YOUR GUIDE TO
UNDERGRADUATE
STUDY IN
ENGINEERING & INFORMATION
TECHNOLOGIES
2011
“I’m interested in many areas of computing and software. Anything related to technology I find fascinating and firmly believe that this is an area that Australia will excel in the future. If you’re interested in one of the most exciting and interesting industries today, do an IT degree at Sydney.”
CONTENTS

GETTING STARTED
02 Welcome to Sydney
03 Schools
05 What should you study at school?

COURSES AND CAREERS
06 Space Engineering
08 Aeronautical Engineering
09 Mechanical Engineering
10 Mechatronic Engineering
11 Biomedical Engineering
12 Chemical and Biomolecular Engineering
13 Civil Engineering
14 Civil Engineering (Construction Management)
15 Civil Engineering (Environmental)
16 Civil Engineering (Geotechnical)
17 Civil Engineering (Structural)
18 Civil Engineering (Project Engineering and Management)
19 Electrical Engineering
20 Electrical Engineering (Power)
21 Electrical Engineering (Telecommunications)
22 Electrical Engineering (Computer)
23 Software Engineering
24 Electrical Engineering (Bioelectronics)
25 Information Technologies
27 Flexible First Year Program
28 Combined degrees

IMPORTANT DATES

<table>
<thead>
<tr>
<th>2010</th>
<th>2011</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>28 AUGUST</td>
<td>5 JANUARY</td>
<td>24 ~ 28 JANUARY</td>
</tr>
<tr>
<td>OPEN DAY AT</td>
<td>INFO DAY AT</td>
<td>IN-PERSON ENROLMENT</td>
</tr>
<tr>
<td>THE UNIVERSITY OF SYDNEY</td>
<td>THE UNIVERSITY OF SYDNEY</td>
<td></td>
</tr>
<tr>
<td>30 SEPTEMBER</td>
<td>6 JANUARY</td>
<td>23 ~ 25 FEBRUARY</td>
</tr>
<tr>
<td>CLOSE OF ON-TIME</td>
<td>CLOSE OF CHANGE OF</td>
<td>ORIENTATION WEEK</td>
</tr>
<tr>
<td>APPLICATIONS THROUGH UAC</td>
<td>PREFERENCES THROUGH UAC</td>
<td></td>
</tr>
<tr>
<td>CLOSE OF APPLICATIONS FOR</td>
<td>FOR MAIN ROUND</td>
<td>28 FEBRUARY</td>
</tr>
<tr>
<td>MOST UNIVERSITY OF SYDNEY</td>
<td></td>
<td>SEMESTER ONE BEGINS</td>
</tr>
<tr>
<td>SCHOLARSHIPS</td>
<td>19 JANUARY</td>
<td></td>
</tr>
<tr>
<td>(sydney.edu.au/scholarships)</td>
<td>MAIN ROUND OFFERS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RELEASED ON LINE</td>
<td></td>
</tr>
</tbody>
</table>
University is a time for exploration of learning and self. You’ll never have the same opportunity to discover new interests and passions than when you’re a university student. Campus is full of sports, clubs and student societies – the more you expose yourself to, the more rewarding your time at university. Don’t let this moment pass you by.

A FEW GREAT REASONS TO STUDY WITH US
We offer a wide range of dynamic courses with flexible degree structures. We don’t believe one model fits all. We encourage you to start working towards your goal, your way, from your first day at university.

As a global university, many of our degrees have a strong international emphasis. We offer comprehensive exchange programs that will allow you to travel and experience a different culture while you learn.

We prepare you for the rigours of higher learning, provide you with skills and versatility for professional employment and help you rise to the responsibility of leadership.

A RICH AND VIBRANT STUDENT LIFE
Our location is great with Glebe and Newtown within walking distance, public transport is close by to get around, with Redfern and Central stations and plenty of bus stops to get you where you need to be.

We have numerous student clubs and societies, cafes, bars, bands, theatre productions, sports, sporting complexes, you will be a part of Australia’s most vibrant and active student community.
The faculty’s degrees are offered through its five schools

SCHOOL OF CHEMICAL AND BIOMOLECULAR ENGINEERING
Chemical engineers are in demand all over the world; working on projects as diverse as providing water for third world communities, leading edge tissue engineering research, shaping the hydrogen economy, and creating pollution free iron production.

With windmill farms, water recycling, and the need to reduce waste and by-products, Chemical and Biomolecular Engineers look to inspire a new way of life that benefits the economy, the community, and the environment.

The School of Chemical and Biomolecular Engineering, established in 1946, offered the first university-level chemical engineering program in Australia. The school is committed to teaching excellence and graduates are highly regarded and sought after by employers in Australia and overseas.

The school offers degrees which are internationally renowned and considered a world leader in many cutting edge areas of chemical and biomolecular engineering. The degrees provide stimulating career options across a range of growing industries, including energy (oil, gas, and renewable resources), food, health, water, biotechnology, and the environment.

SCHOOL OF CIVIL ENGINEERING
Civil engineers touch almost every aspect of our lives. They plan, design, construct, maintain and recycle many of the community’s structures you can see around you: from towering offices to heritage buildings; from roads and bridges to railways and tunnels; and from power stations and airports to dams and harbours.

Civil engineering graduates are highly skilled professionals who combine technical, managerial, organisational, financial, environmental and problem solving skills.

We offer undergraduate degrees accredited by Engineers Australia, and coursework and research degrees, as well as internationally accredited Project Management Graduate Programme.

We have research strength in structures and geomechanics, and are expanding their expertise and facilities to encompass sustainability, climate change and renewable energy. We also have a wind tunnel and wave machine.

The school has staff expertise and the facilities to perform high quality research, recognised around the world. The school also provide professional consulting and testing services on a wide range of engineering issues.

SCHOOL OF AEROSPACE, MECHANICAL AND MECHATRONIC ENGINEERING
The School of Aerospace, Mechanical and Mechatronic Engineering offers innovative and unique undergraduate teaching programs in aeronautical, mechanical and mechatronic engineering as well as specialisations in biomedical and space engineering. The programs are highly competitive, especially space and biomedical which require very high ATAR scores.

The school is unique as it prides itself on which prides itself in being an international leader in research covering a wide range of interests both in the fundamentals and the applied. The Research is relevant both nationally and internationally and attracts a significant proportion of industry funding which ensures that all our students benefit through teaching and opportunity.

The school is a leader in innovation in curriculum design with flagship programs such as:

Formula SAE Challenge – Mechanical students build a racing car and then compete in the Formula SAE challenge.

Autonomous Boat and Submersible Robot – Mechatronic students build an autonomous boat and a submersible vehicle.

SCHOOLS
SCHOOL OF ELECTRICAL AND INFORMATION ENGINEERING

One of first schools at the University of Sydney, Electrical and Information Engineering offers high quality undergraduate and postgraduate education using student-centred resources for learning and teaching, in an exciting and contemporary environment.

Our school's degree programs have foundations in physics, mathematics, computer science and basic electrical engineering principles.

The core skills develop the themes of electrical circuits, electronics and computer systems, signals and communications, power systems, control, energy systems and management.

There are opportunities to make contacts in industry, including a three-month practical training in industry at the end of Year 3 and many Year 4 thesis projects are linked to industrial problems and applications.

All students have a ‘common Year 1’ during which they enrol in the same units of study (essentially engineering basics and science). This ‘common Year 1’ facilitates transfer between specialisations and, in most cases, enables students to complete the BE degree requirements in 4 years. The degrees start to differ significantly in Year 3.

The research activities, in all major areas of electrical engineering, attract funding from nationally competitive grant sources including significant funding from the Australian Research Council. The school’s links with industry have been strengthened by funding from sources including NEC, BAE, Ericsson, BT, EnergyAustralia, ABB, Defence Science and Technology Organisation, Powercor, and other national and international companies where their graduates are highly appreciated for their expertise, creativity and leadership.

SCHOOL OF INFORMATION TECHNOLOGIES

Every major industry depends on IT professionals with the ability to design, set up, program and support the tools and infrastructure needed to compete in a technological world.

IT permeates every aspect of our lives. Social networking tools like Facebook and Twitter have revolutionised the way we communicate. Email has become accepted as a legally binding document. Technology and science are transforming our world, changing the way we do business, the way we learn and even the way we entertain ourselves.

IT is ranked around the world as one of the fastest growing professions over the last ten years and will continue to grow. IT offers fascinating, mission-critical, high paying jobs and multiple career paths.

Our school embraces this challenge and creates a nurturing environment where you can create flexible pathways to learn, interact with world leading IT researchers and practitioners and immerse yourself in the rich world of computer science and information systems.

Our undergraduate and postgraduate courses are accredited by the Australian Computer Society (ACS), teaching fundamental principles and practical skills in IT, and establishing the foundations for an entire career covering a wide range of exciting industries.

The School of Information Technologies is housed in a purpose-built building with state of the art facilities, maintaining its position as a key teaching and research institution.

ADVANCED ENGINEERING & IT PROGRAM

The Advanced Engineering & IT program is open to students who have proven outstanding academic ability (ATAR of 98 or higher). It offers the opportunity to participate in a talented student program in the areas such as Advanced Physics, Advanced Math, Advanced Engineering and Advanced IT.

Entry to the program is by invitation from the Dean following the release of HSC results.

Advanced Engineering and IT is available in all engineering and IT disciplines and continues over the complete length of the degree. The program includes project components and design work that is associated with the leading research and industry consultation groups within the faculty.

For more information about the Advanced Engineering Course please go to sydney.edu.au/engineering/apply/advanced_engineering
WHAT SHOULD YOU STUDY AT SCHOOL?

Do you enjoy maths, science and IT?

Can you visualise, draw, and construct things?

Do you have a passion to create, come up with solutions and are you environmentally aware?

Do you want to lead and inspire teams?

BRIDGING COURSES
Many degrees in engineering and IT have assumed knowledge which are subjects we expect you to have studied before you begin this course. If you don’t have the assumed knowledge you won’t be excluded from the course but you might find it difficult to manage the work as lecturers will assume you have this knowledge.

Bridging courses are designed to assist you if you do not meet the assumed knowledge for the degree that you want to do. The bridging courses are held during February each year, just before the beginning of Semester 1.

We offer the following bridging courses:
- Chemistry Bridging Course
- Mathematics Bridging Course
- Physics Bridging Course

Please refer to the following website for further details and costs:
sydney.edu.au/science/student/undergrad/entry/bridging

FLEXIBLE ENTRY
We recognise that there are a number of pressures on students as you consider your options for the future. The breadth of opportunities after completing secondary studies is daunting, in addition to the concern in achieving a competitive ATAR (or equivalent) to receive a place in your chosen degree. If you are worried about getting into one of our undergraduate courses there is no need for despair as you may be eligible for our Flexible Entry Scheme. Through this scheme we look at ways of assessing your suitability for entry to certain courses rather than just allocating bonus points. You need to fill in the online form and answer a series of questions to assess your options. International students, including onshore international students studying the HSC, are not eligible for the Flexible Entry Scheme.

Flexible Entry is offered for most courses, however the criteria for consideration and application process between courses can vary so please refer to our website for further details at sydney.edu.au/apply/flexibleentry

Please note that Flexible Entry is available to Year 12 school leavers who intend to commence their studies in Semester 1.
SPACE ENGINEERING
AERONAUTICAL ENGINEERING (SPACE)
MECHANICAL ENGINEERING (SPACE)
MECHATRONIC ENGINEERING (SPACE)

The space engineering specialisation at the University of Sydney is the only one of its kind in Australia focusing specifically on the space engineering community within the region.

WHAT IS IT?
Space Engineering is a systems engineering approach to solving problems at the forefront of current technology.

Space Engineering is an exciting and challenging new area of teaching and research concerned with the theory, design, testing, construction and use of engineering components in the most demanding of environments: space.

This specialisation is offered with the Aeronautical, Mechanical or Mechatronic degree programs. You will learn the basic engineering principles before taking further specialisations. As a graduate you will be able to satisfy the needs of evolving space industries in fields such as Propulsion Systems, Design, Communication, Navigation, Control and Remote Sensing.

There are 4 key subjects which all Space Engineering students undertake and optional Advanced Space Engineering projects. These subjects include all the Space Engineering students, irrespective of the degree program taken; a truly multi-disciplinary structure.

CAREERS AND OPTIONS
While the aerospace industry in Australia is small there are still excellent opportunities for top graduates, and the demand for qualified space engineers is increasing significantly within the Asia-Pacific region. There are also broader opportunities in the growing, high-tech Aeronautical-Space and Mechatronic-Space industries. The key aspect of all the space streams is that you will be are exactly qualified within your main degree field (Aeronautical, Mechanical and Mechatronics), thus the engineering employment opportunities are the same as those who are undertaking the straight degree program (that is, without the Space option).

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“I chose aeronautical engineering because I’m fascinated with planes and flight. I’m also doing a physics major with a minor in IT because I adored physics at high school and wanted to learn more and IT allows me to further develop my software skills. Engineering is an ever expanding field of study – there’s always more to learn and discover.”

Kate Monkley
Engineering/Science
AERONAUTICAL ENGINEERING

WHAT IS IT?
Aeronautical engineering is the study of the design, development, manufacture, maintenance and control of machines or vehicles operating in the earth’s atmosphere or in outer space.

The design of a flight vehicle is quite complex and demands a knowledge of many engineering disciplines such as aerodynamics, propulsion systems, structural design, materials, avionics, and stability and control systems.

Maintaining and operating a flight vehicle requires an understanding of materials, reliability and maintenance, structural analysis for necessary repairs, together with knowledge of the disciplines within the design process.

The degree includes the opportunity to undertake practical flying training. Some students continue to fly and obtain their pilots license. However a strong base is fundamental due to rapid technological changes.

Specialisation in areas like helicopter design, structural optimisation and experimental aerodynamics may be part of the major thesis in the final year. The program includes work placements and practical simulation using wind tunnel technology and flight simulators. Students work on actual aircraft and aircraft components to measure structural and aerodynamic characteristics. The course offers an exchange program with leading aerospace universities in the northern hemisphere.

CAREER OPTIONS
Employment in manufacturing and assembly, design, research and certification in the airline/aerospace industry and general engineering positions. Aeronautical engineers are employed in Australia and overseas with government, the airline industry and private consultancies.

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Aeronautical engineering is an immensely exciting and challenging field of engineering in which you solve problems relating to the science and technology of aircrafts and other flying vehicles and come up with unique solutions to the problem.
Mechanical engineers research, design, manufacture, and test all kinds of mechanical things: tools, engines, machines, and other devices.

**WHAT IS IT**
Mechanical engineers design and develop everything you think of as a machine - from supersonic fighter jets to bicycles and toasters. And they influence the design of other products as well - shoes, light bulbs and even doors. Many mechanical engineers specialise in areas such as manufacturing, robotics, automotive, transportation and air conditioning. Others cross over into other disciplines, working on everything from artificial organs to the expanding field of nanotechnology, and some use their mechanical engineering degree as preparation for the practice of medicine and law. The mechanical engineer may design a component, a machine, a system or a process. Mechanical engineers will analyse their design using the principles of motion, energy, and force to ensure the product functions safely, efficiently, reliably, and can be manufactured at a competitive cost.

Mechanical engineers work in the automotive, aerospace, chemical, computer, communication, paper, and power generation industries. Mechanical engineers will be found in virtually any manufacturing industry. Increasingly, mechanical engineers are needed in the environmental and biomedical fields. Indeed virtually every product or service in modern life has probably been touched in some way by a mechanical engineer.

**CAREER OPTIONS**
You may gain employment in the fields of power generation, process industry, mineral and oil exploration, manufacturing industry, transportation, building industry, automated port facilities, biomedical implant design, environmental pollution control, and automatic control.

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MECHATRONIC ENGINEERING

WHAT IS IT?
Every day you come into contact with the products of mechatronic engineering. As a mechatronic engineer, you may be involved in the application of electronics, computer systems and control theory to automate mechanical systems, as well as in the design and development of electro-mechanical systems. Examples may include car engine management systems, production robots, micromachines, smart structures and hitech consumer products that involve an interaction of machine, computer and electronic systems to extract high levels of performance.

You may also be involved in designing automated vehicle navigation systems using GPS, designing process control systems for chemical production industries, designing and implementing computer controlled machine monitoring systems, designing micro-machines, project management, inventing new products and processes or being an aid worker and providing engineering services to developing nations. Mechatronic engineers are in great demand as they possess a combination of mechanical engineering, electronic engineering and computing skills which make them very versatile.

CAREERS AND OPTIONS
Students may find jobs associated with product design and development, robotics and automation for advanced manufacturing, automatic control systems and software design and development for real-time computer systems.

The course places strong emphasis on development of skills in digital electronics, microprocessors, computer control, and software design in a mechanical engineering environment. Management and communications are integral in your study program.

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Biomedical engineers work with doctors and medical scientists, researching and designing ways to improve health care, medical services and designing and delivering technology to improve the quality of life.

WHAT IS IT?
Biomedical engineering combines knowledge of electronic, mechanical, chemical and materials-engineering, with the life sciences of medicine, biology and molecular biology. Biomedical devices:
- Support and enhance human life
- Help individuals to overcome physical disabilities
- Aid in delivering medical procedures
- Test and deliver data which improve health and safety.

Biomedical engineers work with doctors and medical scientists, researching and designing ways to improve health care and medical services. They may be involved in the development of medical products and different types of equipment used to monitor and treat patients and in designing and improving equipment for disabled people.

A biomedical engineer working in a hospital, for example, may be responsible for the safe and effective operation of equipment such as monitoring, diagnostic, and therapeutic medical equipment ranging from catheters, CAT scanners, pacemakers and kidney machines. They may be involved in designing artificial joints and limbs and assisting the surgical team in fitting these to the patient.

The degree meets the tertiary study entry requirements for the Graduate Medical Program.

CAREER OPTIONS
Biomedical engineers are exposed to many fields of study in engineering, medicine and biology. Due to this broad experience biomedical engineers find employment in hospitals, government bodies, industry or academic areas. Specific areas of employment include: design of medical instrumentation and prostheses; involvement in the development, manufacture and testing of medical products; and the management of technology in the hospital system.

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Chemical and biomolecular engineering is concerned with the ways in which raw materials are changed into useful and commercial products. This involves the research of raw materials and their properties, design and development of equipment and the evaluation of operating processes.

These skills are combined to extract raw materials which can then be refined and manufactured to produce such things as food, petrol, plastics, paints, paper, ceramics, minerals and metals. Often these processes are carried out at large scale plants – the safe operation of these plants is also part of chemical engineering.

Chemical and biomolecular engineering also addresses the challenges faced by the process industries, including the chemicals, minerals, energy and agriculture, food, beverage and pharmaceuticals sectors. Extracting raw materials without harming the environment is a major area of work for these engineers. For example, new types of fuels which can be used safely to provide the energy we need, without having an adverse effect on the environment, are currently being developed and tested. Chemical and biomolecular engineers are also involved in the production of pharmaceutical, cosmetic and personal care products as diverse as penicillin and shampoo.

CAREERS AND OPTIONS
Engineers working in this field may specialise as combustion engineers, petroleum engineers, chemical engineers, smelting engineers, water treatment engineers or environmental engineers. There is also scope for chemical and biomolecular engineers to move into related areas including biotechnology, food engineering and mineral engineering.

The course offers one-year exchange programs with universities in Europe, Asia and North America.

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CIVIL ENGINEERING

Much of the physical infrastructure of our modern society is designed and built by civil engineers. Civil engineers are concerned with all types of structures including dams, bridges, pipelines, roads, towers and buildings.

WHAT IS IT?
Civil engineers are concerned with all types of structures including dams, bridges, pipelines, roads, towers and buildings. They are responsible for the design and construction of all our transport systems, the design and management of our gas and water supply, sewerage systems, harbours, airports and railways. Civil engineers plan, design and test the structures of private and public buildings and facilities. They are also involved in many environmental areas such as the assessment of the impact large scale projects have on the environment and the collection and treatment of sewage and industrial wastes, pollution control, environmental control and resource protection and management.

CAREERS AND OPTIONS
Career paths include construction and mining companies, engineering and infrastructure consultants, municipal councils, public works, airport and harbour authorities, banks and project management consultants. Specialisations in sustainable solutions to environmental problems, redevelopment after natural disasters, flood mitigation and wind/pollution control are options in the fourth year of the program.

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CIVIL ENGINEERING (CONSTRUCTION MANAGEMENT)

The construction industry in Australia is a large industry which has virtually unlimited opportunities for rewarding employment and professional practice.

WHAT IS IT
Construction engineers engage in the design of temporary structures, quality assurance and quality control, building and site layout surveys, on site material testing, concrete mix design, cost estimating, planning and scheduling, safety engineering, materials procurement, and cost engineering and budgeting. This degree has been designed to produce graduates with sound engineering knowledge and competency in the application of projects and programs in the construction industry. It is particularly related to infrastructure and large projects and specialisation in project management including subjects in legal and contractual studies, costing and estimating and quality management.

CAREER OPTIONS
Examples of employment for construction management engineers can include construction companies, project management specialists, government organisations, large corporations including mining and industrial companies, and local councils.

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Environmental engineers have a broad understanding of the environmental impacts of human activities and how to develop solutions to better manage those impacts.

WHAT IS IT
Environmental engineers are concerned with protecting the environment by assessing the impact a project has on the air, water, soil and noise levels in its vicinity. This is done by studying the project’s design, construction and operation and minimising any adverse effects that it may have on the environment. Environmental engineers are also involved in removing problems caused by past activity, such as cleaning contaminated industrial land so it can be used for housing. Environmental engineers predict what problems may be caused by accidents, such as oil spills for example, and assess what may cause problems for the environment in the long term. They also plan and design equipment and processes for the treatment and safe disposal of waste material and direct the conservation and wise use of natural resources. They are involved in research and development of alternative energy sources, water reclamation, waste treatment and recycling.

CAREER OPTIONS
Environmental engineers work in developing environmental impact studies, monitoring environmental problems, cleaning up the environment and overcoming major environmental damage. This can involve work with government agencies and consultancies specialising in remediation of groundwater and surface water pollution, sewerage and drainage works, and disposal of municipal and mining waste.

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CIVIL ENGINEERING
(GEOTECHNICAL)

Knowledge from the fields of geology, material science, testing, mechanics, and hydraulics are applied by geotechnical engineers to safely and economically design foundations, retaining walls, and similar structures.

WHAT IS IT
Geotechnical engineers examine the soil and rock layers that make up the earth in order to determine their physical and chemical properties. Using this information, they design foundations and earthworks structures for buildings, roads, and many other types of projects.

They provide information and knowledge on how the soil and rocks beneath a proposed structure will behave under pressure. An understanding of the structures being built is needed in order to assist in the design of their foundations.

Geotechnical engineers spend a lot of time outdoors, collecting samples and testing ground areas and advising on work in progress.

CAREER OPTIONS
Geotechnical engineers are involved in investigating sites to find out what is under the ground, designing foundations, planning and designing of road, rail and canal cuttings, offshore work investigating and designing cable routes, pipelines, foundations for offshore facilities and design of landfills for society’s waste products.

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CIVIL ENGINEERING (STRUCTURAL)

A structural engineer designs structures to be safe for their users and to fulfil the function for which they are designed.

WHAT IS IT
Structural engineering is a branch of civil engineering, and its applications are extremely diverse. Natural forces such as wind, waves and earthquakes and their effects all need to be taken into account when a structure is designed and built. Certain stresses caused by the modern environment, such as the traffic of both cars and people, also need to be considered. A structural engineer ensures that structures are built in such a way that they stand up to these forces. Innovative solutions to these problems are researched, developed and tested by structural engineers.

Structural engineers often specialise in one area of work, such as bridges and tunnels, buildings, or large constructions such as oil installations. If a building appears to be collapsing or subsiding, a structural engineer will suggest methods of improving the foundations and keeping the structure intact.

CAREERS AND OPTIONS
Structural engineers work in the design of major structures including bridges, high-rise buildings, industrial buildings, stadiums, and sporting and exhibition centres. Structural engineers need to show innovation and apply artistic, creative and technical skills to design. Many find employment in specialist consulting structural engineering firms.

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CIVIL ENGINEERING (PROJECT ENGINEERING AND MANAGEMENT)

Engineers require skills at management levels in technology-based enterprises. Engineering management and project management provides the financial, investment evaluation and business skills necessary to operate in the rapidly expanding and changing market place.

WHAT IS IT
The field of project engineering and management is broad, challenging and rewarding. It concerns conceptualisation, development, integration, implementation and management of projects in a variety of fields, ranging from multi-million dollar infrastructure projects such as water, power, transport, through to equally large mining, environmental, building and construction projects.

Project engineering and management includes the engineering of all types of projects, from conception and feasibility studies through to construction and commissioning at the strategic level. The course covers core areas of specialist engineering knowledge and practice, particularly relating to design and construction aspects of projects; theory and practice of project conceptualisation, planning, management and control; legal, ethical and policy issues; economics and financial management of projects; and information technology applicable to project management.

CAREERS AND OPTIONS
Project management engineers can work in construction companies, as consulting engineers, property developers, industrial and mining corporations, industrial banks, and investment analysis and development.

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Take a minute to imagine life without electricity. A lot of things that we take for granted would change out of all recognition. If you can imagine life without electricity, electronic devices and computers, you will quickly appreciate the importance of electricity to everybody.

WHAT IS IT
Electrical engineering encompasses electronic, computer systems, telecommunications, control and electrical power engineering. It is concerned with the way electrical energy is produced and used in homes, the community and industry. Electrical engineers design and build the systems and machines that generate, transmit, measure, control and use electrical energy essential to modern life.

Our electrical engineering course is designed to be flexible, with foundation material at the start and later years encouraging specialisation in a variety of fields within the discipline, such as biomedical engineering, energy engineering and automatic control.

The final years offer electives in management and numerous modern, high-technology disciplines including microelectronics, image processing, telecommunications, photonics, power electronics, real time control, energy and biomedical engineering. You can also specialise in telecommunications, software, power, or computer engineering, but in a more generalist style than in the separate degrees.

CAREERS AND OPTIONS
As an electrical engineer your options are endless. You could work in developing body area networks, medical imaging scanners, bionic ears and eyes, heart pumps, pacemakers and hearing aids. Or you could work in computer systems, data and telecommunication networks including the internet, biomedical instruments and applications, such as, mobile telecommunications and wireless networks, optical and microwave communications, integrated electronic systems advanced robotics and intelligent machines, image and signal processing systems, generation and transmission of electric power and renewable energy systems, Smart” systems which monitor and maintain themselves, and high-voltage engineering.

For 2011 electrical, telecommunications and computer engineering will be under the one UAC code for B Engineering (Electrical Engineering) (Telecommunications, Electronics, Computer)
The world of sustainable energy system technologies offers many career opportunities. According to Engineers Australia, the industry needs hundreds of new engineers in the power sector (utilities and power generation) each year.

**WHAT IS IT**
Electricity impacts everyone’s life. Although it is invisible, electricity is something real and essential.

Power engineers are the people who make sure we have electricity - day in and day out. They plan, design, construct, operate and maintain power systems and equipment. This is the infrastructure that generates, transports and distributes electricity – the heartbeat of modern society.

Power engineers ensure we get power to where it’s needed, i.e., cities, towns, railways, lines, large businesses and industry.

Power engineers also conduct research on developing alternative power sources such as solar and wind energy. Electrical power engineers work for companies and government departments that are involved with providing and using electrical power.

**CAREER AND OPTIONS**
There is heavy demand for power transmission and generating systems engineers, grid maintenance and stability contractors and industrial power supply engineers. Additionally, there is demand from industries other power, such as petrochemical and mining.

For 2011 electrical, telecommunications, and computer engineering will be under the one UAC code for B Engineering (Electrical Engineering) (Telecommunications, Electronics, Computer)

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Electrical & Information Engineering
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F +61 2 9351 3847
E claire.bridgman@sydney.edu.au
sydney.edu.au/engineering/electrical
WHAT IS IT
From the humble telephone in the corner to the GPS navigation systems, wireless internet and beyond, telecommunications engineering focuses on the design, planning, commissioning and monitoring of complex telecommunications networks and broadcasting equipment. It is an area of specialisation concerned with all aspects of theory and applications for a broad range of systems such as telephone and data networks, radio and television broadcasting, satellite and deep space applications. They also deals with digital communications, microwaves and antennas, optical communications, the design and manufacture of lasers and optical fibres, signal and information processing and satellite mobile communications.

The Blackberry is old; 3G is dead, Torrent downloads take too long – the world is moving to 4G, wireless sensors networks, body area networks, and ‘smart’ meters and power engineers will lead the way.

CAREERS AND OPTIONS
Career opportunities can be found with providers such as Telstra, Optus Unwired, Vodafone, AAPT and vendors like Motorola, Sony Ericsson, Nokia, NEC, Computer companies such as Microsoft, IBM, Google, network management, research and application of that research in CSIRO, NICTA and universities, multimedia and IT companies, design of equipment and telecom devices, military and defence applications

For 2011 electrical, telecommunications and computer engineering will be under the one UAC code for B Engineering (Electrical Engineering) (Telecommunications, Electronics, Computer)

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Electrical engineering (computer)

WHAT IS IT?
Computer engineering deals with both hardware and software aspects of computer systems. It is at the core of all the latest electronic devices. It is not only the basis of current computers and the internet, but also a vital part of mobile phones, portable multimedia devices, biomedical systems, automobiles, aircraft and spaceships. Most current research in the sciences predominantly use hardware, software and signal processing that comes out of computer engineering research.

Demand for computer engineers is strong due to the growing use of computers in all sorts of products and the need for engineers competent about computers in both hardware and software areas.

CAREERS AND OPTIONS
Computer engineers find employment in areas such as: embedded microprocessor systems, digital control systems, image processing, digital signal processing, tracking and surveillance, measurement and sensing, data processing systems, software engineering, biomedical engineering and power systems.

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Due to the speed of change in this rapidly growing field, companies require well-rounded professionals who can be both engineer and developer, as well as the strategic professional and lifelong learner who can evolve along with a continually evolving industry.

**WHAT IS IT**

From the evolving internet, to the growth of mobile, handheld and embedded devices, the critical need for engineers who can build our virtual world gets greater by the day. Software engineering addresses all aspects of software production, from strategy and design to coding, quality and management.

Software engineers design and develop many types of software, including computer games, business applications, operating systems and network control systems. They must be experts in the theory of computing systems, the structure of software, and the nature and limitations of hardware to ensure that the underlying systems will work properly.

The tasks performed by software engineers evolve quickly, reflecting changes in technology and new areas of specialisation, as well as the changing practices of employers and industry.

**CAREERS AND OPTIONS**

Software engineers will find employment opportunities in information technology, database management, multimedia and telecommunication software systems, language compilers, internet programming, real-time software engineering, control systems, biomedical systems and artificial intelligence.

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The emerging field of bioelectronics is opening major scientific and technological avenues in the new millennium.

WHAT IS IT
Bioelectronics is concerned with the use of biological materials and processes in electronic devices and the use of electronic devices in living systems. This can include medical devices, image processing and implantable devices.

Biomedical electronic devices and systems are key growth areas of engineering due to the impact increasing medical costs of an ageing society. Internationally, Bioelectronics is a fast growing area in terms of revenue and career prospects in electrical and information engineering and more recently there has been an explosive growth of research applied to medical problems in the areas of life sciences, physical sciences and engineering.

Bioelectronic engineers use engineering principles to understand, modify, control or interact with biological systems electronically and develop technology to assist in diagnosis and treatment.

CAREERS AND OPTIONS
This course provides the required basis for a career as a biomedical engineer or medical physicist as well as the tertiary requirements for the Graduate Medical Programme. Opportunities also include areas in health, sports sciences and human interaction in engineering, smart buildings and new computer interfaces and transport.

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ELECTRICAL ENGINEERING (BIOELECTRONICS) (PROPOSED FOR OFFER IN 2011)
Computers are part of everyday life, helping us to be smarter, safer and to have more fun.

Our degree programs offer streams (majors) in computer science or information systems.

Computer science involves the study of computers and the programs that run on computers. This stream will appeal to more technically-minded students who wish to contribute to the future development and support of information technology. Information systems involves creating computer systems which satisfy individual and organisational needs. Rather than being about developing and enhancing the performance of computers, information systems is about making computer systems work for people. Computer science and information systems are therefore complementary disciplines of study.

Within the structure of our degrees, students are encouraged to explore their interests by enrolling in units from a range of other disciplines such as psychology, languages, biology, philosophy, geography or commerce. This can give domain-specific knowledge useful to the application of information technologies in that area.

These degrees allow broad and varied options in career choices such as information and communication technology, research and development, government policy, marketing and communications, finance and banking, education, biomedicine, consultancy, change management, software analysis and development and computer systems administration.

The Bachelor of Computer Science and Technology has considerable flexibility. During the first two years, students devote approximately one-quarter of their study to core requirements, covering topics such as programming, databases, systems analysis, and professional IT practice. Subjects are chosen from a wide range of areas including networking, human-computer interaction, graphics, object-oriented design, internet software platforms, artificial intelligence, and e-business analysis and design. In addition to the IT-relevant subjects, students can devote up to one-third of their time to other subjects, e.g. languages, commerce, psychology or biology.
The Bachelor of Information Technology is perfect for those who want to work in senior leadership positions in the IT or affiliated industries.

As a Bachelor of Information Technology graduate, you will be an IT specialist and possess an excellent combination of knowledge and practical, hands-on expertise to influence and reinforce an organisation’s technology infrastructure and to support the people who use it. You’ll often be responsible for selecting and deploying software products appropriate for an organisation. IT professionals create and manage business applications, web sites, systems and the IT environment for every industry.

The degree has been developed in consultation with industry to ensure graduates are equipped for the changing demands in this dynamic area. This degree is aimed at students who wish to succeed in the rapidly expanding and highly competitive world of information technology. It has been designed to reflect industry needs and is characterised by its breadth, flexibility, quality and emphasis on contemporary practice.

Students completing the Bachelor of Computer Science and Technology, Bachelor of Computer Science and Technology Advanced and the Bachelor of Information Technology are eligible for associate membership with the Australian Computer Society.

With an IT degree, students can literally go anywhere.

CONTACT
Information Technologies
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sydney.edu.au/engineering/it
So you’re thinking of studying engineering or IT at Sydney but you’re unsure what area you’d like to specialise in?

Flexible first year gives you the freedom of choice and time to discover where your true strengths and passions are in engineering and IT.

Now you can explore a number of areas before deciding upon your ultimate specialisation. All streams of engineering and IT are included in the Flexible First Year program so you have the opportunity to discover your strengths and interests before committing to one stream. Flexible First Year allows you to change at the end of Semester One or the end of first year to one of the many specialisations we offer. You will still complete your degree in the normal time and, as a graduate, you will emerge fully qualified in the area of your choice with as much in-depth knowledge as those from other less flexible courses. We keep all your options open, so you can change direction without affecting the duration of your course.

You can transfer to a higher ATAR course in Year 2 depending on your ATAR and academic performance in your first year. Generally, you will need a credit average (65 percent) for ATAR streams in the low 90s range and a distinction average (75 percent) for those in the high 90s range. If you have already achieved the required ATAR for a stream, then entry into that stream is assured.

You can do a combined degree with Flexible First Year. Provision has been made for elective units in the program to enable you to complete the requirements of your other degree.

You may apply through UAC as normal and all the relevant information will be available in the current UAC Guide. The Flexible First Year UAC Code is: 511756.

sydney.edu.au/engineering/apply/flexiblefirstyear
Combined degree courses (double degrees) offer opportunities for more focussed or flexible career preparation

Combined degrees offer you the opportunity to add other areas of study to your technology-based engineering and IT degree. These fully integrated degree programs add a second qualification and enhance your job prospects.

If you choose a combined degree you can still complete the flexible first-year program. You may withdraw from a combined degree program and revert to a single degree (other than Law) after one or two years of study.

You can take most engineering specialised streams as a component of a combined degree provided your ATAR is above or equal to the cut-off for the specific engineering specialisation.

If you choose IT you may take either the computer science stream or the information technology stream as a component of a combined degree.

In each year you will study engineering or information technologies as well as subjects in:
- Arts
- Science
- Commerce
- Architecture
- Law
- Medical Science

sydney.edu.au/engineering/apply/combined_degree

<table>
<thead>
<tr>
<th>DEGREE</th>
<th>ATAR</th>
<th>ADVANTAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>B Engineering/B Commerce</td>
<td>94.70</td>
<td>Giving you the best of both worlds, this is a very popular and successful combination designed to extend the management component of the Bachelor of Engineering. You can combine any engineering specialisation with commerce. It allows for one major and one minor in any area of commerce. Some units are compulsory, including the introductory commerce courses in accounting, economics and econometrics.</td>
</tr>
<tr>
<td>B Information Technology/B Commerce</td>
<td>94.80</td>
<td>In this combined degree students undertake one major from the Faculty of Economics and Business (for e.g., accounting, finance, economics) and a stream from IT. Students will learn skills and vocabulary from both disciplines and have the opportunity to practise their combined skills in project-based courses and through industry internships. The aim is to produce graduates with exceptional skills in both IT and business and help shape them into the future captains and leaders of the industry.</td>
</tr>
<tr>
<td>B Engineering/B Science</td>
<td>91.35</td>
<td>This is an established and highly popular degree, and emphasises the strong scientific foundations of engineering. The engineering degree emphasises practical aspects of science &amp; technology, while the science degree emphasises fundamental principles. Both expand scientific and/or technological career options. Although you may have achieved the ATAR for the combined degree, you must still achieve the ATAR for the stream of engineering you wish to take.</td>
</tr>
<tr>
<td>B Information Technology/B Science</td>
<td>99.45</td>
<td>There is natural synergy between IT and science. All science areas involve using IT and many science graduates work in IT. This 5-year degree program undertakes core units in areas including computer science, information systems, and selected science areas such as mathematics, physics, biology, chemistry, geography or psychology.</td>
</tr>
<tr>
<td>B Engineering/B Arts</td>
<td>90.75</td>
<td>You can take any Arts subjects with the Bachelor of Engineering. Engineering emphasises practical aspects of science and technology while Arts provides choices which balance and complement engineering. Arts can be taken with any strand of engineering. Although you may have achieved the ATAR for the combined degree, students must still achieve the ATAR for the stream of engineering they wish to take.</td>
</tr>
<tr>
<td>B Information Technology/B Arts</td>
<td>99.05</td>
<td>This is designed to meet the growing industry demand for elite graduates who master both the IT and Arts disciplines. It allows you to obtain an IT degree and further enhance your career options by adding skills from humanities, social sciences and languages. You can complete one major and one minor study in Arts areas including linguistics, anthropology, cultural studies, film studies, digital culture or a language.</td>
</tr>
<tr>
<td>B Engineering/B Design in Architecture</td>
<td>96.30</td>
<td>This program offers choice and flexibility with the artistic aspects of engineering and architecture design over 5 years. Architectural studies will emphasise the conceptual and aesthetic aspects of the design process, while engineering teaches the analysis of forces within the structure, and how to proportion the structural skeleton to support these forces. Registration as an architect requires completion of both BEng(Arch) and MArch degrees.</td>
</tr>
<tr>
<td>B Engineering/B Medical Science</td>
<td>95.60</td>
<td>This combines the core elements of engineering and medical science degrees and is designed for those interested in spanning engineering and medical sciences in future endeavours. Your technology-based engineering skills will be complemented by skills in medical sciences. It also forms an ideal base for postgraduate research in the biomedical field, or for vocational coursework programs such as graduate medicine or graduate dentistry.</td>
</tr>
<tr>
<td>B Information Technology/B Medical Science</td>
<td>93.00</td>
<td>The degree provides you with a structured program of study which allows you to obtain an IT degree and further enhance your career options by adding skills from Medical Science, Biomedicine, and Bioinformatics. You will undertake core units in areas including computer science, information systems, and selected medical science areas.</td>
</tr>
<tr>
<td>B Engineering/B Laws, B Information Technology/B Laws</td>
<td>96.65</td>
<td>The Combined Law program allows students to study the Bachelor of Laws (LLB) in conjunction with another degree. It works by spreading out the first year of the Sydney LLB over 4 years for Engineering.</td>
</tr>
</tbody>
</table>
### Future Events for 2010

Please contact trish.dimasi@sydney.edu.au

**Year 10 Academic Excellence Awards**
29 April

**Compass Experience Day**
28 May

**Year 10 Subject Selection Evenings**
3, 7, 8 June

**Scholarships Information Evening**
13 July and 21 July

**Science in the City**
16-18 August

**Smith Family Experience Day**
12 August

**Sydney Open Day**
28 August

**Year 12 Information Night for Students and Parents**
September 2010
Please contact the faculty for more information

**Degree in a Day**
29, 30 September, 1st October

**Year 10 Summer Work Experience**
November 2010

**Chemical & Biomolecular Engineering Summer Workshop for High School Students**
8 December

**Honeywell Engineering Summer School**
6-10 December

**Information Day**
5 January 2011
For IT events please contact weiying.ho@sydney.edu.au

**Girls Programming Network**
For academically gifted female students in Year 9-12, with or without programming experience, 9th-30th March

**National Computer Science School Challenge**
NCSS Challenge is an online programming competition. The NCSS Challenge runs for 6 weeks, commencing on Monday 2nd August 2010.

www.challenge.ncss.edu.au

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### Course Information 2010

<table>
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<tr>
<th>Course Code</th>
<th>Degree</th>
<th>ATAR</th>
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<tbody>
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<td>Eng (Aeronautical)</td>
<td>90.95</td>
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<tr>
<td>511718</td>
<td>Eng (Aeronautical - Space)</td>
<td>99.30</td>
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<td>511729</td>
<td>Eng (Mechanical)</td>
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<td>Eng (Mechatronic)</td>
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<td>Eng (Biomedical)</td>
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<td>511741</td>
<td>Eng (Civil)</td>
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<td>511742</td>
<td>Eng (Civil Construction Management)</td>
<td>87.00</td>
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<td>511743</td>
<td>Eng (Civil Environmental)</td>
<td>95.50</td>
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<td>511744</td>
<td>Eng (Civil Geotechnical)</td>
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<td>511745</td>
<td>Eng (Civil-Structural)</td>
<td>92.70</td>
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<td>511746</td>
<td>Eng (Civil-Project Eng &amp; Mngt)</td>
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<td>511748</td>
<td>Eng (Elect) (Power)</td>
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<td>511751</td>
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<td>Eng (Telecommunications)</td>
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<td>511753</td>
<td>Eng (Software)</td>
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<td>511756</td>
<td>Eng, BCST &amp; BIT (Flexible First Year)</td>
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Please note
These are the 2010 ATAR scores. Some of these may change in 2011. Please check the website or your UAC guide for changes.