Bachelor of Engineering (Medical) (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
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

Recommended Study
Chemistry, Maths C and Physics.

Career Outcomes
Graduates from this degree may expect to find employment
in hospitals as advisors to health and medical professionals,
in firms concerned with the design, manufacture, supply and
maintenance of medical, health and sporting equipment,
occupational health agencies and in research institutions. In
the early stages of their careers biomedical engineers might
expect to be involved in the innovative use of technology, in
the design of new devices and the assessment of
appropriate engineering solutions to medical problems. More experienced biomedical engineers manage
Biomedical Engineering Departments in hospitals and
manufacturing companies and lead teams of engineers and
technologists in the development of engineering solutions to
improve health care.

Overview
This degree integrates physical, chemical, mathematical,
and computational sciences and engineering principles to
study human biology, medicine, human behaviour and
health. It will provide you with the skills to design,
manufacture, install, monitor and maintain medical and
surgical equipment and to provide advice on engineering
matters to medical and allied staff. Current issues such as
total quality management and health legislation are also
covered. In the final year, students undertake a design
project in the biomedical field.

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

Special Course Requirements
Students must obtain at least 60 days of industrial
employment in an engineering environment as part of the
Work Integrated Learning unit. Half of this experience must
be in an industry related to Biomedical Engineering.

Minors
For professional recognition you will undertake an
applications minor which consists of a workplace intergrated
learning unit, a project unit and two specialised engineering
units.

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

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

Find out more on deferment.

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

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

Year 2 - Semester 1 (to be introduced in 2011)
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
LSB255  Human Anatomy

Year 3 - Semester 1 (to be introduced in 2012)
ENB222  Thermodynamics 1
ENB311  Stress Analysis
ENB319  Biomechanical Engineering Design
LSB451  Human Physiology

Year 3 - Semester 2 (to be introduced in 2012)
ENB313  Automatic Control
ENB322  Biofluids
ENB338  Biomaterials
MAB233  Engineering Mathematics 3
OR
Selective

Year 4 - Semester 1 (to be introduced in 2013)
BEB701  Work Integrated Learning 1
BEB801  Project 1
ENB318  Biomechanical Engineering Systems
Selective

Year 4 - Semester 2 (to be introduced in 2013)
BEB802  Project 2
ENB335  Modelling and Simulation For Medical Engineers
ENB437  Health Legislation in the Medical Environment
PCB605  Biomedical Instrumentation

Medical Engineering Selectives
BSB115  Management
HMB384  Injury Prevention and Rehabilitation
MAB220  Computational Mathematics 1
MAB422  Mathematical Modelling
PCB593  Digital Image Processing
PCN112  Medical Imaging Science
PCN211  Physics of Medical Imaging
PUB112  Workplace Health and Safety
PYB012  Psychology
SCB384  Forensic Sciences - From Crime Scene to Court

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

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

Year 2 - Semester 2 (to be introduced in 2011)
ENB150  Introducing Engineering Design
ENB200  Introducing Sustainability
ENB221  Fluid Mechanics
LSB255  Human Anatomy

Year 3 - Semester 1 (to be introduced in 2012)
ENB205  Electrical and Computer Engineering
ENB215  Fundamentals of Mechanical Design
ENB221  Fluid Mechanics
LSB255  Human Anatomy

Year 3 - Semester 2 (to be introduced in 2012)
ENB205  Electrical and Computer Engineering
ENB215  Fundamentals of Mechanical Design
ENB322  Biofluids
ENB338  Biomaterials

Year 4 - Semester 1 (to be introduced in 2013)
ENB319  Biomechanical Engineering Design
MAB233  Engineering Mathematics 3

Year 4 - Semester 2 (to be introduced in 2013)
BEB701  Work Integrated Learning 1
BEB801  Project 1
ENB318  Biomechanical Engineering Systems
Selective

Medical Engineering Selectives
BSB115  Management
HMB384  Injury Prevention and Rehabilitation
MAB220  Computational Mathematics 1
Year 4 - Semester 2 (to be introduced in 2013)
- ENB313 Automatic Control
- ENB335 Modelling and Simulation For Medical Engineers
- ENB437 Health Legislation in the Medical Environment
- PCB605 Biomedical Instrumentation

Year 5 - Semester 1 (to be introduced in 2014)
- BEB701 Work Integrated Learning 1
- BEB801 Project 1
- BEB802 Project 2
- ENB318 Biomechanical Engineering Systems

Medical Engineering Selectives
- BSB115 Management
- HMB384 Injury Prevention and Rehabilitation
- MAB220 Computational Mathematics 1
- MAB422 Mathematical Modelling
- PCB593 Digital Image Processing
- PCN112 Medical Imaging Science
- PCN211 Physics of Medical Imaging
- PUB112 Workplace Health and Safety
- PYB012 Psychology
- SCB384 Forensic Sciences - From Crime Scene to Court

Full-time Course structure - Commencing February 2009

Year 1 - Semester 1
- BEB100 Introducing Professional Learning
- ENB101 Engineering Mechanics 1
- ENB104 Engineering Materials
- MAB131 Engineering Mathematics 1A
- MAB180 Engineering Mathematics 1B
- OR

Year 1 - Semester 2
- ENB102 Engineering Mechanics 2
- ENB103 Electrical Engineering
- MAB132 Engineering Mathematics 2A

Published on : 16 May 2011
Year 1 - Semester 1
ENB101  Engineering Mechanics 1
LSB131  Anatomy
MAB131  Engineering Mathematics 1A
OR
MAB180  Engineering Mathematics 1B
PCB136  Engineering Physics 1C

Year 1 - Semester 2
ENB102  Engineering Mechanics 2
ENB103  Electrical Engineering
ENB104  Engineering Materials
MAB132  Engineering Mathematics 2A
OR
MAB182  Engineering Mathematics 2B

Year 2 - Semester 1
BEB100  Introducing Professional Learning
ENB211  Dynamics
ENB231  Materials and Manufacturing 1
LSB451  Human Physiology

Year 2 - Semester 2
BEB200  Introducing Sustainability
ENB201  Fluid Mechanics
ENB215  Fundamentals of Mechanical Design
ENB222  Thermodynamics 1

Year 3 - Semester 1
ENB105  Electrical and Computer Engineering
ENB311  Stress Analysis
ENB319  Biomechanical Engineering Design
MAB233  Engineering Mathematics 3

Year 3 - Semester 2
ENB318  Biomechanical Engineering Systems
ENB322  Biofluids
ENB338  Biomaterials
ENB437  Health Legislation in the Medical Environment

Year 4 - Semester 1
BEB801  Project 1
ENB301  Instrumentation and Control
ENB432  Engineering Asset Management and Maintenance Applications Minor Selective

Year 4 - Semester 2
BEB701  Work Integrated Learning 1
BEB802  Project 2
ENB335  Modelling and Simulation For Medical Engineers
PCB605  Biomedical Instrumentation

Applications Minor Selectives
BSB115  Management
MAB220  Computational Mathematics 1
HMB384  Injury Prevention and Rehabilitation
MAB422  Mathematical Modelling
PCB593  Digital Image Processing
PCN112  Medical Imaging Science
PCN211  Physics of Medical Imaging
PUB112  Workplace Health and Safety
PYB012  Psychology
SCB384  Forensic Sciences - From Crime Scene to Court

Year 4 - Semester 2
BEH801  Project 1
BEB802  Project 2
ENB335  Modelling and Simulation For Medical Engineers
PCB605  Biomedical Instrumentation

Applications Minor Selectives
BSB115  Management
MAB220  Computational Mathematics 1
HMB384  Injury Prevention and Rehabilitation
MAB422  Mathematical Modelling
PCB593  Digital Image Processing
PCN112  Medical Imaging Science
PCN211  Physics of Medical Imaging
PUB112  Workplace Health and Safety
PYB012  Psychology
SCB384  Forensic Sciences - From Crime Scene to Court

Full-time Course structure - Commencing February 2007 & 2008

Year 1 - Semester 1
ENB101  Engineering Mechanics 1
LSB131  Anatomy
MAB131  Engineering Mathematics 1A
OR
MAB180  Engineering Mathematics 1B
PCB136  Engineering Physics 1C

Year 1 - Semester 2
ENB102  Engineering Mechanics 2
ENB103  Electrical Engineering
ENB104  Engineering Materials
MAB132  Engineering Mathematics 2A
OR
MAB182  Engineering Mathematics 2B

Year 2 - Semester 1
BEH100  Introducing Professional Learning
ENB211  Dynamics
ENB231  Materials and Manufacturing 1
LSB451  Human Physiology

Year 2 - Semester 2
BEH200  Introducing Sustainability
ENB201  Fluid Mechanics
ENB215  Fundamentals of Mechanical Design
ENB222  Thermodynamics 1

Year 3 - Semester 1
ENB105  Electrical and Computer Engineering
ENB311  Stress Analysis
ENB319  Biomechanical Engineering Design
MAB233  Engineering Mathematics 3

Year 3 - Semester 2
ENB318  Biomechanical Engineering Systems
ENB322  Biofluids
ENB338  Biomaterials
ENB437  Health Legislation in the Medical Environment

Year 4 - Semester 1
BEH801  Project 1
ENB301  Instrumentation and Control
ENB432  Engineering Asset Management and Maintenance Applications Minor Selective

Year 4 - Semester 2
BEH701  Work Integrated Learning 1
BEH802  Project 2
ENB335  Modelling and Simulation For Medical Engineers
PCB605  Biomedical Instrumentation

Applications Minor Selectives
BSB115  Management
MAB220  Computational Mathematics 1
HMB384  Injury Prevention and Rehabilitation
MAB422  Mathematical Modelling
PCB593  Digital Image Processing
PCN112  Medical Imaging Science
PCN211  Physics of Medical Imaging
PUB112  Workplace Health and Safety
PYB012  Psychology
SCB384  Forensic Sciences - From Crime Scene to Court

Full-time Course structure - Commencing February 2006

Year 1 - Semester 1
ENB101  Engineering Mechanics 1
LSB142  Human Anatomy and Physiology
MAB131  Engineering Mathematics 1A
OR
MAB180  Engineering Mathematics 1
PCB136  Engineering Physics 1C

Year 1 - Semester 2
Published on : 16 May 2011
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BEB100  Introducing Professional Learning
ENB103  Electrical Engineering
ENB104  Engineering Materials
MAB132  Engineering Mathematics 1B
OR
MAB182  Engineering Mathematics 2B

Year 2 - Semester 1
ENB211  Dynamics
ENB231  Materials and Manufacturing 1
HMB274  Functional Anatomy
MMB211  Mechanics 1

Year 2 - Semester 2
BEB200  Introducing Sustainability
ENB201  Fluid Mechanics
ENB215  Fundamentals of Mechanical Design
ENB222  Thermodynamics 1

Year 3 - Semester 1
ENB105  Electrical and Computer Engineering
ENB311  Stress Analysis
ENB319  Biomechanical Engineering Design
MAB233  Engineering Mathematics 3

Year 3 - Semester 2
ENB318  Biomechanical Engineering Systems
ENB322  Biofluids
ENB335  Modelling and Simulation For Medical Engineers
ENB338  Biomaterials

Year 4 - Semester 1
BEB801  Project 1
ENB301  Instrumentation and Control
ENB432  Engineering Asset Management and Maintenance
Applications Minor Selective

Year 4 - Semester 2
BEB701  Work Integrated Learning 1
BEB802  Project 2
ENB437  Health Legislation in the Medical Environment
PCB605  Biomedical Instrumentation
Applications Minor Selectives

BSB115  Management
MAB220  Computational Mathematics 1
HMB384  Injury Prevention and Rehabilitation
MAB422  Mathematical Modelling
PCB593  Digital Image Processing
PCN112  Medical Imaging Science
PCN211  Physics of Medical Imaging
PUB112  Workplace Health and Safety
PYB012  Psychology
SCB384  Forensic Sciences - From Crime Scene to Court

Potential Careers:
Biomechanical Engineer, Biomedical Engineer, Engineer, Mechanical Engineer.

UNIT SYNOPTES

BEB100 INTRODUCING PROFESSIONAL LEARNING
This unit will introduce students to a range of skills and knowledge sets required to support professional practice in design, engineering and urban development disciplines. It will include information literacy and communication skills and knowledge development. In addition, the unit will provide orientation to design, engineering and urban development professions through an introduction to their history, their place in society, the importance of ethical conduct to their practice and to the particular qualities of professional knowledge especially with regard to practice knowledge. The importance of integrated scholarship and collaborative links with other professions will be highlighted.
Equivalents: BNB007, CNB190, PSB414  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point

BEB200 INTRODUCING SUSTAINABILITY
This unit will address issues of sustainability from a number of perspectives thus providing students with a variety of lenses on the ways in which the human-made environment impacts on the future of human settlement. The unit will include an introduction to sustainability from a variety of perspectives, including indigenous and other cultural perspectives, and from ecological, economic and technological perspectives. It will demonstrate to students the ways in which contrasting, and sometimes conflicting, ideas about sustainability are prioritised and how these priorities contribute to the impact that design, engineering and urban development professions have on a sustainable future.
Equivalents: PSB422  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point
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 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-requisite to the second unit (or a follow-on from the first unit). The final 'deliverable' for this unit may vary for each discipline and details will be provided in lectures/tutorials and on the Blackboard website.

Equivalents: CEB411, CEB420, CNB434, EEB781-1, EEB889-1 Credit points: 12 Contact hours: 2 per week Campus: Gardens Point Teaching period: 2010 SEM-1 and 2010 SEM-2

BEB802 PROJECT 2
This unit is usually taken in the final year of study, and is only taken by students completing a two unit project. Students complete an individual project involving the application of skills and knowledge attained during the earlier years of their degree program. This unit will be taken as the second of two 'project' units related to the same student project.

Equivalents: CEB415, EEB782-2, EEB889-2 Credit points: 12 Contact hours: 2 Campus: Gardens Point Teaching period: 2010 SEM-1 and 2010 SEM-2

BSB115 MANAGEMENT
The unit provides an introduction to the theories and practice of management and organisations. Emphasis is on the conceptual and people skills that are needed in all areas of management and in all areas of organisational life. The unit acknowledges that organisations exist in an increasingly international environment where the emphasis will be on knowledge, the ability to learn, to change and to innovate. Organisations are viewed from individual, group, corporate and external environmental perspectives.

Antirequisites: BSD115 Equivalents: CTB115 Credit points: 12 Contact hours: 3 per week Campus: Gardens Point and Caboolture Teaching period: 2010 SEM-1, 2010 SEM-2 and 2010 SUM

ENB101 ENGINEERING MECHANICS 1
Introduction to statics, forces, moments and couples; resolution and resultant of forces acting on a particle or rigid body; equilibrium of particle or rigid body under forces and/or moments; analytical methods for plane truss analysis; shear force and bending moment in beams; the properties of sections. Dynamics (for electrical engineering students).

Equivalents: CEB109 Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2010 SEM-1

ENB102 ENGINEERING MECHANICS 2
Free body diagram, Stresses in beams and bars, Moments, shear and deflections in beams and frames, Torsion in shafts, Stress transformation and buckling. Module 2: (Mech): Thin walled structures, combined loading of structures and machine members; yield criteria for safe elastic loading.

Prerequisites: ENB101 or ENB110 Equivalents: CEB110 Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2010 SEM-2

ENB103 ELECTRICAL ENGINEERING
Fundamental quantities in circuits and network laws, response to sinusoidal sources, and circuit measurements, real and reactive power calculation, power factor improvement, electric and magnetic fields, three-phase system and applications, transformer theory.

Prerequisites: MAB126 or MAB131 or MAB180 Equivalents: EEB213 Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2010 SEM-2

ENB104 ENGINEERING MATERIALS
Atomic Bonding; Crystal Structure; Elastic Deformation; Elasticity Case Study; Plastic Deformation; Defects; Alloying and Strengthening in Metals; Diffusion; Fracture, Fatigue and Creep; Phase and Phase Diagrams; Iron-Carbon Phase Diagram; Transformation of Phases; Introductory to Corrosion; Ceramics, Polymers and Composite Materials, Electronic Materials.

Equivalents: MMB131 Credit points: 12 Contact hours: 5 per week Campus: Gardens Point Teaching period: 2010 SEM-1
ENB105 ELECTRICAL AND COMPUTER ENGINEERING
Module 1: Introductory Computing fundamentals of problem solving using computers and programming and techniques for writing correct and efficient programs. MATLAB and its applications.
Module 2: Electrical machines and their characteristics, principles of transformers basic electronic circuits, filters, PLC and operational amplifier circuits and applications.
Prerequisites: ENB103 Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2010 SEM-1

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

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

ENB201 FLUID MECHANICS
Fluid properties, behaviour of stationary and moving fluids, hydraulics and buoyancy; theory and application of the energy and momentum equations; pipe and open channel flow; dimensional analysis and pump performance characteristics.
Assumed knowledge: MAB126 or MAB180 or MAB131, and ENB101 or ENB110 are assumed knowledge.
Equivalents: CEB217 Credit points: 12 Contact hours: 4 Campus: Gardens Point Teaching period: 2010 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

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; kinetics 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: 2010 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

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: 2010 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

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: 2010 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:** 2010 SEM-1

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**ENB301 INSTRUMENTATION AND CONTROL**

The unit introduces the student to classical control systems, analysis and synthesis, and implementation in an industrial control context. It introduces the principles of electrical measurements and instrumentation, sensors, PLC, DSC and industrial networks, and foundation of feedback control theory for engineers.

**Prerequisites:** MAB126 or MAB182 or MAB132  
**Assumed knowledge:** ENB105 or ENB205 or ENB243 are assumed knowledge.  
**Credit points:** 12  
**Contact hours:** 5 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

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**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:** 2010 SEM-1

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**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

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**ENB318 BIOMECHANICAL ENGINEERING SYSTEMS**

Topics covered in this unit include an appreciation of the mechanics of the tissues of the joints (micro mechanics or tissue mechanics) and the function of the body during normal activities (macro-mechanics or biomechanics). This unit is designed to develop an understanding of the complex properties of the individual tissues and practical competencies in the evaluation of human function and performance from a biomechanical perspective. Biomedical engineers require the ability to analyse the mechanics of the human body for applications such as prosthetic design (both artificial limbs and replacement joints), design of assistive devices for people with disabilities, sporting performance, ergonomic tasks, and other health related areas.

**Prerequisites:** ENB211  
**Assumed knowledge:** LSB131 and LSB451 are assumed knowledge.  
**Equivalents:** MMB391  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

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**ENB319 BIOMECHANICAL ENGINEERING DESIGN**

This unit is structured to further develop the engineering design skills of students, with particular emphasis on the role of computer-aided design (CAD), materials selection, manufacturing processes, assembly and maintenance in the design and management of bio-engineering devices. A knowledge of manufacturing processes, fundamentals of engineering design, engineering drawing and engineering materials is assumed. Contents include design for manufacture, materials selection, computer-aided design and solid modelling, rapid prototyping techniques, user interface, and case studies of selected medical devices.

**Prerequisites:** ENB215  
**Equivalents:** MMB392  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

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**ENB322 BIOFLUIDS**

The mechanics of fluids in biological and biomedical systems differs from industrial applications as most of the fluids encountered exhibit viscosity that changes in a non-linear manner with shear rate. It is therefore necessary, when designing a second course in the mechanics of fluids for medical engineers, to examine the particular properties of the fluids that might be encountered and to introduce techniques to analyse their behaviour. It is also important to consider how the properties of the fluids relate to their biological function and the relevance of their properties to the design of associated equipment.

**Prerequisites:** ENB201 or ENB221  
**Equivalents:** MMB362  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

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**ENB335 MODELLING AND SIMULATION FOR MEDICAL ENGINEERS**

Traditional experimentation techniques can often not be applied to investigate the mechanics of biological systems. Medical engineers are often then required to use modelling and simulation techniques to understand the behaviour of biomechanical components and/or systems. This unit introduces you to some of the fundamental principles of modelling and simulation techniques and their applications in Biomedical Engineering.

**Prerequisites:** ENB318  
**Equivalents:** MMB496  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

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**ENB338 BIOMATERIALS**
Topics covered in this unit include: an understanding of the relationships between the properties, failure mechanisms, processing and microstructures of various materials used for medical applications and their interaction with human tissues; an understanding of the fundamentals of the use of materials in a medical environment and an understanding of the fundamentals of materials properties and processing; consideration of metallic, ceramic, polymeric implant materials; composites as biomaterials; structure-property relationships of biomaterials; tissue response to implants; soft tissue replacements; hard tissue replacements.

Assumed knowledge: LSB131, LSB451 and ENB231 are assumed knowledge. Equivalents: MMB292 Credit points: 12 Contact hours: 4 per week Campus: Kelvin Grove Teaching period: 2010 SEM-1

Contact hours: 4 per week Campus: Kelvin Grove Teaching period: 2010 SEM-1

HMB384 INJURY PREVENTION AND REHABILITATION
This unit considers the following: epidemiology and nature of common injuries that occur at home, school, work and during sporting activities; current philosophies of preventative measures and strategies for the treatment and rehabilitation of injuries; the role of health training, exercise and fitness in injury prevention, treatment and rehabilitation regimes; the pathology of injuries and repair processes highlighted by examining specific examples.

Prerequisites: HMB274 Credit points: 12 Contact hours: 3 per week Campus: Kelvin Grove Teaching period: 2010 SEM-1

LSB131 ANATOMY
This unit includes basic concepts of anatomy: an overview of the structure of cells, body tissues, and body systems; aspects of surface anatomy which are relevant to human movement; musculoskeletal systems.

Antirequisites: LSB142, LSB182, LSB258 Equivalents: LSB145 Credit points: 12 Contact hours: 5 per week Campus: Kelvin Grove Teaching period: 2010 SEM-1

HMB274 FUNCTIONAL ANATOMY
This unit includes the following: surface anatomy of the trunk and upper and lower limb; morphological and mechanical properties of bone, muscle-tendon units with implications for physical activity; joint structure and function; analyses of movement tasks including walking and running; cinematography and electromyography in functional anatomy of movement tasks.

Prerequisites: LSB131 or LSB255 Credit points: 12
MAB127 MATHEMATICS FOR ENGINEERING 2
This unit extends the areas of function, calculus, matrices and vectors introduced in MAB125 by introducing functions of more than one variable, partial derivatives and multiple integrals, vector valued functions, and matrix methods for the solution of systems of ordinary differential equations. Each of these topics is realised by contextualised engineering related 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: 2006 SEM-1, 2010 SEM-2 and 2010 SUM

MAB131 ENGINEERING MATHEMATICS 1A
This unit includes the following: sine and cosine functions; logarithmic functions; exponential functions; revision of complex numbers; determinants; vector algebra in 2 and 3 dimensions; derivatives and their applications; differentiation; chain rule; higher derivatives; integrals and their applications.
Prerequisite(s): At least SA in both Senior Mathematics B and Senior Mathematics C or MAB100
Contact hours: 4 per week
Campus: Gardens Point
Teaching period: 2006 SEM-1 and 2006 SEM-2
Incompatible with: MAB180

MAB131 ENGINEERING MATHEMATICS 1A
This unit includes the following: trigonometry, complex numbers, differentiation with applications, integration with applications, matrices, linear systems and vector algebra. Students must have completed at least four semesters of both Senior Mathematics B and C with an exit level of Sound Achievement (or equivalent).
Prerequisite(s): At least SA in both Senior Mathematics B and Senior Mathematics C or MAB100
Contact points: 12
Contact hours: 4 per week
Campus: Gardens Point
Teaching period: 2009 SEM-1
Incompatible with: MAB180

MAB132 ENGINEERING MATHEMATICS 1B
This unit includes: sine and cosine functions; logarithmic functions; exponential functions; complex numbers; determinants; vector algebra in 2 and 3 dimensions; derivatives and their applications (differentiation, chain rule, higher derivatives); integrals and their applications. Students must have completed four semesters of Senior Mathematics B with an exit level of Sound Achievement, or have passed MAB105 (or equivalent). Incompatible with MAB131. Students with an exit level of High Achievement or better in Senior Mathematics C are advised to take MAB131.
Prerequisite(s): At least SA in Senior Mathematics B (four semesters) or equivalent or MAB105
Contact hours: 4 per week
Campus: Gardens Point
Teaching period: 2009 SEM-1 and 2009 SEM-2
Incompatible with: MAB131, HA in Senior Mathematics C

MAB180 ENGINEERING MATHEMATICS 1
This unit includes: sine and cosine functions; logarithmic functions; exponential functions; complex numbers; determinants; vector algebra in 2 and 3 dimensions; derivatives and their applications (differentiation, chain rule, higher derivatives); integrals and their applications.
Prerequisite(s): At least SA in Senior Mathematics B (four semesters) or equivalent or MAB105
Contact hours: 4 per week
Campus: Gardens Point
Teaching period: 2006 SEM-1 and 2006 SEM-2
Incompatible with: MAB131, HA in Senior Mathematics C

MAB182 ENGINEERING MATHEMATICS 2B
Prerequisite(s): MAB180
Contact hours: 4 per week
Campus: Gardens Point
Teaching
period: 2009 SEM-1, 2009 SEM-2 and 2009 SUM
Incompatible with: MAB112, MAB132

MAB182 ENGINEERING MATHEMATICS 2B

Prerequisite(s): MAB180  Contact hours: 4 per week
Campus: Gardens Point  Teaching period: 2006 SEM-2 and 2006 SUMMER  Incompatible with: MAB112, MAB132

MAB220 COMPUTATIONAL MATHEMATICS 1
This unit includes: sources of error; computer arithmetic; solution of nonlinear equations in one variable; solution of systems of linear equations; interpolation; finite differences; numerical differentiation and integration; solution of first order linear differential equations; MATLAB programming. Students without an exit level of Sound Achievement in four semesters of Senior Mathematics C need to be concurrently enrolled in MAB100 if not completed earlier.

Assumed knowledge: Grade of at least Sound Achievement in Senior Mathematics B (or equivalent) or MAB105 and corequisite MAB120 or MAB125 or MAB100 or MAB180 if you don't have Senior Mathematics C is assumed knowledge Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1 and 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

MAB422 MATHEMATICAL MODELLING
This unit includes models developed with the "real world" description. These models are taken from the areas of cancer research, population growth and engineering. Emphasis is on mathematical modelling and not on the development of new mathematical content.

Prerequisites: MAB121  Antirequisites: MAN422
Assumed knowledge: MAB220 is recommended for prior/concurrent study for exposure to MATLAB  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2010 SEM-2

MMB211 MECHANICS 1
All engineering designs must possess an appropriate/adequate degree of stability before they can be considered safe and reliable in service. Mechanics 1 provides a synthesis of knowledge from the general principles of mechanics and demonstrates how these can be used to ensure design integrity and design assessment. The unit introduces students to the theory of elasticity and elastic parameters such as stress and strain; analysis and design of pressurised thin walled cylinders and spheres; deflection of beams; direct and shear stresses during beam bending; buckling of columns; combined loading of structures and machine members; yield criteria for safe elastic loading.

Prerequisite(s): MAB132, CEB109  Credit points: 12  Contact hours: 5 per week  Campus: Gardens Point  Teaching period: 2006 SEM-1

PCB136 ENGINEERING PHYSICS 1C
This introductory unit covers: dynamics (motion in 1D, vectors, Newton's Laws, motion in 2D (including circular motion), uniform circular motion, work, energy and power potential energy and conservation of energy, linear momentum and collisions); waves (oscillatory motion, wave motion, sound waves, superposition and standing waves); geometrical optics (reflection, refraction, dispersion, Huygen's principle, image formation by mirrors and lenses, optical instruments); physical optics (interference of light, diffraction); thermal physics (temperature, thermometry,弹性参数应力和应变；分析和设计受压薄壁圆柱和球体；弯曲柱的屈曲；组合加载的结构和机器成员；安全弹性加载的条件。

Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2009 SEM-1 and 2009 SEM-2

PCB136 ENGINEERING PHYSICS 1C
This introductory unit covers: dynamics (motion in 1D, vectors, Newton's Laws, motion in 2D (including circular motion), uniform circular motion, work, energy and power potential energy and conservation of energy, linear momentum and collisions); waves (oscillatory motion, wave motion, sound waves, superposition and standing waves); geometrical optics (reflection, refraction, dispersion, Huygen's principle, image formation by mirrors and lenses, optical instruments); physical optics (interference of light, diffraction); thermal physics (temperature, thermometry,弹性参数应力和应变；分析和设计受压薄壁圆柱和球体；弯曲柱的屈曲；组合加载的结构和机器成员；安全弹性加载的条件。

Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2009 SEM-1 and 2009 SEM-2

PCB136 ENGINEERING PHYSICS 1C
This introductory unit covers: dynamics (motion in 1D, vectors, Newton's Laws, motion in 2D (including circular motion), uniform circular motion, work, energy and power potential energy and conservation of energy, linear momentum and collisions); waves (oscillatory motion, wave motion, sound waves, superposition and standing waves); geometrical optics (reflection, refraction, dispersion, Huygen's principle, image formation by mirrors and lenses, optical instruments); physical optics (interference of light, diffraction); thermal physics (temperature, thermometry,弹性参数应力和应变；分析和设计受压薄壁圆柱和球体；弯曲柱的屈曲；组合加载的结构和机器成员；安全弹性加载的条件。

Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2009 SEM-1 and 2009 SEM-2

PCB136 ENGINEERING PHYSICS 1C
This introductory unit covers: dynamics (motion in 1D, vectors, Newton's Laws, motion in 2D (including circular motion), uniform circular motion, work, energy and power potential energy and conservation of energy, linear momentum and collisions); waves (oscillatory motion, wave motion, sound waves, superposition and standing waves); geometrical optics (reflection, refraction, dispersion, Huygen's principle, image formation by mirrors and lenses, optical instruments); physical optics (interference of light, diffraction); thermal physics (temperature, thermometry,弹性参数应力和应变；分析和设计受压薄壁圆柱和球体；弯曲柱的屈曲；组合加载的结构和机器成员；安全弹性加载的条件。

Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2009 SEM-1 and 2009 SEM-2

PCB136 ENGINEERING PHYSICS 1C
This introductory unit covers: dynamics (motion in 1D, vectors, Newton's Laws, motion in 2D (including circular motion), uniform circular motion, work, energy and power potential energy and conservation of energy, linear momentum and collisions); waves (oscillatory motion, wave motion, sound waves, superposition and standing waves); geometrical optics (reflection, refraction, dispersion, Huygen's principle, image formation by mirrors and lenses, optical instruments); physical optics (interference of light, diffraction); thermal physics (temperature, thermometry,弹性参数应力和应变；分析和设计受压薄壁圆柱和球体；弯曲柱的屈曲；组合加载的结构和机器成员；安全弹性加载的条件。

Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2009 SEM-1 and 2009 SEM-2

PCB136 ENGINEERING PHYSICS 1C
This introductory unit covers: dynamics (motion in 1D, vectors, Newton's Laws, motion in 2D (including circular motion), uniform circular motion, work, energy and power potential energy and conservation of energy, linear momentum and collisions); waves (oscillatory motion, wave motion, sound waves, superposition and standing waves); geometrical optics (reflection, refraction, dispersion, Huygen's principle, image formation by mirrors and lenses, optical instruments); physical optics (interference of light, diffraction); thermal physics (temperature, thermometry,
thermal expansion, heat and thermal energy, heat capacity and specific heat, latent heat, heat transfer).

**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2006 SEM-1 and 2006 SEM-2

**PCB593 DIGITAL IMAGE PROCESSING**

This unit provides students with a basic understanding of the computer techniques used in image processing and reconstruction. Specific areas of study include the following: the structure of a digital image; image display techniques; grey scale palettes and look-up tables; Fourier transform theory; convolution theory; image processing hardware; image processing techniques, eg analysis, enhancement and restoration; spatial filtering; Fourier space filtering; methods of image reconstruction; 3D volume and surface rendering; applications of image processing in medicine, astronomy and remote sensing, etc.

**Prerequisites:** PCB375-2 or PCB496 or PQB250  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

**PCB605 BIOMEDICAL INSTRUMENTATION**

This lecture/tutorial program includes an integrated practical component. The topics include the following: transducers; signal conditioning; sources of noise; guarding and shielding; analogue to digital and digital to analogue conversion; computer interfacing; data acquisition; sampling theorem; signal averaging; application of Fourier transforms; signal processing (digital filters); statistics of physical measurements, significance testing; least squares methods; interfacing microcontrollers to analogue circuits.

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

**PCN112 MEDICAL IMAGING SCIENCE**

This unit offers an introduction to programming techniques and algorithms and digital image processing; the principles of display, perception and interpretation of medical images; image quality. The second part, nuclear medicine, describes radioactive decay, radionuclide production, imaging systems and internal dosimetry.

**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

**PCN211 PHYSICS OF MEDICAL IMAGING**

This unit addresses the physical principles involved in the production of radiographic, ultrasonic and magnetic resonance images, and quality control protocols.

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

**PUB112 WORKPLACE HEALTH AND SAFETY**

Introduces students to the basic concepts and theoretical framework of occupational health and safety such that they can identify health and safety problems in the workplace; be aware of strategies for dealing with such problems; and become familiar with the legislation, government agencies and health personnel associated with the working environment. Topics covered will include the physical, chemical and biological environments, and ergonomics. The students will also develop knowledge and skills associated with the actual measurement of the physical and chemical working environment and evaluation of the data collected.

**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** external  
**Teaching period:** 2010 SEM-1

**PYB012 PSYCHOLOGY**

The body of knowledge which defines Psychology as a discipline is basic to an understanding of human behaviour and interaction. Psychological theories, concepts and methods of investigation provide ways of evaluating personal and professional practice. Informed practice can then seek to meet the needs of individuals, groups and communities. All professional people need to have frameworks for understanding their own behaviour and that of others. This unit provides students with essential knowledge as a basis for their personal and professional effectiveness. It is the foundation for understanding further study in psychology and its many applications.

**Equivalents:** PYB100, PYB101  
**Credit points:** 12  
**Contact hours:** 3 per week  
**Campus:** Gardens Point and Kelvin Grove  
**Teaching period:** 2010 SEM-1 and 2010 SEM-2

**SCB384 FORENSIC SCIENCES - FROM CRIME SCENE TO COURT**

This unit provides an introduction to two fundamental areas in forensic science, crime scenes and justice. Mock crime scenes involving real life scenarios are used to provide hands-on training on crime scene management and examination protocols. The principles for forensic examination of crime scenes involving fire, explosion, murder, etc, are introduced through lectures, workshops and practical exercises. Also an overview of the techniques used in forensic photography, fingerprinting as well as Legal procedures at court is presented. This unit is provided by professional forensic practitioners with practical real life experience being transferred to new generations. This head start provides a unique advantage for a strong career in forensics.

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