Bachelor of Engineering (Mechanical and Nanotechnology)

Open Day will be held on Sunday 15 August 2010, City West campus. Visit unisa.edu.au/openday
Information Sessions will be held at the **Careers Festival,** Sunday 29 August 2010, Mawson Lakes campus. To register, visit unisa.edu.au/infosessions
Drop-In Times will be available from 6-10 December 2010, from 9.00am – 7.00pm at Campus Central, Mawson Lakes campus. An additional **Information Session** will be held on Wednesday 15 December, 2010, at 6.30pm, Mawson Lakes campus. To register visit unisa.edu.au/infosessions

SATAC code	434761
UniSA program code	LBMR
CRICOS code (international students only)	063515G
TER (February 2010 cut-off)	81.20
Program length	4 years
Prerequisites	SACE Stage 2 Mathematical Studies
Assumed knowledge	SACE Stage 2 Physics
Home campus	Mawson Lakes
Accepts Special Entry (STAT)	Yes
External study available	No
Part-time study available	Yes
TAFE credit available	Yes
Honours study available	Yes
Program fees	Commonwealth supported
Program fees (international students only)	(A$) $23,500 per annum
Scholarships available	unisa.edu.au/scholarship

Program overview

The program provides fundamental aspects of mechanical engineering combined with nanotechnology and hands-on experience in nanomaterials utilising both research-led teaching and practical exposure gained throughout the program. In their final year, students have the opportunity to undertake an advanced nanomaterials research project with UniSA's Mawson Institute or the Ian Wark Research Institute.

Accelerated three-year Engineering program

It is possible to complete this program in less than four years by undertaking courses offered during study period breaks. This accelerated option will be offered by the Program Director to students who achieve outstanding grades in the first year.

What will I study?

In the first year, all Engineering students study eight core engineering courses, including Engineering Design and Innovation, Mathematical Methods for Engineers 1 and 2, Mechanics and Physics, Computer Techniques, Sustainable Engineering Practice and Electrical and Energy Systems. These courses provide a practice-centred foundation to engineering that exposes students to the breadth of cross-disciplinary studies as well as how engineering is applied in industry.

Students undertake a number of hands-on engineering projects including participation in the Engineers Without Borders Challenge. By the end of first year, students can choose an area of interest to specialise in. Courses offered in following years cover areas such as design, mechanics, materials, energy, fluids, processes and engineering modelling. Specialised final-year courses provide advanced and innovative topics in mechanical and nanotechnology engineering such as nanomaterials, nanofabrication, nanocomposites, quality management and mechanical system design.

The final-year project offers the choice to extend these specialist skills through a research project, industry-based project, or one of the many special School projects. All students in the program undertake 12 weeks of compulsory industrial experience during their study. This experience is highly regarded by students and prospective employers.

Students have the opportunity to apply and integrate the knowledge and skills they have gained during their program in an industry setting. Industry experience also helps students to determine their engineering career pathway as they are able to experience particular sectors prior to graduation.

UniSA, in association with industry partners and sponsors, recognises many deserving students with prizes and awards at various levels of study (for more information visit unisa.edu.au/ame/prizes).

Students who graduate from this degree are able to apply for entry into the Master of Engineering (LMEN), and receive credit for four courses completed in the undergraduate degree. Hence it is possible to gain a bachelor and master degree in five years of full-time study.

What does it take?

The ability and desire to design, innovate, communicate, identify and solve problems is important. Students should have an inquiring mind with good verbal and written communication skills. Competence in mathematics and physics is essential.

Who will employ me?

The 21st century is hailed as the century of nanotechnology. Nanotechnology offers solutions to many current problems by means of smaller, lighter, faster and better performing materials, components and systems. This opens up new opportunities for employment. Mechanical and Nanotechnology Engineering graduates find work locally and internationally in the defence, petrochemical, minerals and materials processing, mining, research, food processing, manufacturing, pharmaceutical and environmental industries.

Professional recognition

The program is professionally accredited by Engineers Australia and is recognised as satisfying the requirements for graduate membership of Engineers Australia and comparable international institutions through the Washington Accord.

For further information on these organisations visit washingtonaccord.org and engineersaustralia.org.au

Honours

Students achieving a credit level average at the end of third year will be allowed to enrol in honours courses in fourth year. Successful completion of the program and the honours project courses may lead to the award of a degree with honours.

Program requirements

FIRST YEAR

- Computer Techniques
- Engineering Materials
- Mathematical Methods for Engineers 1
- Sustainable Engineering Practice
- Electrical and Energy Systems
- Engineering Design and Innovation
- Mathematical Methods for Engineers 2
- Mechanics and Physics

SECOND YEAR

- Mechanics and Structures
- Engineering Modelling
- Manufacturing Practice
- Mechanical Engineering Practice N
- Mechanics of Machines
- Mechanical Design Practice
- Fluid and Energy Engineering
- Elective
- Industrial Experience

THIRD YEAR

- Design for Manufacture and Assembly
- Energy Conversion and Management
- Project Planning and Control
- Computer Aided Engineering Practice
- Design in Plastics and Advanced Composites
- Engineering Maintenance
- Operations Management for Engineers
- Fluid and Energy Management Practice

FOURTH YEAR

- Total Quality Management
- Nanomaterials and Fabrication
- Mechanical Engineering Project 1
- Mechanical Systems Design
- Nanocomposites and Practice
- Mechanical Engineering Project 2

FOURTH YEAR (HONOURS)

- Total Quality Management
- Nanomaterials and Fabrication
- Mechanical Engineering Project 1
- Mechanical Systems Design
- Nanocomposites and Practice
- Mechanical Engineering Honours Project

Prof Peter Majewski

Associate Head: Research, Mawson Institute. University of South Australia

'Everything we make today is comprised of atoms. The properties of those products depend on how those atoms are arranged. For example, rearrange coal atoms and you make a diamond, rearrange sand (with a couple of other trace elements) and you can make silicone chips for your iPod; rearrange the atoms in air, dirt and water and you can make spuds!
In the not too distant future nanotechnology will be able to snap together the fundamental building blocks of nature easily, inexpensively and in most of the ways the laws of physics allow. When it does it will allow mechanical engineers to fabricate entire generations of cleaner, stronger, lighter, and more precise products.'

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