic technical skills required to identify and solve geotechnical engineering problems of the type commonly encountered by specialist geotechnical consultants, and secondly, to have a good understanding of some specialist techniques for site investigation, performance prediction and construction. The unit will be presented as study modules, each one emphasising a different area of geotechnical engineering. The study areas and the case studies used for practice may change from year to year depending on the availability of experienced practitioners and on current geotechnical projects and interests.

**Prerequisites:** ENB371 **Credit points:** 12
**Contact hours:** 4.5 per week **Campus:** Gardens Point **Teaching period:** 2010 SEM-1

**MAB233 ENGINEERING MATHEMATICS 3**
This unit is mostly introductory statistics for engineering but also includes a small component on foundations of computational mathematics. Statistics includes: the planning, execution, analysis and reporting of data investigations; use of a statistical package; modelling data; relationships between variables; estimation; confidence intervals; tolerance limits; hypothesis testing; fitting and investigating relationships; regression; design and analysis.
of experiments; risk; random variables; special distributions; linear combinations of correlated variables; reliability. The introduction to computational mathematics includes: function approximation; polynomial interpolation; numerical solution of ordinary differential equations.

**Prerequisites:** MAB131 or MAB182 or MAB121 or MAB126 or MAB127  
**Antirequisites:** BSB123  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1