Bachelor of Engineering (Mechanical) (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 Gary Chadwick
Campus: Gardens Point

Why choose this course?
Mechanical Engineering at QUT has a well-established and highly regarded reputation for teaching and produces graduates who are highly sought after by industry.

Career outcomes
When you graduate from this degree you will have the opportunity to work in a number of fields, such as a process engineer, consulting engineer or a project engineer with an average starting salary of around $42,500.

Practical teaching
You will be exposed to ideas and experience of guest lecturers from the real world, industry professionals and academic staff with relevant industry experience.

Industry links
The course has close links with relevant local and overseas industries. Many of the teaching staff are involved in research with government and industry sectors, ensuring the program is relevant to industry and giving you the opportunity to work on real projects during your studies.

Course structure
You will receive a thorough grounding in the engineering sciences and hands-on practical experience in real-world problem solving and application of theory in a program that is strongly orientated towards industry.

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 Mechanical Engineering:
- technical and engineering activities.
- mathematics, science and technology.
- working with your hands.

Recommended Study
Chemistry, Maths C and Physics.

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

Second Major and Minors
You will have the opportunity to undertaken 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: http://www.bee.qut.edu.au/study/current/2majormin/ .

MECHANICAL ENGINEERING Second Major and Minor Options
Second Major:
Motor Racing Engineering (previously Automotive Engineering)
Engineering Management
Heavy Mechanical Engineering
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 (Mechanical) must complete 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 Engineering Systems - Phone +61 7 3138 1993, Fax +61 7 3138 1516, email: bee.enquiries@qut.com

### 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.

### 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.

### 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)**

<table>
<thead>
<tr>
<th>Course Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ENB211</td>
<td>Dynamics</td>
</tr>
<tr>
<td>ENB212</td>
<td>Strength of Materials</td>
</tr>
<tr>
<td>ENB231</td>
<td>Materials and Manufacturing 1</td>
</tr>
<tr>
<td>MAB127</td>
<td>Mathematics for Engineering 2</td>
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**OR**

<table>
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<tr>
<th>Course Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>MAB233</td>
<td>Engineering Mathematics 3</td>
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</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course Code</th>
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</thead>
<tbody>
<tr>
<td>ENB205</td>
<td>Electrical and Computer Engineering</td>
</tr>
<tr>
<td>ENB215</td>
<td>Fundamentals of Mechanical Design</td>
</tr>
<tr>
<td>ENB221</td>
<td>Fluid Mechanics</td>
</tr>
<tr>
<td>ENB331</td>
<td>Materials and Manufacturing 2</td>
</tr>
</tbody>
</table>

### Please note:

Students wishing to undertake CEED based Industry Project should consult the Subject Area Coordinator to provide a program for the final 2 years. CEED program requires that you undertake units BEB701, BEB801 and BEB802 together in either Semester 1 or 2.

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

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>ENB222</td>
<td>Thermodynamics 1</td>
</tr>
<tr>
<td>ENB311</td>
<td>Stress Analysis</td>
</tr>
<tr>
<td>ENB312</td>
<td>Dynamics of Machinery</td>
</tr>
<tr>
<td>ENB316</td>
<td>Design of Machine Elements</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course Code</th>
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</thead>
<tbody>
<tr>
<td>ENB313</td>
<td>Automatic Control</td>
</tr>
<tr>
<td>ENB317</td>
<td>Design and Maintenance of Machinery</td>
</tr>
<tr>
<td>ENB321</td>
<td>Fluids Dynamics</td>
</tr>
<tr>
<td>MAB233</td>
<td>Engineering Mathematics 3</td>
</tr>
<tr>
<td>OR</td>
<td>Selective</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEB801</td>
<td>Project 1</td>
</tr>
<tr>
<td>ENB421</td>
<td>Thermodynamics 2</td>
</tr>
<tr>
<td></td>
<td>Second Major/Minor unit</td>
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<tr>
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<td>Second Major/Minor unit</td>
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</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEB701</td>
<td>Work Integrated Learning 1</td>
</tr>
<tr>
<td>BEB802</td>
<td>Project 2</td>
</tr>
<tr>
<td></td>
<td>Second Major/Minor unit</td>
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<td></td>
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</tbody>
</table>

### Mechanical Engineering Selectives

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENB314</td>
<td>Industrial Noise and Vibration</td>
</tr>
<tr>
<td>ENB333</td>
<td>Operations Management</td>
</tr>
<tr>
<td>ENB336</td>
<td>Industrial Engineering</td>
</tr>
</tbody>
</table>
Course structure - Motor Racing Engineering 2nd major (commencing 2010 onwards)

<table>
<thead>
<tr>
<th>Year 1 - Semester 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENB100 Engineering and Sustainability</td>
</tr>
<tr>
<td>ENB110 Engineering Statics and Materials</td>
</tr>
<tr>
<td>ENB130 Mechanical and Thermal Energy</td>
</tr>
<tr>
<td>MAB125 Foundations of Engineering Mathematics OR MAB126 Mathematics for Engineering 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 2 - Semester 1 (to be introduced in 2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENB211 Dynamics</td>
</tr>
<tr>
<td>ENB212 Strength of Materials</td>
</tr>
<tr>
<td>ENB231 Materials and Manufacturing 1</td>
</tr>
<tr>
<td>MAB127 Mathematics for Engineering 2 OR MAB233 Engineering Mathematics 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 2 - Semester 2 (to be introduced in 2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENB205 Electrical and Computer Engineering</td>
</tr>
<tr>
<td>ENB215 Fundamentals of Mechanical Design</td>
</tr>
<tr>
<td>ENB221 Fluid Mechanics</td>
</tr>
<tr>
<td>ENB331 Materials and Manufacturing 2</td>
</tr>
</tbody>
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Please note:

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

| ENB222 Thermodynamics 1                               |
| ENB311 Stress Analysis                                |
| ENB312 Dynamics of Machinery                          |
| ENB316 Design of Machine Elements                    |

<table>
<thead>
<tr>
<th>Year 3 - Semester 2 (to be introduced in 2012)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENB313 Automatic Control</td>
</tr>
<tr>
<td>ENB317 Design and Maintenance of Machinery</td>
</tr>
<tr>
<td>ENB321 Fluids Dynamics</td>
</tr>
<tr>
<td>MAB233 Engineering Mathematics 3 OR Selective</td>
</tr>
</tbody>
</table>

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

| BEB801 Project 1                                      |
| ENB315 Motor Racing Vehicle Design                    |
| ENB421 Thermodynamics 2                               |
| ENB432 Engineering Asset Management and Maintenance   |

<table>
<thead>
<tr>
<th>Year 4 - Semester 2 (to be introduced in 2013)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEB701 Work Integrated Learning 1</td>
</tr>
<tr>
<td>BEB802 Project 2 OR Selective</td>
</tr>
</tbody>
</table>

Motor Racing Engineering Selectives

| ENB314 Industrial Noise and Vibration                  |
| ENB333 Operations Management                          |
| ENB339 Introduction to Robotics                        |
| ENB433 Plant and Process Design                        |
| ENB434 Tribology                                      |
| DNB202 Product Usability                               |

Course structure - Engineering Management 2nd major (commencing 2010 onwards)

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<th>Year 1 - Semester 1</th>
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<tbody>
<tr>
<td>ENB100 Engineering and Sustainability</td>
</tr>
<tr>
<td>ENB110 Engineering Statics and Materials</td>
</tr>
</tbody>
</table>
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 (to be introduced in 2011)  
ENB211  Dynamics  
ENB212  Strength of Materials  
ENB231  Materials and Manufacturing 1  
MAB127  Mathematics for Engineering 2  
OR  
MAB233  Engineering Mathematics 3  

Year 2 - Semester 2 (to be introduced in 2011)  
ENB205  Electrical and Computer Engineering  
ENB215  Fundamentals of Mechanical Design  
ENB221  Fluid Mechanics  
ENB331  Materials and Manufacturing 2  

Please note:  
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Year 3 - Semester 1 (to be introduced in 2012)  
ENB222  Thermodynamics 1  
ENB311  Stress Analysis  
ENB312  Dynamics of Machinery  
ENB316  Design of Machine Elements  

Year 3 - Semester 2 (to be introduced in 2012)  
ENB313  Automatic Control  
ENB317  Design and Maintenance of Machinery  
ENB321  Fluids Dynamics  
MAB233  Engineering Mathematics 3  

Course structure - Heavy Mechanical Engineering 2nd major (commencing 2010 onwards)  

Year 4 - Semester 1 (to be introduced in 2013)  
ENB336  Industrial Engineering  
ENB421  Thermodynamics 2  
ENB432  Engineering Asset Management and Maintenance  
Selective  

Year 4 - Semester 2 (to be introduced in 2013)  
BEB701  Work Integrated Learning 1  
BEB801  Project 1  
BEB802  Project 2  
ENB333  Operations Management  

Engineering Management Selectives  
Semester 1:  
ENB423  Heating, Ventilation and Air-Conditioning  
ENB435  Computer Integrated Manufacturing  
Any Business unit with permission from coordinator.  
Semester 2:  
ENB339  Introduction to Robotics  
ENB422  Energy Management  
ENB433  Plant and Process Design  
ENB434  Tribology  
Any Business unit with permission from coordinator.  

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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  

Course structure - Heavy Mechanical Engineering 2nd major (commencing 2010 onwards)  

Year 4 - Semester 1 (to be introduced in 2013)  
ENB336  Industrial Engineering  
ENB421  Thermodynamics 2  
ENB432  Engineering Asset Management and Maintenance  
Selective  

Year 4 - Semester 2 (to be introduced in 2013)  
BEB701  Work Integrated Learning 1  
BEB801  Project 1  
BEB802  Project 2  
ENB333  Operations Management  

Engineering Management Selectives  
Semester 1:  
ENB423  Heating, Ventilation and Air-Conditioning  
ENB435  Computer Integrated Manufacturing  
Any Business unit with permission from coordinator.  
Semester 2:  
ENB339  Introduction to Robotics  
ENB422  Energy Management  
ENB433  Plant and Process Design  
ENB434  Tribology  
Any Business unit with permission from coordinator.  

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Year 2 - Semester 1 (to be introduced in 2011)
ENB211  Dynamics
ENB212  Strength of Materials
ENB231  Materials and Manufacturing 1
MAB127  Mathematics for Engineering 2
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MAB233  Engineering Mathematics 3

Year 2 - Semester 2 (to be introduced in 2011)
ENB205  Electrical and Computer Engineering
ENB215  Fundamentals of Mechanical Design
ENB221  Fluid Mechanics
ENB331  Materials and Manufacturing 2

Please note:
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Year 3 - Semester 2 (to be introduced in 2012)
ENB313  Automatic Control
ENB314  Industrial Noise and Vibration
ENB317  Design and Maintenance of Machinery
ENB321  Fluids Dynamics

Year 4 - Semester 1 (to be introduced in 2013)
BEB801  Project 1
ENB421  Thermodynamics 2
ENB423  Heating, Ventilation and Air-Conditioning
MAB233  Engineering Mathematics 3
OR
Selective

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

BEB701  Work Integrated Learning 1
BEB802  Project 2
ENB433  Plant and Process Design
ENB434  Tribology

Heavy Mechanical Engineering Selectives

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

BEB701  Work Integrated Learning 1
BEB802  Project 2
ENB433  Plant and Process Design
ENB434  Tribology

Potential Careers:
Engineer, Mechanical 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

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:** 2011 SEM-1 and 2011 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 project unit. 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:** 3 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-1 and 2011 SEM-2

**DNB202 PRODUCT USABILITY**
The professional designer designs principally for others and not primarily by personal preference. Therefore an understanding of the breadth of physical and cognitive needs and capabilities of people is vital to the development of useable products. This unit provides the basis for a user-centred design philosophy built upon an understanding of people and their capabilities and knowledge and experience to integrate advanced human factors and usability concepts into the industrial design process. The content covered in this unit includes: anthropometrics; principles of physical and cognitive ergonomic requirements of special needs groups; human error; usability principles; usability evaluation methods and user testing techniques.

**Prerequisites:** DNB101  
**Equivalents:** ADB212  
**Credit points:** 12  
**Contact hours:** 3 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-2

**ENB100 ENGINEERING AND SUSTAINABILITY**
This unit introduces you to the professional skills and practices of engineers in the context of sustainable development.

**Antirequisites:** DEB100 and UDB100  
**Credit points:** 12  
**Contact hours:** 3 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-1 and 2011 SEM-2

**ENB110 ENGINEERING STATICS AND MATERIALS**
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-1 and 2011 SEM-2

**ENB120 ELECTRICAL ENERGY AND MEASUREMENTS**
This unit introduces you to basic electrical circuit concepts. It requires you to perform circuit analysis, circuit synthesis, and the measurement and testing of relevant quantities within circuits.  

**Credit points:** 12  
**Contact hours:** 3 per week  
**Campus:** Gardens Point  
**Teaching period:** 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

**ENB205 ELECTRICAL AND COMPUTER ENGINEERING**
This unit introduces single and three phase power, electrical machines, principles of transformers, electronic circuits and sensors, filters, operational amplifier applications. It also covers computing fundamentals, programming in MATLAB
and Excel using applications in electrical and computer engineering.

**Prerequisites:** ENB120 or ENB103  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-2

**ENB211 DYNAMICS**

Fundamental equations of particle kinetics; energy, power, impulse and momentum; kinematics of rigid bodies in plane motion, relative motion and motion relative to rotating axes; kinematics of rigid bodies, Basic machine components, (Gears, clutches, brakes etc.), Single degree of freedom system.

**Prerequisites:** (MAB126 or MAB180 or MAB131) and (ENB130 or PCB136 or PCB150)  
**Assumed knowledge:** ENB110 or ENB101 are assumed knowledge.  
**Equivalents:** MMB112  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-1

**ENB212 STRENGTH OF MATERIALS**

This unit introduces the analysis of stress and strain in simple engineering components and systems such as uniaxial and bending stresses, deflection of beams, torsion, thin walled structures, combined loading, yield criteria, and introduces the finite element method (FEA).

**Prerequisites:** ENB110 or ENB101 and ENB104  
**Credit points:** 12  
**Contact hours:** 5 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-1

**ENB215 FUNDAMENTALS OF MECHANICAL DESIGN**

Basic procedures of design, design for sustainability, universal design, Concept development, creative problem solving, Basic component design, computational scheme in design, manufacture & materials.

**Assumed knowledge:** MAB126 or MAB180 or MAB131, and ENB101 or ENB110, and ENB104 or ENB110 are assumed knowledge.  
**Equivalents:** MMB281  
**Credit points:** 12  
**Contact hours:** 5 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-2

**ENB221 FLUID MECHANICS**

This unit introduces the basic concepts of fluid mechanics and applies them to some simple engineering problems.

**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

**ENB222 THERMODYNAMICS 1**

Thermodynamic behaviour of substances; theory and application of the 1st and 2nd laws of thermodynamics; thermodynamic cycles, including gas cycles, vapour power cycles and refrigeration cycles; gas-vapour mixtures and the principles of air-conditioning; fuels and combustion.

**Assumed knowledge:** MAB127 or MAB182 or MAB132, and ENB130 or PCB136 are assumed knowledge.  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-2

**ENB231 MATERIALS AND MANUFACTURING 1**

Materials and their engineering applications, Manufacturing systems and technology, material properties and manufacturing, material selection, failure, graphical communication.

**Assumed knowledge:** ENB104 or ENB110 is assumed knowledge.  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-1

**ENB311 STRESS ANALYSIS**

Further analysis of stress and strain; torsion of prismatic sections and thin-walled sections; axisymmetric problems; energy methods; thin plates. Introduction to FEA including the use of a FEA software.

**Prerequisites:** ENB102 or ENB212  
**Equivalents:** MMB212  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-1

**ENB312 DYNAMICS OF MACHINERY**

Kinematic and dynamic analysis of planar linkages and mechanisms; multi-degree of freedom systems with steady and transient vibrations. Introduction to noise.

**Prerequisites:** ENB211  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-2

**ENB313 AUTOMATIC CONTROL**

This unit introduces you to the theory and practice of control systems engineering. The unit introduces system modelling principles for mechanical, electrical and electromechanical systems, using the Laplace transform to build transfer-function models of system components. The unit emphasizes the practical application of control theory to the analysis and design of feedback systems to ensure stability, reduce steady state errors and improve transient response.

**Prerequisites:** ENB211  
**Antirequisites:** ENB301  
**Assumed knowledge:** ENB312 is assumed knowledge.  
**Credit points:** 12  
**Contact hours:** 5 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-1

**ENB314 INDUSTRIAL NOISE AND VIBRATION**

The unit is about the study of noise and vibration measurement and control which is experienced in industry. It includes a basic understanding of the theories and capable of modelling and predicting noise and vibration in an industrial environment. This unit will provide you with sufficient experience in instrumentation and measurement of noise and vibration and to apply them in industry.

**Prerequisites:** ENB312  
**Assumed knowledge:** MAB127 or MAB132 or MAB182 are assumed knowledge.  
**Credit points:** 12  
**Contact hours:** 5 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-1
ENB315 MOTOR RACING VEHICLE DESIGN
After studying Fundamentals of Mechanical Design and Design of Machine Elements, in this unit you will study design of different systems of motor racing vehicles. This will accomplish systematic study of Mechanical Design and will enable you to carry out design of race vehicles and prepare them for a competition. Attention will be paid to styling and ergonomics as well as construction methods used in building race vehicles. The topics covered include: Introduction. Concept development of a race vehicle. Tyre selection. Suspension geometry, components and alignment. Brakes. Race car handling. Engine and engine tuning. Drive train (gearing and differentials). Frame and body. External and internal aerodynamics of a race vehicle. Driver compartment (fitting and comfort). Testing and preparation for a competition. Safety in motor racing (accident avoidance and driver protection).
Prerequisites: ENB316 Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2011 SEM-1

ENB316 DESIGN OF MACHINE ELEMENTS
Analysis of operating conditions and their impact on design solutions, design of fasteners, shafts and other mechanical components, design of springs, Design for manufacturability, fundamentals of lubrication, computer aided design (solid modelling), frames and housings.
Prerequisites: ENB215 Equivalents: MMB381 Credit points: 12 Contact hours: 6 per week Campus: Gardens Point Teaching period: 2011 SEM-1

ENB317 DESIGN AND MAINTENANCE OF MACHINERY
Design of equipment for special applications such as pressure vessel, food processing, Design of machine system, Optimisation of design, machinery failure, prediction, analysis and prevention. Design for reliability application of FMEA, Condition monitoring, ethics, Fundamentals of friction, wear related to design, Failure analysis & OH&S.
Prerequisites: ENB316 Equivalents: MMB382 Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2011 SEM-2

ENB321 FLUIDS DYNAMICS
Hydraulic and pneumatic systems; design, analysis and performance of pumps, turbines and fluid couplings; unsteady pipe flow; flow around solid bodies, including potential flow and boundary layers; compressible flow and shock waves.
Prerequisites: ENB201 or ENB221 Equivalents: MMB352 Credit points: 12 Contact hours: 4 per week

Campus: Gardens Point Teaching period: 2011 SEM-2

ENB331 MATERIALS AND MANUFACTURING 2
ENB331 is a third year unit which extends the formative body of knowledge gained in ENB231 and introduces the shear deformation mechanisms of engineering material and how these properties can be used to understand the mechanics of metal cutting. Descriptive and analytical information about different material removal processes is provided to the student through lectures, tutorials and case studies. The unit also provides the student with an excellent opportunity to apply the knowledge in the design and manufacture of a component.
Prerequisites: ENB231 Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2011 SEM-2

ENB333 OPERATIONS MANAGEMENT
This unit develops students’ ability in applying quantitative techniques in solving different types of industrial operations problems. Topics include: product mix, assignment and transportation models; location and layout decisions, job design analysis; project planning; quality control and the use of simulation in operations management.
Equivalents: MMB476 Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2011 SEM-1

ENB336 INDUSTRIAL ENGINEERING
Aim of this unit is to develop skills and understanding the concepts and techniques of lean manufacturing (methods engineering). These includes identifying wastes using Value Stream Mapping (VSM), 5S, SMED, JIT, plant layout, cell design with proper material handling and balance and job design with due consideration to ergonomics.
Assumed knowledge: MAB233 is assumed knowledge.
Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2011 SEM-2

ENB339 INTRODUCTION TO ROBOTICS
This unit introduces you to the components, systems and mathematical foundations of robotics. The unit introduces the technologies and methods used in the design and programming of modern intelligent robots, and encourages critical thinking about the use of robotic technologies in various applications. The unit emphasizes the practical application of robotic theory to the design and synthesis of robotic systems that respond accurately and repeatably.
Assumed knowledge: ENB201 or ENB221 and ENB222 are assumed knowledge.
Equivalents: MMB451 Credit points: 12 Contact hours: 5 per week Campus: Gardens Point Teaching period: 2011 SEM-2

ENB421 THERMODYNAMICS 2
Applications of heat transfer theory in steam power plant, refrigeration and gas turbines; steady state and transient conduction; convection with internal or external flow; free convection in stationary fluids; boiling and condensation; thermal resistance networks; heat exchangers; radiation heat transfer.

Prerequisites: ENB222 and ENB321
Equivalents: MMB351
Credit points: 12
Contact hours: 4 per week
Campus: Gardens Point
Teaching period: 2011 SEM-1

ENB422 ENERGY MANAGEMENT
Topics covered in this unit include: Global energy and climate issues, the systematic process by which energy use is monitored and analysed; individual treatment of electricity, fuels and their properties, compressed air, buildings, cycle requirements, energy recovery equipment; financial analysis of proposals. Environmental aspects will be considered for each topic.

Assumed knowledge: ENB201 or ENB221 and ENB222 are assumed knowledge.
Equivalents: MMB451
Credit points: 12
Contact hours: 3 per week
Campus: Gardens Point
Teaching period: 2011 SEM-2

ENB423 HEATING, VENTILATION AND AIR-CONDITIONING
Heating, Ventilation and Air Conditioning (HVAC) is closely related to human habitation, comfort and productivity. It also consumes considerable amount of energy. With increasing global warming, it is becoming one of the most important engineering systems in modern buildings.

This unit will introduce you basic principles of HVAC and refrigeration systems. It will discuss the design factors and practices related to the design and operation of HVAC systems. It will also provide you with other relevant knowledge commonly used in the building services industry. This course should therefore provide you a good basis to undertake further study, research and professional work in this field.

Prerequisites: ENB201 or ENB221 or ENB222
Credit points: 12
Contact hours: 3 per week
Campus: Gardens Point
Teaching period: 2011 SEM-2

ENB433 PLANT AND PROCESS DESIGN
The unit is of great assistance to graduates who will work in one of the many industry where Mechanical Engineers are concerned with Plant and Process Design. These industries use heat exchangers, piping systems and cooling towers intensively. This would include power stations, mineral processing, sugar/processing and refinery/chemical industries. The unit is taught by university and industry specialists who have considerable experience in their chosen field.

Credit points: 12
Contact hours: 4 per week
Campus: Gardens Point
Teaching period: 2011 SEM-2

ENB434 TRIBOLOGY
Tribology is the study of friction, wear and lubrication. In this unit, the knowledge you acquire is applied to solve problems prevalent in engineering. Topics covered range from the theory of friction, lubricant properties and chemistry, to the control of friction and wear by proper selection of both materials and lubricants.

Prerequisites: ENB201 or ENB221
Credit points: 12
Contact hours: 4 per week
Campus: Gardens Point
Teaching period: 2011 SEM-2

ENB435 COMPUTER INTEGRATED MANUFACTURING
Topics covered in this unit include: introduction of the concepts of strategic planning for computer integrated manufacturing; concepts of advanced manufacturing technologies and the various components of computer integrated manufacturing system; the importance of concurrent engineering in the context of CIM; introduction to the principles of modelling and simulation techniques as a design and evaluation tool for manufacturing systems.

Assumed knowledge: ENB231 and MAB233 are assumed knowledge.
Equivalents: MMB471
Credit points: 12
Contact hours: 4 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.

Antirequisites: 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.

**Antirequisites:** 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