THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

CREATE CHANGE

The NEW Bachelor of Engineering (Honours)

The future of engineering is changing. And so are we.

Over the last 18 months we've been busy reimagining the Bachelor of Engineering (Honours) program. We've talked with industry, alumni, our advisory boards, recent graduates and current students to ask them what skills future engineering graduates will need? And what will the future of engineering look like for these graduates?

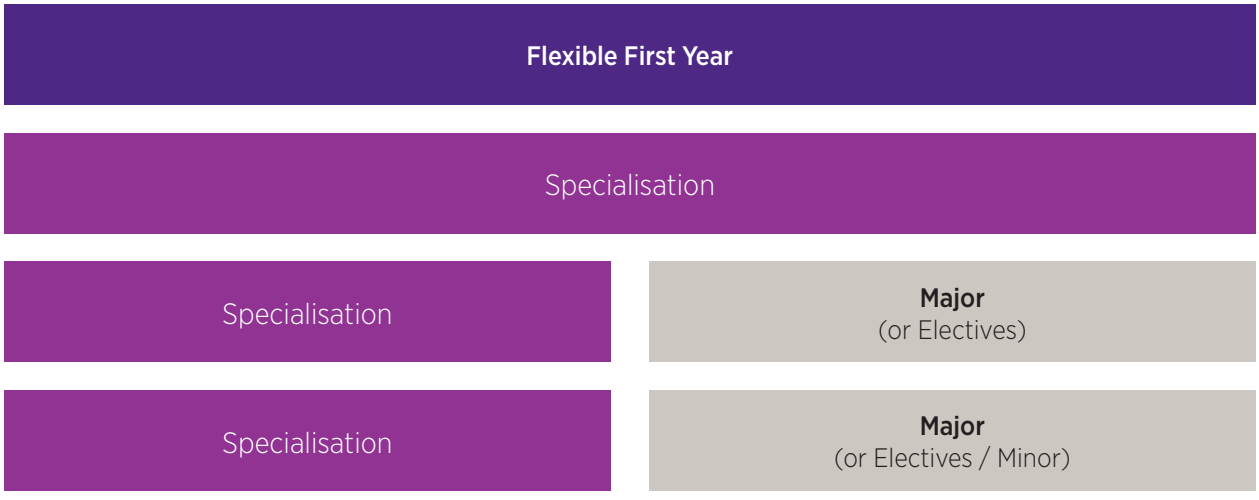
From here, we've crafted a new curriculum that will place our graduates at the forefront of engineering in 2024, 2034 and beyond.

New flexible first year.

A big change is to our flexible first year. We've reconfigured the curriculum to ensure you'll think like an engineer from day one.

This means, from the very beginning of your degree you'll be engaging in hands-on learning experiences across all aspects of engineering - you'll be in the labs and studios designing, building and doing engineering - and we've carried this extensive practical experience all the way through your program.

Bachelor of Engineering (Honours)



More study options for greater career opportunities.

Whether it's about adapting to new trends and innovations, or moving seamlessly across sectors, we're offering an education that gives you flexibility – no matter what you choose to do.

With a greater selection of majors, we're preparing you for the jobs of the future. You now have the opportunity to complement your engineering specialisation with a major in one of the new and emerging areas of engineering. You'll gain technical expertise, and sharpen your critical thinking and research skills to find answers to pressing questions.

Industry has told us that some of the biggest challenges facing graduates in the future is dealing with big data. Our response - we've introduced new courses in programming for all students, as well as options to complete a minor in Data Science or Computing.

Bachelor of Engineering (Honours)

Specialisations	 Chemical Engineering	 Civil Engineering	 Electrical Engineering	 Mechanical Engineering	 Mechatronic Engineering	 Software Engineering
Majors						
Aerospace				✓		
Biomedical	✓		✓	✓		
Bioprocess	✓					
Computer			✓		✓	✓
Environmental	✓	✓				
Fire Safety		✓		✓		
Geotechnical		✓				
General Civil		✓				
Materials	✓			✓		
Metallurgical	✓					
Mining		✓		✓	✓	
Structural		✓				
Transport		✓				
Water & Marine		✓				
Minors						
Computing	✓	✓	✓	✓	✓	
Data Science	✓	✓	✓	✓	✓	✓
Design	✓	✓	✓	✓	✓	✓

Industry experiences throughout your degree.

Contact with industry is threaded throughout the curriculum.

From your first semester, you will work on projects designed by professional engineers. Throughout your degree you will be supported by our Student Employability Team who can help you find that all-important graduate role. You will also have access to the latest industry-grade equipment at our makerspace - UQ Innovate - a place where you can collaborate and create in a friendly and supportive environment.

You'll work in teams to design and prototype scalable solutions to real engineering problems across all disciplines. Whether it is an industry design project creating a process for producing biofuels, or hands-on design, build and test experiences for biomedical applications, we are preparing you for your future - whatever it might be.

By embedding these experiences throughout your degree, when you graduate, you'll possess a distinct blend of creative and practical abilities. This will prepare you to deliver sustainable solutions that benefit communities all over the world.

Chemical Engineering

Chemical engineers play a critical role in transforming raw materials into useful products such as healthy foods, clean water, metals, medicines and sustainable energy.

Drawing on detailed process development, modelling and systems thinking, chemical engineers apply new approaches and big picture thinking to reduce waste and energy consumption.

In this hands-on specialisation you will explore topics including energy and mass flows, safety and sustainability, and the possibilities of interconnected systems. You will benefit from the insights and expertise of world-leading researchers and highly-qualified academic staff.

With practical projects, guest lecturers from industry, internships and placements with leading engineering companies, you will gain the knowledge, skills and industry connections needed to transition from university to the workplace.

Majors

Biomedical Engineering

Biomedical engineers create materials, devices and processes for better health outcomes. Applications range from nanoparticles for precise delivery of medicines, bioprinted patient-specific tissues and organs, devices to detect and treat illnesses before they impact our health, and the large scale manufacture of immune cells to fight cancer or cardiac cells to treat a broken heart. This involves learning how to apply the critical and deep systems thinking intrinsic to chemical engineering design and processes to one of the most complicated and integrated biological systems we know – the human body.

Bioprocess Engineering

Bioprocess engineers create processes and products that support the development of a healthy and sustainable world. Bioprocess engineering combines the core principles of chemical engineering and biology for scalable production of medicines, such as vaccines during pandemics, foods, and beverages. The same principles are applied to treating wastewater and converting waste streams into valuable products, such as biofuels or biodegradable plastics. This involves engineering living cells to produce desirable products and designing and optimising processes to manufacture bioproducts at scale to benefit society.

Environmental Engineering

Environmental engineers design sustainable technologies and processes. They apply engineering knowledge to environmental systems. Your studies will explore the challenges and opportunities of designing more sustainable products and processes, and how to evaluate and address trade-offs between environmental, social and economic indicators.

Materials Engineering

Materials engineers make new materials and improve existing materials by making them more functional, sustainable and affordable. They also develop strategies for effective reuse and recycling of products as we work towards a circular economy. You will learn how to design, select, and process materials to make valuable products. Your studies will explore a wide range of applications, from biomaterials and nanomaterials to 3D printing at scale.

Metallurgical Engineering

Metallurgical engineers play a vital role in developing, managing and improving the processes required to transform ore into metals and recycle metals into useful products. With a strong focus on efficiency and sustainability, these engineers are involved in the physical and chemical processing of metals from crushing, extraction and purification through to product development. In this major, you will study the modelling, design, economics of resource industry processes.

Civil Engineering

Are you ready to unleash your creative vision and gain the specialised skills you need to design and build a world that is beautiful, functional and sustainable?

In civil engineering you will study how to plan, design, construct and maintain infrastructure such as buildings, dams, airports and transport networks. You will also learn how to protect and improve the natural environment while also meeting the changing needs of society.

The civil engineering specialisation enables you to develop technical skills in building materials, the design of structures, hydrology, geotechnical engineering, fire safety and transport systems. This is complemented with an understanding of natural systems and the analysis techniques used to examine how both the built and natural environments perform and adapt to environmental challenges such as climate change and associated shifts in rainfall, wind, flooding and natural disasters as well as future population needs.

With a focus on applying engineering expertise to develop practical solutions, combined with regular interactions with the civil engineering industry and world-class academic staff, you will gain the knowledge, skills and industry links that will enable you to immediately contribute to the engineering profession.

Majors

Environmental Engineering

Civil engineers with a major in environmental engineering enhance the resilience and sustainability of our natural ecosystems and urban environments. This requires integration of technical innovations, design and development with an understanding of natural systems. You will explore how to assess, measure and develop solutions for managing resources such as energy, water, building materials, food and waste in an efficient and cost effect way without harming the environment.

Fire Safety Engineering

Fire safety engineers influence various aspects of the built environment – from the design of modern skyscrapers to the materials chosen to fabricate aeroplanes. UQ offers Australia's only dedicated fire safety engineering program, and this major helps produce graduates who understand the design principles required to improve fire and life safety so we can build more resilient cities and communities.

Geotechnical Engineering

The understanding and prediction of the behaviour of soil and rock as earth materials is imperative for creating safe, sustainable and economic civil engineering solutions. Geotechnical engineers apply scientific principles and engineering methods for developing civil engineering infrastructure on the surface and within the ground including prediction, mitigation and prevention of geological hazards.

General Civil Engineering

This major will develop your fundamental knowledge of all sub-disciplines of civil engineering. This means you will be well placed to solve and manage engineering problems across the natural and built environments, including building design, dams and flood protection systems, analysis and design of earth structures and foundations, transport system design and analysis, and pollution management.

Mining Engineering

Civil engineers with a major in mining engineering look at all phases of mining operations with a focus in geomechanics. From exploration and discovery, through feasibility, development, production, processing and marketing, to final land restoration and rehabilitation. Responsibility for the development and production phases of a mine requires a broad knowledge of all mining operations and skills in leadership and industrial relations.

Structural Engineering

Structural engineers must constantly evolve to anticipate the materials, environments, and technologies that will shape our future buildings. They use innovative materials and manufacturing methods to design efficient, adaptable, and sustainable building infrastructure. As this infrastructure must be resilient in the face of a changing environment, so structural engineers must also understand the future hazards and risks likely to arise, whether from cyclones, earthquakes, or other natural disasters.

Transport Engineering

Transport engineers work to make our everyday travel smarter and faster. They harness the power of big data analytics to learn more about how people travel around cities, and design new ways to shape their movement to reduce the density and congestion of our transport networks. This expanding information environment is also being harnessed by transport engineers to drive future mobility innovations, such as integration of autonomous and electric vehicles, and use of predictive video analytics that can identify and prevent crashes.

Water and Marine Engineering

Coastal and hydraulic engineers design and protect our urban waterways, hydraulic structures, coastlines, and oceans. Advanced monitoring and modelling technologies allow them to predict and mitigate the risks of coastal flooding, land loss, and beach erosion. These same tools allow them to work to restore large areas of coral reef and lead Australia's efforts in finding promising locations for tidal and wave energy production.

Electrical Engineering

Are you passionate about renewable energy? Do you want to discover new ways to generate power? Are you interested in building digital devices that transmit data across the world?

Within the electrical engineering specialisation, you will learn to design and manage equipment used in industries such as telecommunications, electricity generation, renewable energy and healthcare applications. You will have the opportunity to investigate embedded systems that contribute to almost every sector of society.

These systems include smartphones, electrical power and renewable energy to provide electricity for our daily use, medical imaging systems for improved healthcare, electrical appliances for homes, scientific instruments for laboratories, lasers for reliable high-speed communication, satellite systems for remote sensing of the environment, and reliable energy systems to power all of these.

With much of your coursework being hands-on, you will leave university with highly regarded specialist technical skills. This flexible and transportable degree will open opportunities with major companies across the globe.

Majors

Biomedical Engineering

Biomedical engineers create materials, devices and processes for better health outcomes. They have revolutionised healthcare for entire populations with the invention of devices and machines such as pacemakers and ultrasounds. In fact, some may say that biomedical engineers are responsible for saving more lives than doctors.

Biomedical engineering combined with electrical engineering connects technology with medicine. This major incorporates all electrical engineering subjects with specialised coursework in the use of electronics in healthcare.

Your studies will include how to design, construct and maintain health-monitoring devices, and diagnostic systems such as magnetic resonance imaging (MRIs). You will explore the fundamentals of medical signal processing, such as how to analyse electroencephalograms (EEGs), and explore how biomedical devices operate. Students also learn how to interpret the electrical signals produced by these devices.

Computer Engineering

Do you want to create the next generation of iPads, laptops or PCs? Are you interested in building computers that control machinery, medical instruments, cars, whitegoods, robots, communications equipment and satellites?

Computer engineers design and manage computer-based systems, including any device that has a computer embedded in it. That is almost every device these days, ranging from smart watches to smart home devices, smart home appliances to network routers and conventional desktop and laptop computers, to the hundreds of computer chips that can be found in modern cars and more that will be found in future self-driving cars.

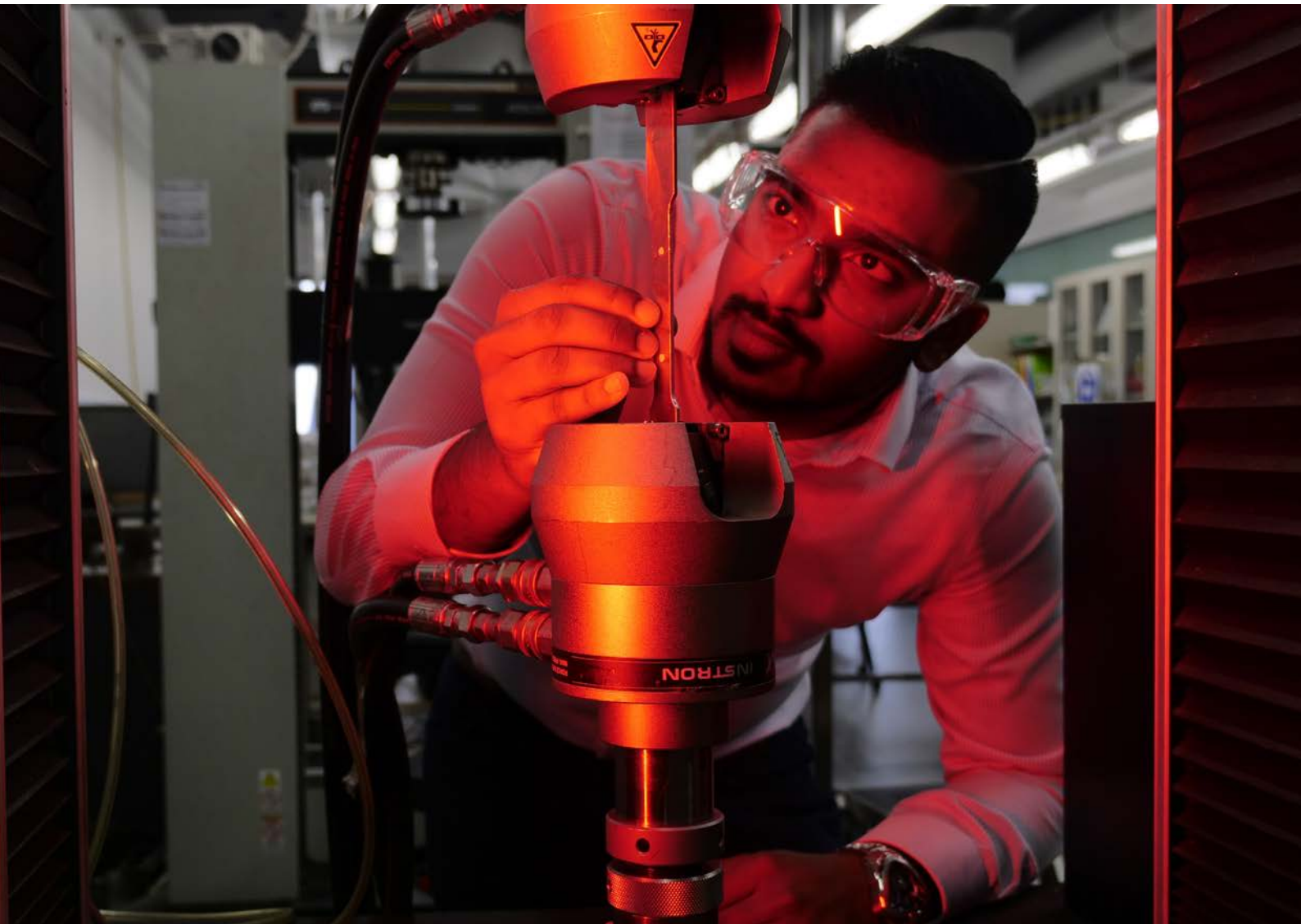
This major will equip you with the skills and knowledge you need to claim your place within a high-growth industry. During your studies, you will gain skills in digital logic design, computer networks, embedded and desktop operating systems, microcontroller selection and programming, electronics, telecommunications and signal processing.

Mechanical Engineering

From planes, trains and automobiles through to artificial hearts, elevators and the world's largest power stations, mechanical engineering involves anything and everything with moving parts.

In this broad specialisation, you will learn how to design, manufacture and control machines and engines ranging from power generators through to manufacturing systems. You'll also have access to innovative technologies and our specialist workshop areas (including our race car workshop) where you can practise your new skills.

You will study air, heat and energy flows, and learn how to control and automate machines. Using your strong analytical skills, you will identify and develop solutions for all kinds of mechanical challenges, and gain an excellent understanding of how machines are used in everyday conveniences from refrigerators to sound production, roller-coasters and computers. You will develop expertise in creating precision machinery and apply the fundamentals of physics, chemistry, biology and technology to leverage the latest advances in cutting-edge nanotechnology.



Majors

Aerospace Engineering

Aerospace engineering is all about flight, whether that's planes, helicopters or rockets. Mechanical engineers with a major in aerospace engineering design more fuel-efficient aircraft that cut emissions, design the fleets of satellites that power modern GPS technology, and create the next generation of spacecraft for missions to Mars and beyond. You will learn how to design and manufacture aircraft, launch vehicles, satellites, drones, spacecraft and ground support facilities. This dynamic major incorporates industry-based project work to help ensure graduates futureproof their careers through the development of powerful industry connections and professional networks.

Biomedical Engineering

Biomedical engineers create materials, devices and processes for better health outcomes. Working in the biomedical industry, mechanical engineers change lives. They create better, more lifelike artificial limbs to improve quality of life for injured and disabled people. Pacemakers, artificial valves and even robotic surgical assistants are all the work of mechanical engineers, as are the running blades used at Paralympic events.

Fire Safety Engineering

Fire Safety influences various aspects of the built environment – from the design of modern skyscrapers to the materials chosen to fabricate aeroplanes. This major develops the design principles required for applying fire safety engineering in the built environment to improve fire and life safety, and implement novel engineering solutions across multiple disciplines and industries.

Materials Engineering

Materials engineers improve the way we do things. They assess mechanical processes and find ways to make them more efficient, safer, and deliver better quality. This means they directly affect almost every major mechanical industry in the world, from water supply and oil and gas through to pharmaceuticals and food manufacturing. You will learn how to select, process and develop materials to design and make products, explore the impacts of temperature during processing, as well as the relationships between microstructures, mechanical properties, manufacturing and service performance.

Mining Engineering

As a mechanical engineer with a major in mining engineering, you will help ensure our communities have the vital metals and minerals we need for the steel frames in our buildings through to the microprocessors in our laptops. In this major, you'll cover the big-picture challenges facing the minerals, mining and resource industries.
You'll study the fundamentals of mining engineering as a major in mechanical engineering, giving you the foundational knowledge and more career opportunities in the resource sector.

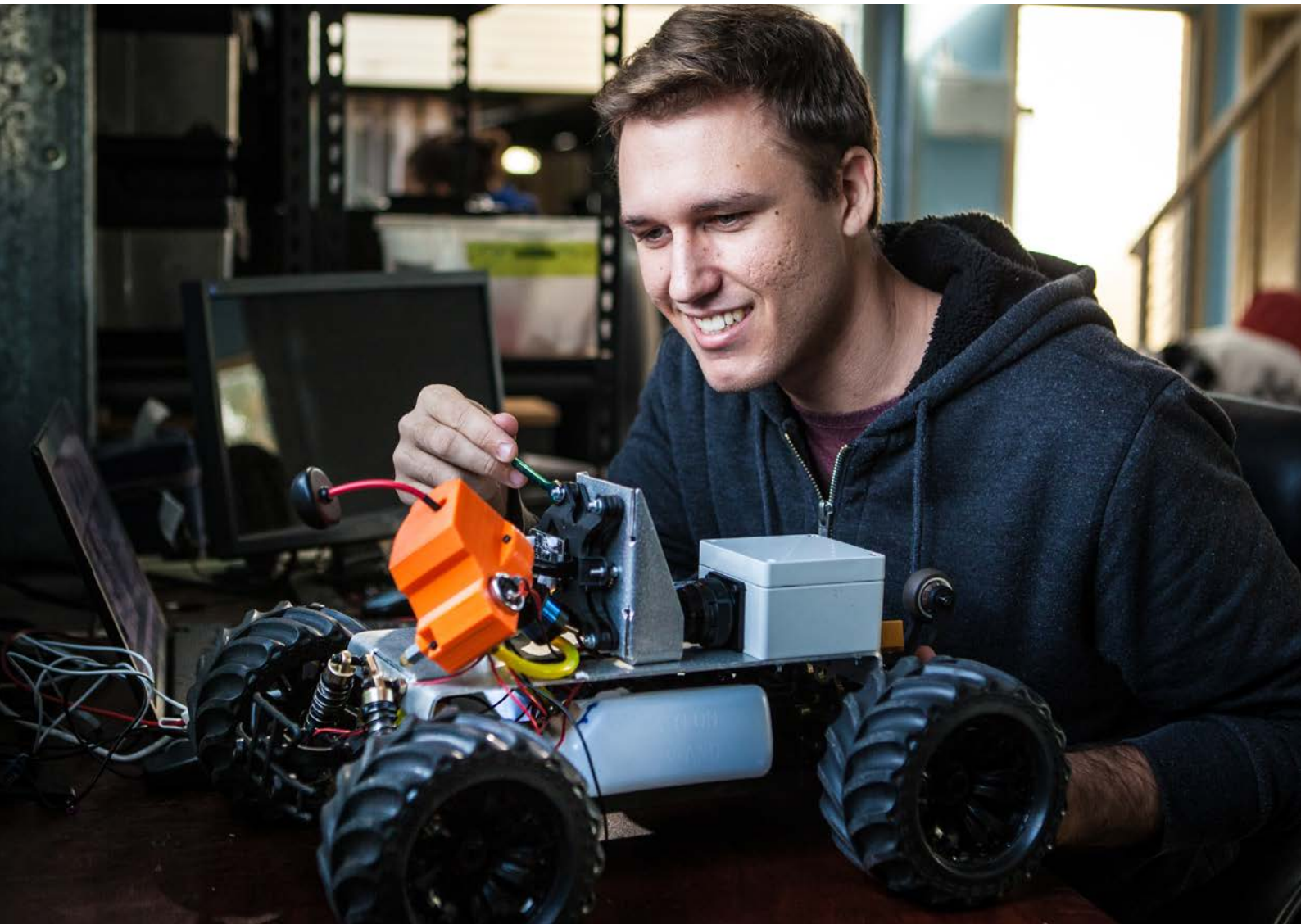
Mechatronic Engineering

Are you ready for one of the most hands-on mechatronic degrees in Australia? Do you want to learn how to retrieve a submarine from the ocean floor or build an autonomous drone?

This specialisation begins with foundational elements including theory, principles of design, mechatronic systems, professional communication skills and ethics. Your studies will incorporate the dynamics and materials of mechanical engineering along with electrical elements such as circuit design.

You will explore concepts and practical applications with studies in artificial intelligence, signal and systems theory, and control theory. This knowledge will also be integrated with computer science as you learn how mechanical and electrical components work together in aerospace systems and industrial automation.

Each year you will complete a hands-on, project-based subject as part of a student team. This will involve designing and building a system to solve a mechatronics task. Previous projects include a mini-rescue vehicle, autonomous drones, cars and sailboats, and submarine recovery. You will also complete a robotics project in your third year of study.



Majors

Computer Engineering

Mechatronic engineers with a major in computer engineering design and manage computer-based systems, including any device that has a computer embedded in it. That is almost every device these days, ranging from smart watches to smart home devices, smart home appliances to network routers and conventional desktop and laptop computers, to the hundreds of computer chips that can be found in modern cars and more that will be found in future self-driving cars.

This major will equip you with the skills and knowledge you need to claim your place within a high-growth industry. During your studies, you will gain skills in digital logic design, computer networks, embedded and desktop operating systems, microcontroller selection and programming, electronics, telecommunications and signal processing.

Mining Engineering

Mining is one of the most technologically advanced industries in Australia and the future of the resource sector is automation. In this major, you'll explore concepts and practical applications in artificial intelligence, signal and system theory and control theory and how this is applied in the resources industry. You'll learn how to design and manufacture industrial robots and smart machines that are aware of their surroundings and can make informed decisions, leading to safer and more productive jobs.

Software Engineering

In a digital future, the opportunities for software are as limitless as the human imagination.

The software engineering specialisation focuses on designing high-quality computer software and offers focused studies in computer programming, databases, web-based computing, cloud computing and cyber security. It also explores formal software engineering including how to design programs and systems that are free from errors, reliable, safe, efficient and manageable.

You will learn how to use computers to provide solutions and deliver high-quality code on time that can be integrated into existing operating environments. You will also use the principles of computer design, engineering, management, psychology and sociology in small or large multinational companies.

Majors

Computer Engineering

Do you want to create the next generation of iPads, laptops or PCs? Are you interested in building computers that control machinery, medical instruments, cars, whitegoods, robots, communications equipment and satellites?

Software engineers with a major in computer engineering design and manage computer-based systems, including any device that has a computer embedded in it. That is almost every device these days, ranging from smart watches to smart home devices, smart home appliances to network routers and conventional desktop and laptop computers, to the hundreds of computer chips that can be found in modern cars and more that will be found in future self-driving cars.

This major will equip you with the skills and knowledge you need to claim your place within a high-growth industry. During your studies, you will gain skills in digital logic design, computer networks, embedded and desktop operating systems, microcontroller selection and programming, electronics, telecommunications and signal processing.

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AUSTRALIA

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Entry Requirements

Bachelor of Engineering (Honours)

Queensland Year 12 or equivalent English, Mathematical Methods, plus one of Physics or Chemistry.

Minimum selection threshold (2020)

OP 8 / Rank 86 / IB 31 / ATAR 85.80

Bachelor of Engineering (Honours) / Master of Engineering

For direct entry: Queensland Year 12 or equivalent English, Mathematical Methods, plus one of Physics or Chemistry.

Minimum selection threshold (2020)

OP 2 / Rank 97 / IB 39 / ATAR 97.00

Please visit future-students.uq.edu.au for full details and further information.

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