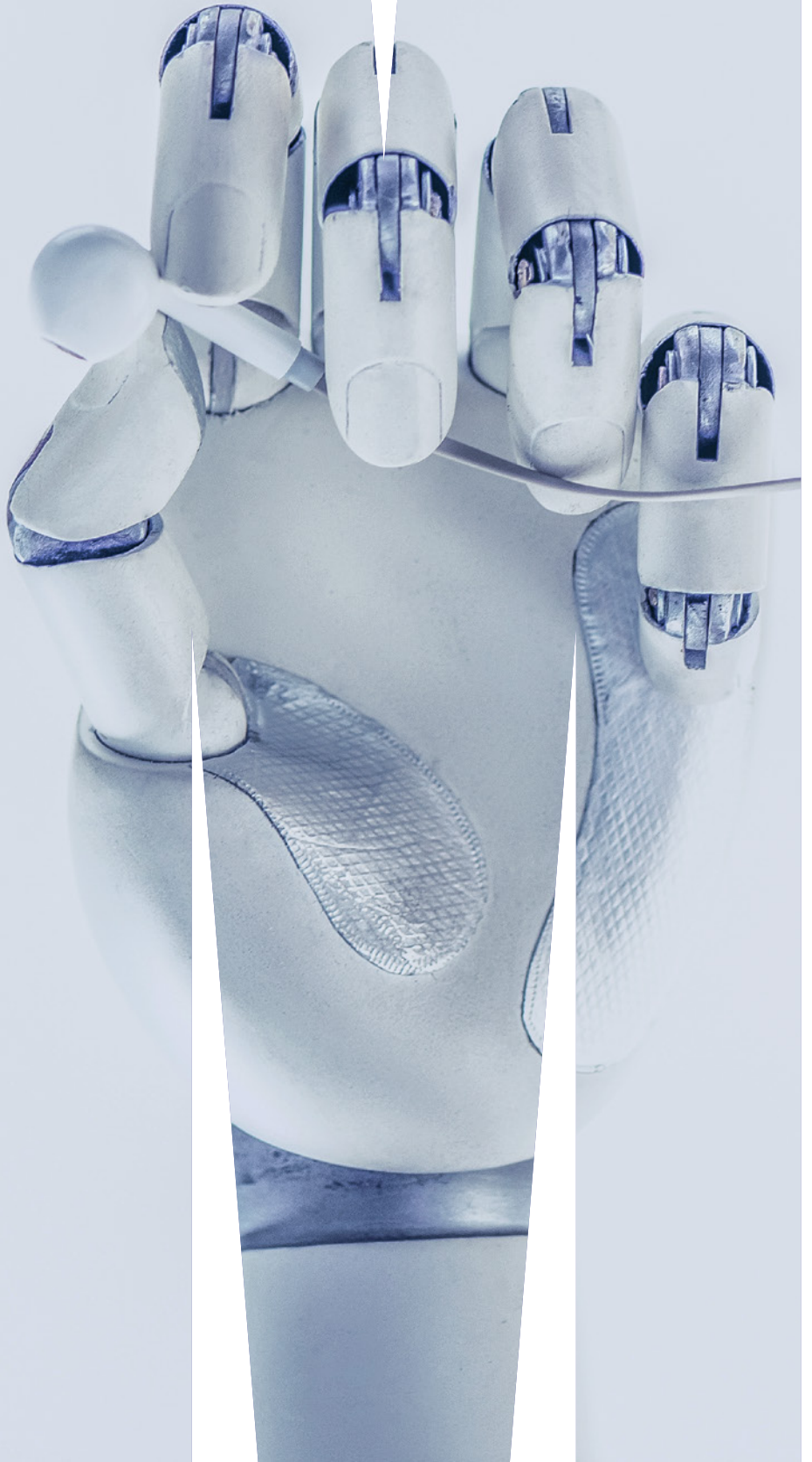




MONASH
University

MONASH
ROBOTICS AND
MECHATRONICS
ENGINEERING

[monash.edu/engineering/
robotics-mechatronics](http://monash.edu/engineering/robotics-mechatronics)



WHAT IS ROBOTICS AND MECHATRONICS ENGINEERING?

Robotics and mechatronics are multidisciplinary fields of engineering that combine mechanical engineering, computing, electronics and control theory.

At the forefront of rapidly transforming technologies, robotics and mechatronics engineers work to design robots and improve the automation, performance, features and functionality of products and systems with a mix of mechanical and electronic components. As a robotics or mechatronics engineer you could design aircraft avionics for autonomous drones, build robots for industry or medicine, develop systems based on smartphones, or help robots understand human behaviour. Robotics and mechatronics engineering is also used in the development, design and operation of processes and production lines needed to make most consumer products.

WHAT DO ROBOTICS AND MECHATRONICS ENGINEERS DO?

Key to robotics and mechatronics engineering is the ability to analyse and design complex machines and systems, which often involve automation. Robotics and mechatronics engineers work with instrumentation, sensors and computer systems. They use these to control movement, optimise processes, monitor systems and detect faults.

Robotics and mechatronics engineers can be found working in transport, manufacturing, healthcare and construction, particularly in places where automation can improve efficiency and productivity, and where reliability and safety are essential to engineering operations.

They design and develop robots to operate in collaboration with humans, and control systems for vehicles, aircraft, machinery, production lines and can now be found working in biotechnology and biomedicine.

Being multidisciplinary in nature, robotics and mechatronics engineers are highly skilled at managing projects and teams which bridge the traditional areas of mechanical and electrical engineering.

Monash University Nova Rover Team is the only student group in the southern hemisphere selected to compete in The 2019 Mars Society University Rover Challenge. The annual robotics competition held at the Mars Desert Research Station in the United States, challenges teams to design and build a rover to be used by explorers on Mars. The team of students from Engineering, Science, Law, Business and Medicine placed top 10 in the world.



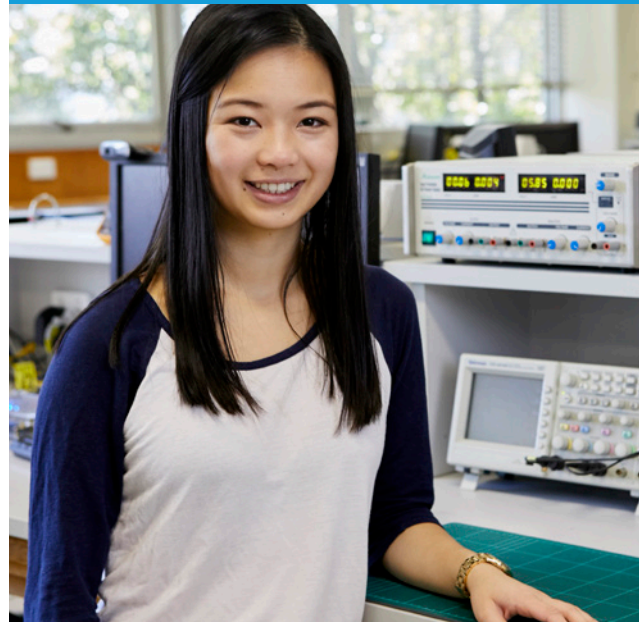
CAREERS IN ROBOTICS AND MECHATRONICS ENGINEERING

YOUR GLOBALLY RECOGNISED COURSE COULD SEE YOU WORKING IN MANY SPECIALIST AREAS INCLUDING:

SMART MANUFACTURING AND INTERNET OF THINGS	FIELD AND TEST ENGINEERING
PRODUCT AND PROCESS DESIGN	PROJECT MANAGEMENT
BUILDING SYSTEMS AND DESIGN	POWER PLANT OPERATION
RESEARCH AND DEVELOPMENT	QUALITY CONTROL
COMPUTATIONAL ANALYSIS	DEFENCE INDUSTRIES

INDUSTRIES EMPLOYING ROBOTICS AND MECHATRONIC ENGINEERS ARE:

MANUFACTURING	ELECTRONICS
TRANSPORT	MINING
AUTOMOTIVE	ROBOTICS
ANIMATRONICS	BANKING
LOGISTICS	CONSULTING
IMAGING	MEDICAL DEVICES
AEROSPACE	TELECOMMUNICATIONS



“Engineering is all about innovation and creativity, and how systems work together to achieve something amazing. And with all the smart-products and intelligent devices developing, robotics and mechatronics engineering is at the forefront. I want to be there to make it – and watch it – come alive.”

Becky Lin

Bachelor of Mechatronics Engineering (Honours) and Bachelor of Commerce
Technical Co-Lead, Precious Plastic Monash

WHY MONASH?

REPUTATION

Monash University has a strong global reputation supported by impressive credentials. We are rated as number one for engineering in Australia and are in the top one percent of universities in the world for engineering (Times Higher Education Rankings 2019).

The Faculty of Engineering is recognised as producing research that is well above world standard (Excellence in Research for Australia 2018).

WORLD-CLASS FACILITIES

Engineering is a hands-on discipline that requires the very best facilities to support your learning. Monash is proud to host a range of world-class engineering facilities, including Monash Robotics coming soon.

MORE CHOICE, GREATER FLEXIBILITY

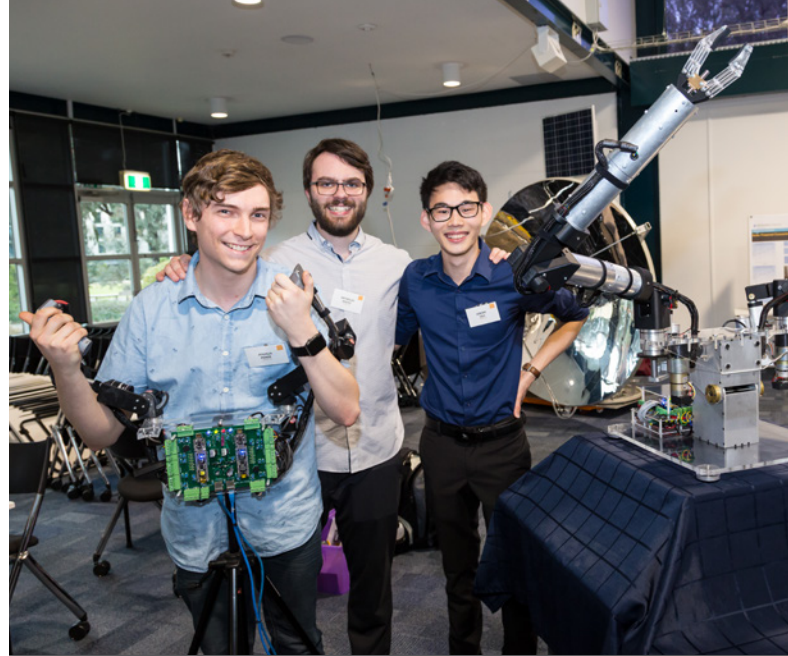
Monash offers the widest choice of engineering courses in Australia. We offer you the flexibility of the common first year – and the opportunity to broaden your career options with a double degree.

THE TOTAL EXPERIENCE

Monash Engineering is well-known for its integration of practical and theoretical learning. The faculty offers a range of enrichment activities to open your eyes to a world outside the classroom. Some of these activities include the Monash Motorsport team, the Unmanned Aerial Systems team, the Nova Rover team, Monash Human Power team, the Co-operative Education Program, the Monash Industry Team Initiative and the Summer Research Program.

PROFESSIONAL RECOGNITION

The Monash Engineering degree is accredited by Engineers Australia. Engineers Australia is signatory to the Washington Accord – an international agreement among bodies responsible for accrediting engineering degree programs. This means that your Monash Engineering qualification will be automatically recognised in any of the signatory countries.



ROBOTICS AND MECHATRONICS ENGINEERING AT MONASH

THE DEPARTMENT OF MECHANICAL AND AEROSPACE ENGINEERING

The Department of Mechanical and Aerospace Engineering is globally renowned for its teaching, its research and its facilities. It is the largest department in the Faculty of Engineering with a dynamic academic, postgraduate and postdoctoral community. Undergraduate students regularly interact with postgraduates and postdoctoral researchers.

Our researchers perform innovative work in exciting and globally relevant areas – including micro-nano devices, robotics, biomedical devices, materials design, advanced manufacturing, aerodynamics, energy, structural monitoring, wind engineering, and the latest in biomedical imaging. This research is shared with undergraduates in the classroom.

THE DEPARTMENT OF ELECTRICAL AND COMPUTER SYSTEMS

The Department of Electrical and Computer Systems Engineering is in a rapidly changing and innovative discipline area and this is reflected in its dynamic, inspiring teaching, research and extensive laboratory facilities. There is an emphasis on emerging areas such as efficient energy utilisation, wireless and broadband telecommunications, biomedical engineering artificial intelligence (AI), autonomous robotics, sensing and image recognition, as well as sophisticated control techniques for plant, transportation and power systems. Students acquire a strong grasp of reconfigurable real time computing and the interaction between electronics and the real world by a wide range of sensors and actuators.

COURSE OVERVIEW AND STRUCTURE

The degree in robotics and mechatronics engineering is completed over four years full time or eight years part time. Double degrees can also be offered with arts, commerce and science.

1

LEVEL 1

The first level of the course has units common across engineering disciplines. At the end of your first year, you can apply to specialise in robotics and mechatronics engineering.

2

LEVEL 2

Level two provides students with fundamental knowledge across the wide range of disciplines which form the basis of robotics and mechatronics. These include thermodynamics, fluid mechanics, electronics, mechanics, computer programming and digital electronics.

3

LEVEL 3

During level three, students select from one of two streams, Artificial Intelligence (AI) or Automation. Students begin to link their fundamental knowledge of robotics and mechatronics to professional areas including instrumentation, manufacturing and modelling. Students also gain practical experience by undertaking a design and build project unique to the robotics and mechatronics course.

4

LEVEL 4

In level four, study specialist subjects in a diverse range of topics in the chosen stream, such as robotics, imaging, control and measurement systems. Undertake a major project which involves elements of design, development, testing and research. Students are also given an introduction to life as a robotics and mechatronics engineer through involvement in professional practice.

COURSE HIGHLIGHTS

Understanding important aspects of mechanical and electrical engineering gives robotics and mechatronics students the edge in contributing to a range of student project activities. These activities can be undertaken throughout the degree or occur in specific year levels.

As a robotics and mechatronics student you could be asked to help design and develop engine and vehicle control systems for the Monash Motorsport Formula SAE team. Formula SAE is the world's largest student engineering design competition. The Monash team is currently ranked 2nd in the world.

For the Monash Unmanned Aerial Systems team (UAS), students assist with flight planning, avionics, power systems and flight control for the autonomous aircraft being developed for the Australian UAV Search and Rescue Challenge.

LEVEL 2 HIGHLIGHTS

In level two of the degree, robotics and mechatronics students compete with other engineering students for the chance to represent Monash in a national design competition organised by Engineers Australia. Each year the design task requires greater reliance on computer control of electro-mechanical systems as you attempt to successfully steer the robot you have designed through the set course.

LEVEL 3 AND 4 HIGHLIGHTS

In levels three and four of the degree, students undertake design and build projects which could involve things as diverse as robots for manufacturing and surgery, autonomous robots, vehicles and aircraft, micro-fluidics, and sensors for remote monitoring and mapping.

MEET OUR GRADUATES



ANDREW BOAST
Bachelor of Mechatronics Engineering (Honours)

Andrew completed his tertiary studies at Monash University Clayton Campus in 2009. He has since been employed as a Project Engineer at a firm in Moorabbin with a proud history servicing major companies, both locally and overseas.

“Working as a project engineer has allowed me to continually develop and apply a diverse range of technical and management skills across large projects in the manufacturing, automotive and mining industries. With a foundation in Mechatronics, I have been involved in both the mechanical and electrical elements of these projects.” The opportunity to design and build machines to allow companies to expand operations, become more efficient, and enhance safety has been a rewarding one.”



CHI NGUYEN
Bachelor of Mechatronics Engineering (Honours) and Bachelor of Science

Chi is currently working as a Teaching Associate at Monash University assisting students to better understand Kinematics and Dynamics in Robotics.

“I enjoy teaching and my role enables me to keep my knowledge up-to-date. Monash University has rich resources and state-of-the-art facilities that enables me to make the most out of my academic career.

If there was one piece of career advice I would tell my student-self it would be to be yourself and work hard on what you love, even though you may not see the outcomes of your efforts right away.

One of the highlights of my degree was to be awarded Top Mechatronics Student. The award is the result of my continuing to strive for excellence for 4 years and I hope I have made my fellow international students proud and have set an example for industriousness and perseverance.”



KEENAN GRANLAND
Bachelor of Mechatronics Engineering (Honours)

Graduating with Mechatronics Engineering degree in 2017, Keenan decided to go on to further study and do a PhD. As part of his PhD research, Keenan is developing an agricultural robot for apple picking with an adaptive gripper for use in complex outdoor environments.

“I am very interested in robotics and design, and my research allows me to focus on both. I enjoy the creativity. Watching the world become more “automatic” and “futuristic” as I grew up, drew me to this area of research. I wanted to be a part of it. My research involves exploring new possibilities in mechanical design. A large focus of my work is in design and analysis of parallel robots, which are finding more and more applications these days. So far the highlight of my PhD has been seeing some of the ideas I worked hard on become a reality in creating prototype to test and analyse different designs, including testing out adaptive gripper on a farm in China.”

NEXT STEPS

COURSE DETAILS

Location: Clayton, Malaysia

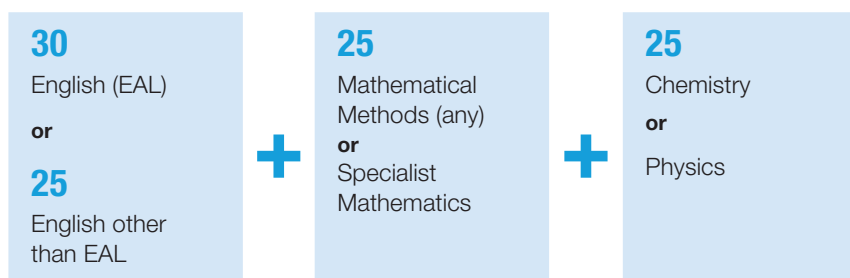
Indicative ATAR: 91.80*

Indicative IB Score: 34*

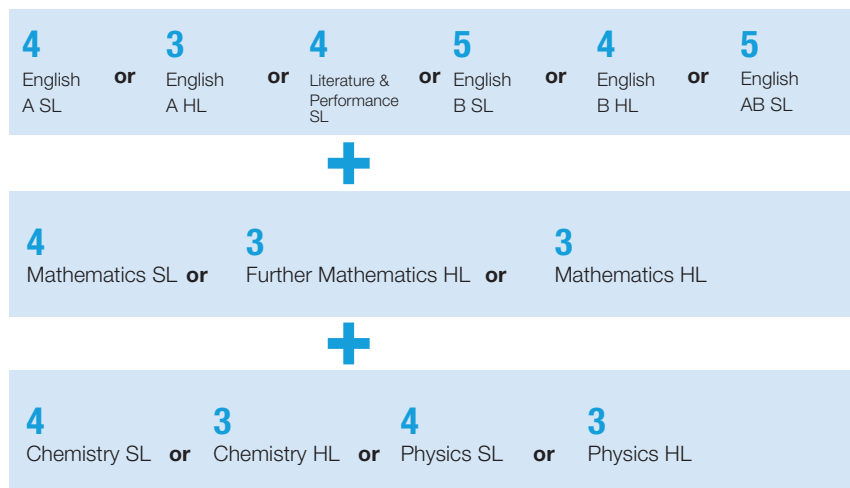
Duration: 4 years

Degree awarded: Bachelor of Robotics and Mechatronics Engineering (Honours)

VCE prerequisites (units 3 and 4)



International Baccalaureate subject prerequisites



* The scores are to be used as a guide only, and are either lowest selection rank to which an offer was made in 2019 or an Estimate (E).

HOW TO APPLY

Domestic (Australian) and onshore international students

Apply through VTAC If you are an Australian or New Zealand citizen, an Australian permanent resident, or you are an international student studying an Australian Year 12 or IB in Australia or New Zealand, apply through the Victorian Tertiary Admission Centre (VTAC).

Visit vtac.edu.au for more information.

International students

International students should apply directly to Monash University and must have completed an equivalent qualification to the Victorian Certificate of Education (VCE) and the prerequisite subjects or equivalent.

For more information, visit monash.edu/study/international

CONNECT

Please contact the Monash Engineering faculty to find out more.

Web

monash.edu/engineering/robotics-mechatronics

Email

future@monash.edu

Phone

1800 MONASH (666 274)

Further information

monash.edu/engineering/robotics-mechatronics

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The information in this brochure was correct at the time of publication (July 2019).
Monash University reserves the right to alter this information should the need arise.
You should always check with the relevant Faculty office when considering a course.

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