

# Engineering

The School of Engineering offers engineering consulting and research capabilities aimed at identifying practical and efficient solutions to clients' needs.

## Construction technology

UWS is home to one of Australia's best laboratories for independent testing and monitoring for the construction and manufacturing industries. Its expertise is especially relevant to civil, structural, and signal processing engineering businesses and regulatory bodies.

The University's Construction Technology Research Laboratory offers:

- » NATA accreditation for testing of both assemblies and components
- » Compliance with Australian and ISO standards
- » Static and dynamic testing
- » Testing in the laboratory or on site, such as testing of road surfaces on the site of Sydney's M7 Motorway
- » Structural monitoring services to monitor movements, strains and vibrations of structures such as bridges, multistorey buildings and other isolated structures
- » Measurement of cracks
- » Assessment and determination of modal frequencies of structures
- » Assessment of products, procedures and design criteria
- » Structural assessment and development of performance criteria for new products
- » Forensic testing

These services are suited to concrete, steel and plastics, and composites of these, as well as polystyrene, alloys and timber. They utilise:

- » Five multi-purpose loading frames, offering flexibility and a capacity of up to 5000kN (500 tonnes)
- » A 16m by 8m multiconfigurible loading floor
- » Numerous actuators, ranging from 150kN to 2000kN
- » Expertise in materials, electronics, mechatronics and industrial design



## Design and manufacturing

The School of Engineering has a range of capabilities for mechatronics, industrial design and small-scale production, with an emphasis on sustainable design.

Facilities include:

- » 3D computing modelling and simulation laboratories
- » A materials analysis and testing laboratory
- » An engineering and computer numerical controlled machining workshop
- » Product ergonomic studies and usability laboratory
- » Computer engineering laboratory
- » Electrical and electronic engineering laboratory
- » Mechatronic engineering laboratory
- » Robotic assembly laboratory

## Rapid prototyping

Using 3D computer-aided design model data to produce an accurate physical prototype – a 3D 'print' – is a fast and cost-effective way to produce physical models and functional or semi-functional prototypes. The School of Engineering uses rapid prototyping 3D printing to enable clients to:

- » Communicate design concepts
- » Conceive and present an architectural project
- » Produce models with any geometric complexity or intricacy without elaborate machine set-up or final assembly
- » Produce low-volume tooling, which can be an intermediate step between design and high-volume manufacturing
- » Test products and if necessary, modify and retest
- » Produce small runs of objects

Mechanical engineers can use 3D printers to create prototypes directly from digital data. Architects can obtain quick, inexpensive models. In industrial design models can be printed, sanded and painted to replicate production models.



Biomedical researchers can use 3D printers to create full-colour parts to accurately represent molecular models. A medical supplier could test a jaw, tooth or bone. A plastics manufacturer can reduce the expense of prototyping in plastic by checking designs first.

Other sectors finding this an invaluable tool range from window manufacturers and electrical engineering businesses to mining and R&D organisations. The technique is applicable to both industrial and commercial products.

The turn-around speed is phenomenal: for example, from request to print in barely a week for design of a product that was in stores within three months.

The School has three fused-deposition modelling machines, a Thermojet 3D printer and laser scanning facilities. They are used to make objects from various materials, including composites. If necessary a foam model can be scanned to generate the required 3D image.

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