Bachelor of Engineering (Civil) (EN40)

Year offered: 2011
Admissions: Yes
CRICOS code: 056529D
Course duration (full-time): 4 years
Domestic Fees (indicative): 2011: CSP $3,878 (indicative) per semester
International Fees (indicative): 2011: $12,250 (indicative) per semester
Domestic Entry: February and July
International Entry: February and July
QTAC code: 412502
Past rank cut-off: 81
Past OP cut-off: 10
OP Guarantee: Yes
Assumed knowledge: English (4, SA) and Maths B (4, SA)
Preparatory studies: For information on acquiring assumed knowledge visit http://www.qut.edu.au/assumed-knowledge
Total credit points: 384
Standard credit points per full-time semester: 48
Course coordinator: Dr R.Mahalinga-Iyer
Discipline coordinator: Dr Prasanna Egodawatta (Acting)
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.

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.

**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.

**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).

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

**Deferment**
Domestic students can defer their offer in this course for one year. In exceptional circumstances up to 12 months of additional deferment may be granted.

Find out more on deferment.

**Limits on grades of 3**
A new policy concerning grades of 3 came into effect from 1 January 2009 (QUT MOPP C/5.2). With effect from this date grades of 3 are no longer considered a conceded or low pass but are classified as a fail grade. Any grades of 3 awarded prior to 1 January 2009 retain the conceded pass status and will be counted for graduation purposes up to the maximum number of grades of 3 permitted for your course. Grades of 3 incurred in units that commence after 1 January 2009 will not count towards your degree. Further information is available on the Student Services website.

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

<table>
<thead>
<tr>
<th>Year 2 - Semester 1 (to be introduced in 2011)</th>
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<tbody>
<tr>
<td>ENB270  Engineering Mechanics of Materials</td>
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<tr>
<td>ENB272  Geotechnical Engineering 1</td>
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<tr>
<td>ENB273  Civil Materials</td>
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<td>MAB233  Engineering Mathematics 3</td>
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<tr>
<th>Year 2 - Semester 2 (to be introduced in 2011)</th>
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<tbody>
<tr>
<td>ENB274  Design of Environmentally Sustainable Systems</td>
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<tr>
<td>ENB275  Project Engineering 1</td>
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<tr>
<td>ENB276  Structural Engineering 1</td>
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<td>ENB280  Hydraulic Engineering</td>
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<th>Year 3 - Semester 1 (to be introduced in 2012)</th>
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<tr>
<td>ENB372  Design and Planning of Highways</td>
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<tr>
<td>ENB375  Structural Engineering 2</td>
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<td>ENB378  Water Engineering</td>
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<td>Second Major/Minor unit</td>
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<th>Year 3 - Semester 2 (to be introduced in 2012)</th>
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<tr>
<td>ENB371  Geotechnical Engineering 2</td>
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<tr>
<td>ENB376  Transport Engineering</td>
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<td>ENB377  Water and Waste Water Treatment Engineering</td>
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<th>Year 4 - Semester 1 (to be introduced in 2013)</th>
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<tbody>
<tr>
<td>BEB701  Work Integrated Learning 1</td>
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<tr>
<td>BEB801  Project 1</td>
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<tr>
<td>ENB471  Design of Concrete Structures and Foundations</td>
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<td>Second Major/Minor unit</td>
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<th>Year 4 - Semester 2 (to be introduced in 2013)</th>
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<tr>
<td>ENB472  Project Engineering 2</td>
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<tr>
<td>ENB476  Civil Engineering Design Project</td>
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<tr>
<td>Second Major/Minor unit</td>
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<td>Selective</td>
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**Civil Engineering Selectives**

| BEB802  Project 2                                |
| ENB373  Design and Construction of Steel Structures |
| ENB379  Transport Engineering and Planning Applications |

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Please Note:
For 1st year enrolment program please refer to EN40 Bachelor of Engineering course entry.
## Course Structure - Transport Engineering and Planning 2nd major (commencing 2010 onwards)

### Year 1, Semester 1
- ENB100 Engineering and Sustainability
- ENB110 Engineering Statics and Materials
- ENB130 Mechanical and Thermal Energy
- MAB125 Foundations of Engineering Mathematics
  - OR
- MAB126 Mathematics for Engineering 1

### Year 1, Semester 2
- ENB120 Electrical Energy and Measurements
- ENB150 Introducing Engineering Design
- ENB200 Introducing Engineering Systems
- MAB126 Mathematics for Engineering 1
  - OR
- MAB127 Mathematics for Engineering 2

### Year 2, Semester 1
- ENB270 Engineering Mechanics of Materials
- ENB272 Geotechnical Engineering 1
- ENB273 Civil Materials
- MAB233 Engineering Mathematics 3

### Year 2, Semester 2
- ENB274 Design of Environmentally Sustainable Systems
- ENB275 Project Engineering 1
- ENB276 Structural Engineering 1
- ENB280 Hydraulic Engineering

### Year 3, Semester 1
- ENB372 Design and Planning of Highways
- ENB375 Structural Engineering 2
- ENB378 Water Engineering
- UDB266 Planning Processes and Consultations

### Year 3, Semester 2
- 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
- ENB477 Advanced Water Engineering
- ENB481 Civil Engineering Project Management
- ENB485 Advanced Geotechnical Engineering Practice

### Year 4, Semester 1
- BEB701 Work Integrated Learning 1
- BEB801 Project 1
- ENB379 Transport Engineering and Planning Applications
- ENB471 Design of Concrete Structures and Foundations

### Year 4, Semester 2
- ENB472 Project Engineering 2
- UDB266 Planning Processes and Consultations
- UDB300 Water and Waste Water Treatment Engineering
- UDB370 Environmental Planning and Management

### Second Major Selectives
- Semester 2:
  - BEB802 Project 2
  - ENB476 Civil Engineering Design Project

### 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).

**Assumed knowledge:** This unit is not designed for first year students. It is recommended that you check WIL Community Blackboard site for information on enrolment pattern. If you are EN40 student you can only enrol after completing a minimum of 192 cp.  
**Credit points:** 12  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-1, 2011 SEM-2 and 2011 SUM

**ENB130 MECHANICAL AND THERMAL ENERGY**  
Engineers work with numerous kinds of systems where consideration must be given to the motion within, and associated energy of, the system. This unit introduces the student to the concepts of mechanical and thermal energy in the context of real engineering systems. The inter-relationships of between forces, motion and energy is described as related to the flow of energy within these engineering systems. After an introduction to engineering units, concepts and data, Newton’s first and second laws are used in the description of system motion and the concepts of force and energy, conservation of momentum and conservation of energy are introduced and described. Thermodynamic processes, certain thermo-physical parameters and the first and second law of thermodynamics are introduced and used to describe simple engineering systems. This is then expanded to include the generation and transport of energy through these systems in terms of convection, conduction and radiation heat transfer.  
**Equivalents:** PCB150  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-1

**ENB150 INTRODUCING ENGINEERING DESIGN**  
This unit introduces you to engineering design. A multi-disciplinary approach is taken with an emphasis in engineering systems, technical design and project management.  
**Assumed knowledge:** ENB110 is assumed knowledge.  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-2

**ENB200 INTRODUCING ENGINEERING SYSTEMS**  
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  
**Teaching period:** 2011 SEM-2

**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  
**Teaching period:** 2011 SEM-1

**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:** 2011 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:** 2011 SEM-1

**ENB274 DESIGN OF ENVIRONMENTALLY SUSTAINABLE SYSTEMS**

This unit extends and applies the knowledge developed in BEB200 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. BEB200 and ENB274 form the foundations of the civil and environmental degree. This unit builds upon generic competencies acquired in BEB100 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:** BEB200 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:** 2011 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:** 2011 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:** 2011 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  
**Teaching period:** 2011 SEM-2
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  Equivalent: CEB322  Credit points: 12  Contact hours: 5 per week  Campus: Gardens Point  Teaching period: 2011 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.  Equivalent: CEB317  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2011 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.  Equivalent: CEB329  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2011 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.  Equivalent: CEB318  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2011 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 multi-modal transport surveys to gain an understanding of the operation of a particular transport system.
Assumed knowledge: ENB274 and ENB372 are assumed knowledge.  Equivalent: CEB323  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2011 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-borne 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.  Equivalent: CEB321  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2011 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:** 2011 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 overlapped 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:** 2011 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:** 2011 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:** 2011 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:** 2011 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:** 2011 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:** 2011 SEM-2
ENB473 DESIGN AND CONSTRUCTION OF MULTI-STOREY 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: ENB276 and ENB375  Assumed knowledge: ENB471 is assumed knowledge. Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2011 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: 2011 SEM-2

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: 2011 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 per week  Campus: Gardens Point  Teaching period: 2011 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: 2011 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: 2011 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: 2011 SEM-1

MAB125 FOUNDATIONS OF ENGINEERING MATHEMATICS

A sound understanding of the language and techniques of mathematics is essential for any quantitative discipline. This unit provides an introduction to the aspects of mathematics especially applicable to engineering and is directed at those students whose mathematics preparation does not include Maths C or an equivalent. For this purpose, it's located in first semester of the first year of your course. This unit introduces you to the fundamental mathematical ideas of function, calculus, vectors and matrices, through the use of contextualised engineering related problems. In solving these problems you will develop both an understanding of the mathematical concepts and competency in appropriate solution methods.

Prerequisites: MAN120  Assumed knowledge: Grade of at least Sound Achievement in Senior Mathematics B (or equivalent) or MAB105 is assumed knowledge  Equivalents: MAB100, MAB120, MAB180  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2011 SEM-1, 2011 SEM-2 and 2011 SUM

MAB126 MATHEMATICS FOR ENGINEERING 1

Building upon the foundations established in MAB125 or Senior Maths C, this unit addresses the significant role of mathematical modelling using differential equations for the description and resolution of simple and complex problems relevant to the discipline of engineering. The formulation and solution of such problems is supported by appropriate advanced mathematical concepts used for function approximation, differentiation and integration. The unit is located in first year for application in core engineering units throughout the rest of the course. Undertaking this unit will allow you to develop your problem solving skills, especially in the context of mathematical techniques applied to ordinary differential equations used to model engineering relevant problems.

Prerequisites: MAN121  Assumed knowledge: Grade of at least Sound Achievement in Senior Mathematics C (or equivalent) or MAB125 or MAB180 or MAB120 is assumed knowledge  Equivalents: MAB111, MAB121, MAB131, MAB182  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2011 SEM-1, 2011 SEM-2 and 2011 SUM

MAB127 MATHEMATICS FOR ENGINEERING 2

Building upon the foundations established in MAB125 or Senior Maths C, this unit addresses the significant role of mathematical modelling using vectors, matrices and multivariable calculus for the description and resolution of simple and complex problems relevant to the discipline of engineering. The formulation and solution of such problems is supported by appropriate advanced mathematical concepts used for function approximation, differentiation and integration. You will complete this unit in first year or first semester of second year depending on your initial maths background. Undertaking this unit will allow you to develop your problem solving skills, especially in the context of advanced mathematical techniques applied to vectors and matrices used to model engineering relevant problems.

Assumed knowledge: Grade of at least Sound Achievement in Senior Mathematics C (or equivalent) or MAB125 or MAB120 or MAB131 or MAB182 is assumed knowledge  Equivalents: MAB112, MAB122, MAB132  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2011 SEM-1, 2011 SEM-2 and 2011 SUM

MAB233 ENGINEERING MATHEMATICS 3

This unit will provide you with the foundation knowledge and skills to carry out a statistical data investigation including defining the problem, planning the investigation, collecting and analysing data, and reporting conclusions in context. It will also provide you with foundation knowledge and concepts of probability, random variables and distributions for further learning in engineering.

Prerequisites: MAB131 or MAB182 or MAB121 or MAB126 or MAB127  Antirequisites: BSB123, MAB101, MAN101  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2011 SEM-1 and 2011 SEM-2

UDB104 URBAN DEVELOPMENT ECONOMICS
This unit will introduce microeconomic and macroeconomics concepts applied to urban and regional development. The unit will initially focus on demand, supply and determination of prices, and other important microeconomic concepts, at the level of an individual development. Here, the value of microeconomics in explaining aspects of development is demonstrated using local and national examples. In doing so, this unit will also help to deepen the appreciation of the key steps in development and the role of the main actors. Since any development project does not occur in a vacuum, the unit will then broaden to consider the impact of changes in the national and local economy on land use and development, including business cycle, monetary and fiscal policy.

**Antirequisites:** BSB113, BSD113  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-2

**UDB266 PLANNING PROCESSES AND CONSULTATIONS**

Students learn how land uses are generated and can be planned. They study the logic, role and methods of successive stages of planning processes including aims, information analysis and synthesis, evaluation, strategy development, monitoring and review. They learn how to consult widely in the community and with other professionals to develop and apply flexible and widely relevant planning processes.

**Prerequisites:** (UDB163 and UDB164) or ENB274 or DE40MJR-LNDARCH - Landscape Architecture Major  
**Equivalents:** PSB433  
**Credit points:** 12  
**Contact hours:** 3 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-1

**UDB267 DEVELOPMENT ASSESSMENT AND INFRASTRUCTURE**

The aim of this unit is to provide students with a grounding in the issues and skills related to the assessment of development applications and planning related to infrastructure. The unit will be conducted in two sections. The first will introduce students to the relevant legislation, procedures, and techniques associated with development assessment. The second will give students an understanding of issues related to the provision and maintenance of technical and social infrastructure, with particular reference to the importance of sustainability and the emergence of new technology and systems.

**Prerequisites:** UDB163 or DE40MJR-LANDARC - Landscape Architecture Major  
**Equivalents:** PSB445  
**Credit points:** 12  
**Contact hours:** 3 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-2

**UDB370 ENVIRONMENTAL PLANNING AND MANAGEMENT**

This unit provides an overview of methods and issues concerning the application of environmental planning and management. Topics focus on environmental impact assessment (EIA), adaptive management, bioregionalism and other models and methods of environmental management.

**Equivalents:** PSB462  
**Credit points:** 12  
**Contact hours:** 3 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-2