Bachelor of Engineering (Civil and Construction) (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
If you are attracted to the intellectual rigour of engineering, but with a bias towards the challenge of converting design into physical reality then construction engineering is the career for you.

Practical teaching
You will graduate with generic skills in leadership, teamwork, communication, and creative thinking. You will work closely with staff in an innovative environment that involves hands-on activities such as using specialist software to solve real-world engineering problems.

Industry links
You will be exposed to ideas and experience of guest lecturers and industry professionals. 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 development skills. "While enrolled in the course you will also undertake industrial experience in an engineering environment.

Facilities / technology
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 tradition laboratory areas. Facilities that integrate virtual and web based material with physical equipment ensure that students 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 and Construction Engineering:

- Building and Construction
- How things work
- Technical and engineering activities.

Recommended study
Chemistry, Maths C and Physics.

Career Outcomes
Construction engineering is suited to people attracted to the intellectual rigour of engineering, but with a bias towards the challenge of converting design into physical reality. While the course retains sufficient traditional civil engineering to enable graduates to work in consultant offices, most would be employed by civil construction companies and Government Departments. Commercial and legal studies equip graduates to progress through the management structures of these organisations or to establish companies of their own. The range of work undertaken by civil construction companies ranges from residential land development through earthworks, tunnels, roads and dams to airports, marine facilities, major bridges and complex buildings. The world wide trend towards design and construction being undertaken within one organisation, acts to advantage engineers competent in both.

Overview
This course combines civil engineering with construction management, you will study civil engineering subjects combined with the requirements for managing the construction of large projects.

**Professional Recognition**

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

**Special Course Requirements**

A candidate for the degree of Bachelor of Engineering (Civil and Construction) must complete at least 60 days of industrial experience/practice in an engineering construction environment as part of the Work Integrated Learning unit.

**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:


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**CIVIL AND CONSTRUCTION ENGINEERING Second Major and Minor Options**

**Second Major:**

Civil Infrastructure

**Minors:**

BEE Applications Minor

Plus

A minor from anywhere in QUT that is outside of the course.

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**International Student Entry**

International students who are interested in mid-year entry should consult the Faculty of Built Environment and Engineering Student Services section regarding the course structure to be undertaken.

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).

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**Further Information**

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

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**Deferment**

QUT allows current Year 12 school leavers to defer their undergraduate admission offer for one year, or for six months if offered mid-year admission, except in courses using specific admission requirements such as questionnaires, folios, auditions, prior study or work experience.

Non-year 12 students may also request to defer their QTAC offer on the basis of demonstrated special circumstances.

Find out more on deferment.

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**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)**

ENB275 Project Engineering 1
ENB276 Structural Engineering 1
ENB280 Hydraulic Engineering
UDB214 Professional Studies 2

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

ENB277 Construction Engineering Law
ENB375 Structural Engineering 2
ENB381 Civil Engineering Construction
UDB312 Contract Administration

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

ENB371 Geotechnical Engineering 2
ENB373 Design and Construction of Steel Structures
ENB382 Estimating in Engineering Construction

Second Major/Minor unit

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

BEB801 Project 1
ENB471 Design of Concrete Structures and Foundations

Second Major/Minor unit
Second Major/Minor unit

Year 4 - Semester 2 (to be introduced in 2013)
BEB701 Work Integrated Learning 1
ENB481 Civil Engineering Project Management
Selective

Civil and Construction Engineering Selectives
BEB802 Project 2
ENB376 Transport Engineering

Year 4 - Semester 2 (to be introduced in 2013)
BEB801 Project 1
ENB373 Design and Construction of Steel Structures
ENB481 Civil Engineering Project Management
Selective

Potential Careers:
Civil Engineer, Construction Manager, Engineer, Project Manager.

UNIT SYNOPSIS

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; workplace, health and safety; professional conduct; ethical responsibility, and other aspects of your workplace 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-
Soil mechanics is a part of geotechnical engineering, 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

**Equivalents:** CEB209, CEB232

**Credit points:** 12  
**Contact hours:** 2 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

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**ENB273 CIVIL ENGINEERING**

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

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**ENB200 INTRODUCING SUSTAINABILITY**

This unit will enable you as a practicing 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

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**ENB270 ENGINEERING MECHANICS OF MATERIALS**

This unit introduces calculating the stress produced in various members of a structural system. It will be taken as the second of two 'project' units related to the same student project.

**Assumed knowledge:** ENB110

**Credit points:** 12  
**Contact hours:** 2 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2
ENB277 CONSTRUCTION ENGINEERING LAW
A study of the Workplace Health and Safety Act 1989/1990, the regulations applying and Codes of Practice. The application of this legislation to a Site Safety Management Plan. Basic understanding of negligence, duty of care, nuisance, fraud and conversion. Contract Law including elements of contract, content of a valid contract, collateral, contract misrepresentation, implied terms; formal requirements and part performance; contract documents and their interpretations; substantial performance and quantum meruit.
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

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 multi-modal 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

ENB381 CIVIL ENGINEERING CONSTRUCTION
Detailed studies of the methods and equipment employed in the execution of civil engineering construction. Includes earthworks, heavy foundations, steel fabrication and erection, bridge construction, marine construction, water retaining structures, road and airfield construction and mechanical erection.
Assumed knowledge: ENB275 is assumed knowledge. Credit points: 12 Contact hours: 4 per week Campus:
Gardens Point  

**ENB382 ESTIMATING IN ENGINEERING CONSTRUCTION**

The majority of the unit applies construction, planning, and commercial understanding previously developed to fundamental estimating skills suited to firm bidding. The conversion of an estimate to a tender, includes the review process, the determination of risk and profit and the drafting of a tender letter conclude the critical content. A comparison with sub-contract pricing and the use of Bills of Quantity is studied and is linked to conceptual estimating, preliminary estimates for budgets and proposals.

**Prerequisites:** ENB381  
**Assumed knowledge:** ENB271 and ENB273 are assumed knowledge.  
**Equivalents:** CEB513  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

**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

**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

**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

**UDB214 PROFESSIONAL STUDIES 2**

Assignment-based project orientated group work where you design and document a commercial development from a project management perspective considering constructability drawing on your skills in estimating; planning; scheduling; site organisation; environmental planning & sustainable urban development. Focus on special construction techniques; reuse of buildings and building materials; durability of materials, minimisation and disposal of construction waste; construction practice; planning and use of appropriate forms of construction for various building sizes and types; community negotiations; statutory responsibilities including access for people with a disability.  

**Prerequisites:** UDB112 or BEB200 or ENB200  
**Assumed knowledge:** UDB210 is assumed knowledge.  
**Credit points:** 12  
**Contact hours:** 3 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

**UDB312 CONTRACT ADMINISTRATION**

The administration of construction contracts represents one of the core applications for both construction managers and quantity surveyors. In order to appreciate some of the commercial implications of contract administration you will study administrative implications for both parties to the contract.

**Equivalents:** CNB302  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1