With more than 44,000 students and 1,400 academic staff, Western Sydney University is one of Australia’s largest research-led universities.

The Engineering programs at Western Sydney University enable professionals and recent graduates to adapt to a dynamically developing and changing technological environment through the upgrading of their skills and knowledge. Engineering courses provide you the opportunity to pursue a specialisation in civil, environmental, electrical, mechanical, telecommunications, and mechatronics engineering.

**MASTER OF ENGINEERING**
The Master of Engineering has been designed to meet Engineers Australia professional accreditation requirements. It enables professionals in Engineering and recent graduates to adapt to a dynamically developing and changing technological environment through the upgrading of their skills and knowledge. The course provides students with training opportunities to foster a culture of life-long learning. Graduates of the course will have a firm foundation to further build their skills as their specialised professional field evolves.

The Master of Engineering opens up careers in diverse areas such as water, roads and buildings; robotics and mechatronics; telecommunications; manufacturing and utilities; commercial, medical and industrial product design; project management and consultancy; industrial or residential development; database design; system analysis, design and integration; and computer network design and management.

**Entry Requirements**
Applicants must have successfully completed a recognised 4-year undergraduate degree, or higher, in engineering in one of the specialisations, e.g. Civil, Environmental, Mechatronic, Mechanical, Electrical, Telecommunication.

English proficiency requirement IELTS 6.5 overall (min 6.0 in each band) or equivalent

**Study Sequence**
Qualification for this award requires the successful completion of 160 credit points. Students must complete 8 core units, 5 specialised alternates from chosen area of specialisation and 3 x 10 credit point electives.

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**Engineering**

<table>
<thead>
<tr>
<th>COURSE NAME</th>
<th>COURSE CODE/ CRICOS CODE</th>
<th>DURATION</th>
<th>TOTAL CREDIT POINTS</th>
<th>2016 INDICATIVE TUITION FEES AUD$</th>
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<tr>
<td>Master of Engineering</td>
<td>3693/042034J</td>
<td>2 years</td>
<td>160</td>
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ANNUAL | PER 10 CREDIT POINTS | CAMPUS | INTAKE
$3,485  | Penrith             | Feb, July

The Western Sydney University is ranked in the top 100 young universities in the world, by the prestigious Times Higher Education (THE) World University Rankings.
List of Core Units

Specialised Software Applications
This unit offers several streams of practical applications in engineering and industrial design software. You get to choose a software application stream depending on their key program. Lectures and assignments are delivered online and are enhanced by face to face contact with stream coordinators. Emphasis is placed on teaching students practical software applications skills relevant to industry needs.

Master Project 1
This unit is a problem based project unit. You are expected to conduct self-studies under supervision by academic staff. Students will identify research topics in consultation with supervisors, carry out literature survey in the fields of engineering and building construction, define research objectives and scope, establish research methodology and prepare a research plan.

Master Project 2
This unit is a continuation of the unit Master Project 1 and is a problem based project unit. You are expected to conduct self-studies under supervision by an academic staff and deliver the final outcomes of the research topics that are proposed in Master Project 1. You will employ the identified methodologies to carry out the research plans and fulfill the research objectives with the defined scope. You are required to produce an oral presentation and a final written report in the fields of engineering and building construction. You will acquire problem solving skills in this unit.

Sustainable Systems
This unit seeks to teach the essential tools available to achieve environmental sustainability in various engineering, construction, industrial design professional settings. The unit will particularly focus on the application of the tools and exploration of Australian regulatory and sustainable development practices.

Research Preparation in Postgraduate Studies
Life is research! This unit introduces you to the nature of research and why it is essential to our today’s way of living. What are the current and big questions in research? How to prepare for conducting a research in various areas? What are differences between study, investigation and research? In this unit, the main emphasis will be on different types of modern research and their methods/methodologies. It will also encompass various advanced tools that support research, its writing styles, publication channels and research ethics. Key elements of good research design are also introduced as well as the concepts of intellectual property and commercialisation.

Professional Practice and Communication
This unit introduces some of the concepts, standards and techniques associated with the current professional practice for engineering and information technology students.

These include the various elements of engineering and IT practice, basic knowledge of law of contracts and legal responsibility, competence in verbal communication and presentations and in reading and writing reports, and an understanding of ethical considerations.

Advanced Engineering Project 1
This unit develops your expertise in engineering project management including professional ethics and legal obligations and their research and presentation skills. It will be achieved through employment of appropriate research skills on a capstone project which demonstrates your professional expertise in identifying and planning an engineering project.

Advanced Engineering Project 2
In this unit, the focus will be to work on an engineering problem in a capstone project and complete the project via enhancement of research and presentation skills. It will be achieved through employment of appropriate research skills on a capstone project, which demonstrates your professional expertise of completing an engineering project.

Specialisations

CIVIL
You can choose 5 specialised alternates from the units listed below for Civil specialisation:

Advanced Numerical Methods in Engineering
The finite element method is an essential tool for the analysis and design of machine parts and civil engineering structures. The objective of this unit is to introduce the principles of finite element method and the applications of one, two and three dimensional elements in solving various engineering problems.

Advanced Structural Analysis
This unit introduces students to the aspects of structural analysis of beams, trusses, frames and plates. It covers several displacement based methods for the analysis of trusses, beams and frames, i.e. slope deflection method and matrix method. The basic concepts of plate bending analysis will be discussed. This unit aims to teach students to master necessary skills in structural analysis as well as skills in using computer software to analyse complex structures.

Advanced Water Engineering
This unit exposes students to the concepts of drainage analysis. It focuses on the surface water components of a hydrologic cycle. The hydrologic theories will be integrated with the hydraulic principles to enable holistic analysis of a catchment.

Advanced Geotechnical Engineering
This unit will provide an overview of soil mechanics concepts required for the solution of practical geotechnical engineering problems. Students will be taught soil and foundation analysis including design techniques. The topics will cover shallow foundations, pile foundations, the stability of earth retaining structures, excavations, soft soils, groundwater flow and stability of slopes. Practical engineering cases will be emphasised.

Sustainability and Risk Engineering (PG)
Analysis of sustainability with engineering perspective is increasingly becoming important in the modern world. Also, in the future sustainability will include risk engineering. Hence, engineers with in-depth understanding of different tools that can be used for both sustainability and risk analysis will have significant competitive edge in their future career. The main objective of this unit is to introduce different tools available for sustainability and risk analysis in various engineering applications. The content includes renewable/alternative energy systems, energy/resource efficiency, sustainable/green buildings, sustainable transport and infrastructure, sustainable water management, environmental management systems, sustainability reporting, life cycle analysis, probability/reliability theory, risk assessment models, overall system analysis.

Advanced Composite Structures
This unit enables students to gain an in-depth knowledge into composite structures based on Australian Standards and International Standards. Recent advances in the design of composite beams, slabs, columns and connections will be introduced.

Advanced Timber Structures
This unit enables students to gain an in-depth knowledge into timber structures based on Australian Standards. Design of timber beams, floors, columns and connections will be...
introduced with a focus on the use of plywood, round timbers, glue-laminated timber and structural laminated veneer lumber.

**Advanced Applied Mechanics**
Applied mechanics deals with the mechanical responses of structural components under various loading and support conditions. This unit will introduce the theory of elasticity and study the bending, buckling and vibration behaviours of beams, plates and shells and their associated applications in engineering practices.

**Advanced Highway Infrastructures**
This unit teaches bridge superstructure design and ground engineering design prior to construction of the highway. The aim is to provide students with advanced knowledge in bridge construction, loading and structural design, ground improvement techniques to deal with soft and weak grounds, and construction of highway embankments. These aspects will be taught in relation to Australian design codes.

**Water Resources System Analysis**
Water resources projects are large infrastructure projects requiring huge capital expenditure. In addition, multiple options are usually available to meet the project goals but at different costs and under varying constraints. This unit presents the application of optimisation techniques to select the best project from a list of competing projects. Applications of these techniques to optimally allocate available water resources are discussed. These are presented within the context of maximising the return of investment.

**Advanced Statistical Hydrology**
This unit covers at-site flood frequency analysis, regional flood frequency analysis, trend analysis of hydrological data, linear regression analysis and multivariate statistical techniques to solve advanced hydrological problems.

**Advanced Waste Management**
This unit covers sources identification and characterisation of solid and hazardous waste generated from the community. Sustainable management of waste incorporating minimisation, recycle, recovery and disposal options is discussed. Also, atmospheric pollutants and their control, greenhouse gases and their impact on climate change are examined.

**Advanced Hydrogeology**
This unit covers occurrence of groundwater, groundwater movement, groundwater hydraulics, water wells, quality of groundwater, groundwater modelling and groundwater management. The objectives of this unit are to enable students to learn the associated concept of groundwater and apply the learnt concepts in solving groundwater problems in advanced engineering practice.

**Deep Foundations**
This unit covers advanced analysis and design criteria for deep foundations. Both statically and dynamically loaded deep foundations are covered including the site investigation methods and field testing methods adopted in practice for determining integrity and load carrying capacity. Appropriate computer software will be introduced to carry out the deep foundation design according to the Australian Standards.

**Advanced Water and Waste Management**
The unit focuses on design of conventional and emerging water and wastewater treatment unit processes using fundamental science and hydraulic engineering principles. The focus is on practical design. The student will be exposed to emerging water and wastewater treatment processes and its applications through research.

**ENVIRONMENTAL**
Choose 5 specialised alternates from list below for Environmental specialisation:

**Advanced Waste Management**
This unit covers sources identification and characterisation of solid and hazardous waste generated from the community. Sustainable management of waste incorporating minimisation, recycle, recovery and disposal options is discussed. Also, atmospheric pollutants and their control, greenhouse gases and their impact on climate change are examined.

**Advanced Water and Waste Management**
The unit focuses on design of conventional and emerging water and wastewater treatment unit processes using fundamental science and hydraulic engineering principles. The focus is on practical design. The student will be exposed to emerging water and wastewater treatment processes and its applications through research.

**Sustainability and Risk Engineering (PG)**
Analysis of sustainability with engineering perspective is increasingly becoming important in the modern world. Also, in the future sustainability will include risk engineering. Hence, engineers with in-depth understanding of different tools that can be used for both sustainability and risk analysis will have significant competitive edge in their future career. The main objective of this unit is to introduce different tools available for sustainability and risk analysis in various engineering applications. The content includes renewable/alternative energy systems, energy/resource efficiency, sustainable/green buildings, sustainable transport and infrastructure, sustainable water management, environmental management systems, sustainability reporting, life cycle analysis, probability/reliability theory, risk assessment models, overall system analysis.

**Planning and Environmental Regulation**
This unit provides students with an understanding of the planning process from both a State government and Local Government perspective. The unit will cover concepts related to the planning process, focusing on development control and regulation issues, planning instruments and development applications. It will also address the areas of planning and environment law, with specific reference to the legal framework that regulates planning and development in NSW.

**MECHATRONIC**
Choose 5 specialised alternates from list below for Mechatronic specialisation:

**Mechanical System Design**
This unit advances students’ understanding on product design and development of machine components and assemblies using systems engineering approaches. The unit covers the design of main components of machinery to ensure their functionality, strength and durability. Components designed include drive components – gears, shafts, belt drives, and bearings, and structural components – welds and threaded fasteners. The machine assembly design is delivered based on systems engineering. Academic skills on research and communication are ensured to be achieved through conducting mechanical design projects.

**Advanced Robotics**
This unit is designed to introduce the engineering concepts involved in Robotics. The kinematics, dynamics, control and sensing aspects in robotics will be introduced. In addition, the concepts of artificial intelligence and their applications in robotics will also be discussed and assessed.

**Advanced Dynamical Systems**
This unit looks at how non-rigid components deform and oscillate. It looks at this classical and damped systems undergoing free vibration, steady state forced vibration and transient forced vibration. The principles of virtual work
are used to investigate the equilibrium and dynamics of mechanisms.

**Mechatronic System Design**
This unit will advance the skills of mechanics, mechanical systems and automation in the practice of engineering design as applied to mechatronic devices and systems. The ability to perform detailed design analysis of machine elements as well as control systems as applicable to manufacturing and process machinery is the intended outcome of undertaking this unit and project-based tasks will form part of the learning process and team work experience.

**Advanced Mobile Robotics**
This unit is designed to develop an understanding of the concepts involved in Mobile Robotics. The areas of mobile robot mechanics, localisation, map building and path planning will be introduced. Various sensors and their applications in mobile robotics are also to be introduced.

**Advanced Electrical Machines and Drives**
The subject covers various types of electrical motors and drive systems, their applications and control. The unit aims to introduce an advanced study of electrical machines and drives. It also covers application considerations and modern developments in high performance drive systems. This course covers various types of the speed control, the starting, the braking and the dynamics of different electrical machines and drives.

**Advanced Control Systems**
This unit covers continuous and discrete control systems. It reviews and builds on the fundamental concepts of the theory of feedback in continuous and discrete time to examine the analysis and design of advanced continuous and discrete time linear control systems. Transfer function and state variable methods are employed. Instruction makes use of extensive experimental tasks. There is also considerable use of Matlab simulations.

**ELECTRICAL**
Choose 5 specialised alternates from list below for Electrical specialisation:

**Personal Communication Systems**
This unit covers the design fundamentals of cellular systems, including frequency reuse, channel assignments, radio wave propagation in mobile environments, modulation techniques, coding techniques, spread spectrum and multiple access. It includes topics from emerging wireless technologies, and third-generation mobile communication systems and standards.

**Power Systems Planning & Economics**
This unit covers planning techniques for energy and electrical power systems. It also covers the economics of various options and reliability of electrical power systems.

**Advanced Power Quality**
This unit is to introduce students to power quality phenomena such as voltage sag/swell, distortions, unbalance, and flicker that occur in power systems. The unit also introduces terms and definitions associated with power quality, following which each phenomenon, that is, voltage sag/swell, transient overvoltage, and harmonics. In addition, flicker is presented and discussed in detail for students to understand the sources and impact of these occurrences on power system as well as typical mitigation techniques. Finally, students are introduced to power quality benchmarking, monitoring, assessment. In addition Advanced knowledge on network frequency responses is presented.

**Advanced Smart Grids and Distributed Generation**
This unit is designed to model, analyse and control of newly developing areas of distributed generation and smart grids. The unit will cover modelling, control, simulation and protection of such systems. The unit will also cover the impacts of renewable sources and power electronics on the operation of smart grids and micro-grids. The unit will also cover environmental and economic impacts of such systems.

**Instrumentation & Measurement (PG)**
This unit covers all topics associated with the measurement and presentation of physical parameters. A wide range of transducers are presented in detail, while instrumentation includes a detailed analysis of a multitude of analog and digital circuits used to amplify, transmit and display electrical signals. The application of these modules in modern measurement equipment is discussed.

**Advanced Electrical Machines and Drives**
The subject covers various types of electrical motors and drive systems, their applications and control. The unit aims to introduce an advanced study of electrical machines and drives. It also covers application considerations and modern developments in high performance drive systems. This course covers various types of the speed control, the starting, the braking and the dynamics of different electrical machines and drives.

**Advanced Signal Processing**
This unit covers the principles and techniques in signal processing. Topics include sampling and quantisation of analogue signals, analysis of digital signals in the time domain and frequency domain, digital filter design, multirate signal processing, signal processing hardware and finite precision length effects in hardware implementation. Students develop skills of analysing and designing digital signal processing systems.

**Advanced Control Systems**
This unit covers continuous and discrete control systems. It reviews and builds on the fundamental concepts of the theory of feedback in continuous and discrete time to examine the analysis and design of advanced continuous and discrete time linear control systems. Transfer function and state variable methods are employed. Instruction makes use of extensive experimental tasks. There is also considerable use of Matlab simulations.

**MECHANICAL**
Choose 5 specialised alternates from list below for Mechanical specialisation:

**Mechanical System Design**
This unit advances students’ understanding on product design and development of machine components and assemblies using systems engineering approaches. The unit covers the design of main components of machinery to ensure their functionality, strength and durability. Components designed include drive components – gears, shafts, belt drives, and bearings, and structural components – welds and threaded fasteners. The machine assembly design is delivered based on systems engineering. Academic skills on research and communication are ensured to be achieved through conducting mechanical design projects.

**Advanced Robotics**
This unit is designed to introduce the engineering concepts involved in Robotics. The kinematics, dynamics, control and sensing aspects in robotics will be introduced. In addition, the concepts of artificial intelligence and their applications in robotics will also be discussed and assessed.

**Advanced Dynamic Systems**
This unit looks at how non-rigid components deform and oscillate. It looks at un-damped and damped systems undergoing free vibration, steady state forced vibration and transient forced vibration. The principles of virtual work are used to investigate the equilibrium and dynamics of mechanisms.

**Mechatronic System Design**
This unit will advance the skills of mechanics, mechanical systems and automation in the practice of engineering design as applied to mechatronic devices and systems. The ability to perform detailed design analysis of machine elements as well as control systems as applicable to manufacturing and process machinery is the intended outcome of undertaking this unit and project-based tasks will form part of the learning process and team work experience.

**Advanced Thermal and Fluid Engineering**
This unit covers fundamental principles in the thermal and fluid engineering. While the main focus will remain on incompressible fluids, effects of compressible fluids will also be discussed. The contents of this unit include fluid mechanics, thermodynamics and heat transfer. Students will learn the engineering applications of thermal and fluid principles.

**Advanced Computer Aided Engineering**
This unit focuses on advanced topics in computer aided engineering and their applications in mechanical engineering in analysing a wide range of engineering problems. The objective of this unit is to advance students’ knowledge and skill level on the finite element method (FEM)-based computer aided engineering (CAE) and its advanced applications in the fields of solid mechanics, fluid mechanics, thermodynamics and heat transfer and product design and development as well. Academic skills on
research and communication are ensured to be achieved through conducting FEM-based CAE projects.

**Advanced Computational Fluid Dynamics**
This unit introduces students to commonly used numerical methods used in computational fluid dynamics (CFD). The unit covers the theory and the application of CFD for solving engineering problems. The numerical methods for solving the in viscous flow and the viscous flow problems will be introduced. The students learn the application of the engineering software in the engineering problems.

**Advanced Numerical Methods in Engineering**
The finite element method is an essential tool for the analysis and design of machine parts and civil engineering structures. The objective of this unit is to introduce the principles of finite element method and the applications of one, two and three dimensional elements in solving various engineering problems.

**TELECOMMUNICATION**
Choose 5 specialised alternates from list below for Telecommunication specialisation:

**Personal Communication Systems**
This unit covers the design fundamentals of cellular systems, including frequency reuse, channel assignments, radio wave propagation in mobile environments, modulation techniques, coding techniques, spread spectrum and multiple access. It includes topics from emerging wireless technologies, and third-generation mobile communication systems and standards.

**Network Management**
The performance of any modern organization is heavily dependent on their networked systems and how these systems are managed. The increasing demand for ICT services and the huge growth of the Internet have resulted in large heterogeneous networks. This unit addresses the issues relevant to management of such networks and the services that run on them. It covers the principles and current practices pertinent to integrated management of networks, systems, and services. The unit helps the students to understand relevant protocols, standards, and standards organizations. It also introduces them to trends and key research areas in management of networked systems.

**Multimedia Communication Systems**
This unit covers advanced concepts and technologies used in emerging multimedia communication systems. Theory, practice and standards for IT professionals endeavouring to build data compression systems for multimedia applications are emphasised.

**Wireless Networking**
Wireless technologies are amongst the most exciting and rapidly growing areas in computing and information technology. They implement applications that profoundly impact our personal way of communication, as well as how business in a variety of industries and organisations are conducted. This unit goes into details of such issues. It discusses wireless networking technologies and their related applications. The main features of wireless and mobile communication systems and the networked services that are based on these systems are also presented. The unit provides students with an in-depth understanding of relevant protocols, the emerging standards and standard organisations. The students are also introduced to some of the relevant current key research issues of the field.

**Instrumentation & Measurement (PG)**
This unit covers all topics associated with the measurement and presentation of physical parameters. A wide range of transducers are presented in detail, while instrumentation includes a detailed analysis of a multitude of analog and digital circuits used to amplify, transmit and display electrical signals. The application of these modules in modern measurement equipment is discussed.

**Advanced Signal Processing**
This unit covers the principles and techniques in signal processing. Topics include sampling and quantisation of analogue signals, analysis of digital signals in the time domain and frequency domain, digital filter design, multi-rate signal processing, signal processing hardware and finite word-length effects in hardware implementation. Students develop skills of analysing and designing digital signal processing systems.

**Advanced Data Networks**
This unit covers all major network technologies: asynchronous transfer mode (ATM), Internet, and telephony. Essential networking topics such as protocol layering, multiple access, switching, scheduling, routing, congestion control, error and flow control, and network security are covered in detail. An engineering approach is taken to provide insight into network design.

Students must also complete (as a condition for EA accreditation) a 12-week industrial experience training program: Industrial Experience (PG).

**Industry Placement**
Students will undertake a 12 week industry placement to obtain relevant workplace experience in Engineering companies under the supervision of professional engineers in one company or more which will give the student a solid grounding in the key program of engineering which they have chosen to pursue.
FURTHER INFORMATION
For more information about studying at Western Sydney University, including course information, English language requirements, intakes, tuition fees, assessment methods, accommodation options, financial obligations and living in Australia, please visit westernsydney.edu.au/international or email internationalstudy@newsydney.edu.au