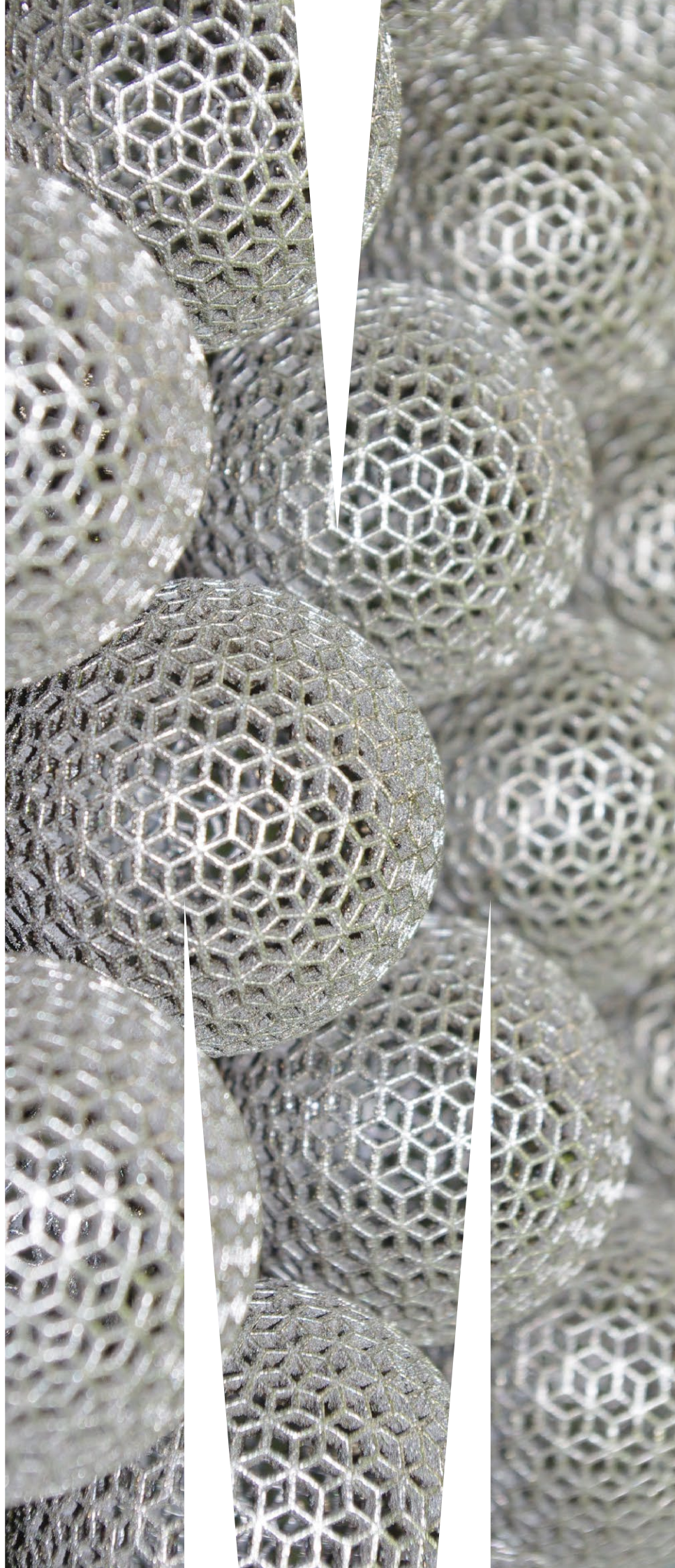


MONASH
MATERIALS
SCIENCE AND
ENGINEERING

[monash.edu/engineering/
materials](http://monash.edu/engineering/materials)



WHAT IS MATERIALS SCIENCE AND ENGINEERING?

Materials science and engineering refers to the understanding and manipulation of materials to benefit technological advances in all aspects of engineering, manufacturing and health industries.

Today, materials science and engineering also encompasses the creation of materials to meet specific needs – such as nanomaterials and functional materials. This is a new area that is only just being realised. Improved processing such as additive manufacturing and characterisation equipment (such as the Monash Centre for Electron Microscopy and Australian Synchrotron) mean the possibilities are endless.

WHAT DO MATERIALS SCIENCE AND ENGINEERING PROFESSIONALS DO?

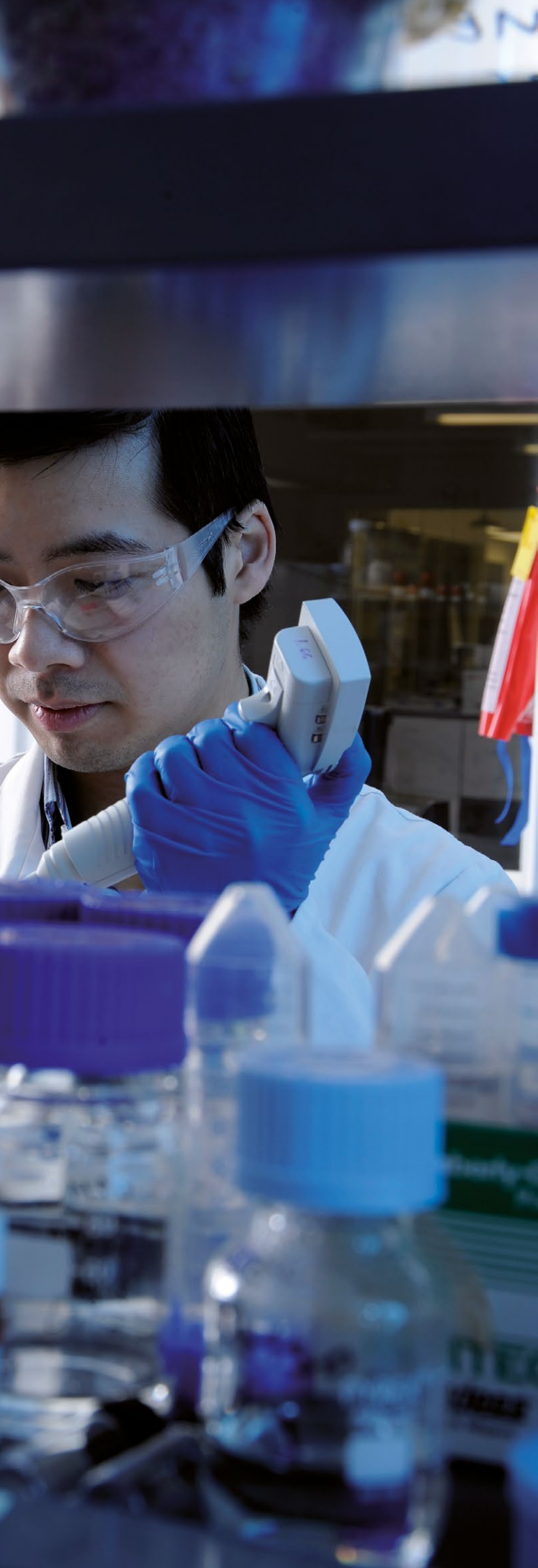
Materials science and engineering professionals make a unique contribution to the design of new devices, products and components. They also improve existing ones by altering material properties.

Working across a range of industrial activities including manufacturing, processing and recycling, materials science and engineering professionals become metallurgists, plastics engineers, ceramists, adhesive scientists, process and quality control engineers, and corrosion or fracture engineers.

Materials science and engineering professionals select, design and develop materials for:

- aerospace vehicles
- automotive industry
- solar energy and battery devices
- biomedical implants and ophthalmic devices
- construction, buildings, pipelines etc.
- tissue engineering and drug delivery
- chemical and pharmaceutical industry
- information and communication systems
- electronic and magnetic devices
- optical and opto-electronic components.





CAREERS IN MATERIALS SCIENCE AND ENGINEERING

Demand for materials professionals continues to outstrip supply. Monash materials graduates receive an exceptionally positive response in the employment market.

Monash offers one of the few available undergraduate courses to cover a broad sweep of materials issues – which is especially valuable given the multidisciplinary nature of this area. Our students secure jobs in a wide range of industries – often early in their final year.

Materials professionals have the expertise required in many areas, including:

- conservation of energy and recycling
- new biomaterials for superior implants and to heal the body
- novel electro-optic polymers that allow greater amounts of information storage
- lightweight metal alloys to conserve energy and reduce pollution
- new magnetic materials
- additive manufacturing and 3D printing
- next-gen aerospace materials
- materials for energy storage such as fuel cells, batteries and solar cells
- functional materials made at the nanoscale, including the 'wonder-material' graphene.

As such, materials engineers really make a difference in the world! Many graduates broaden their options with combined degrees in science, humanities or law. We now also offer a combined biomedical science and materials engineering degree due to the overwhelming emergence of opportunities at this interface.

COMPANIES THAT HIRE OUR MATERIALS SCIENCE AND ENGINEERING PROFESSIONALS

AECOM	Holden
Airbus	HRL
APA	Huntsman
Arthur Andersen	Infracorr
Alcoa	KPMG
BASF	Kraft
Basell	MAN
BlueScope	Melbourne Water
BHP Billiton	Orica
CSIRO	Olex Cables
Deloitte	Qenos
Dow	Telstra
DST-Group	Savcor
EPA	Shell
Esso /Exxon Mobil	Smith and Nephew
Ford	Toyota
GHD	Woodside
Glaxo Smith Kline	PricewaterhouseCoopers

MATERIALS SCIENCE AND ENGINEERING AT MONASH

The Department of Materials Science and Engineering is an international, research-active department with modern facilities and a broad education offering in materials science and engineering.

Although our work spans the entire materials field, we specialise in both the cutting-edge and fundamentals of metals and alloys, biomaterials and tissue engineering, nanomaterials, polymers, composites, corrosion, advanced materials characterisation and, most recently, materials modelling.

Our department partners with many research centres, industry organisations and research groups throughout Australia and around the world.



WHY MONASH?

REPUTATION

Monash University has a strong global reputation supported by impressive credentials. We are rated as the number one engineering school in Australia and within the top one per cent of world universities (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

Monash Engineering has outstanding facilities for education and research. The Department of Materials Science and Engineering is home to the Monash Centre for Additive Manufacturing (MCAM) and the Woodside FutureLab.

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 team, Engineering Leadership Program, the Monash Industry Team Initiative, Summer Research Program, Precious Plastics, Monash Young Medtech Innovators (MYMI) and Monash Forge.

PROFESSIONAL RECOGNITION

The Monash Engineering degree is accredited by Engineers Australia. 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.

COURSE OVERVIEW

COURSE STRUCTURE

Materials engineering is a specialisation within the Bachelor of Engineering (Honours) degree. After completing the common first year, students go on to specialise and graduate with a Bachelor of Materials Engineering (Honours).

Level one of the course therefore contains units common to all ten engineering disciplines. At the beginning of your second year, you can apply to specialise in materials engineering.

During level two you will explore topics such as crystallography, thermodynamics, biological engineering and solid mechanics.

Level three looks at applications of materials, concentrating on the unique properties of specific material groups (e.g. polymers/plastics, ceramics, metals, metal alloys), as well as surface properties such as corrosion and adhesion.

During level four you will undertake specific studies of the use of real materials in engineering. Design work and management are also a key emphasis – as is the major practical research project.

COURSE HIGHLIGHTS

Immersion in industry-based problems

During your final year, you will undertake a full-year research project that involves hands-on immersion in the field you're most passionate about. You will perform pioneering research using state-of-the-art facilities – often in collaboration with a Monash industry partner.

Incursions and excursions

Materials units are geared towards providing you with many contemporary and practical skills. To achieve this, we invite industry leaders to deliver lectures in specific topics and provide many field excursions to complement your learning.

Cross-disciplinary opportunities

Everything is made of materials – aircraft, civil structures and even chemical process plants. As such, your materials degree can take you further than you might expect. For this reason, Monash offers you the opportunity to choose electives and final-year projects that are 'cross-departmental'. We support students wishing to achieve a balance in their degree and explore sectors they are most passionate about.

DOUBLE DEGREES

More and more organisations seek engineering graduates with expertise in other disciplines. They increasingly value the breadth of knowledge evident in Monash double-degree graduates.

A double degree allows you to pursue a career in either area – or to take up one of the many opportunities emerging at the interface of disciplines.

Combine your materials engineering qualification with another bachelor's degree in:

- arts
- biomedical science
- commerce
- law
- science.

FURTHER YOUR STUDY WITH THE MASTER OF ADVANCED ENGINEERING

The Master of Advanced Engineering allows you to explore materials engineering at an advanced level and learn how to apply your new knowledge to technical challenges. The course will also focus on engineering leadership to strengthen your critical reasoning and strategic thinking skills, and will only add one or two years to your study.

MEET OUR STUDENTS



CHRISTINE CRAWSHAW
Assistant Project Manager,
AECOM

AECOM offers a popular young professionals program, which pairs graduates with mentors for support as they venture through their career.

Working in the Advanced

Materials Group at AECOM, Christine's role encompasses vast responsibilities. She liaises with clients, manages budgets and checks that contractors are following guidelines. She also regularly helps prepare technical reports, bids and marketing materials. "On the technical side, I undertake calculations for cathodic protection systems and analyse data obtained on site," says Christine.

"Life at AECOM is never boring. I am continually learning and doing something different. I enjoy work because I can do something productive with my day – and there is no homework to worry about in the evening!"



SIMONE BRENNAN
Asset Engineer,
Transfield Services

Simone was inspired to study engineering because she always loved making things. And she loved science – especially chemistry. She is now employed as an asset engineer for

Transfield Services in the facilities management and property services office in Sydney.

"I mainly work on our contract with NBN Co [National Broadband Network]. I visit their new data centre sites and ensure that their assets are captured and maintained. I also project-manage their wireless antennas that are used to provide NBN internet to people living in remote locations," explains Simone.

"Materials science and engineering was a great choice for me because I wanted to acquire the scientific knowledge behind all sorts of everyday items. I now look at everything differently and ask many questions as a result of my engineering degree."

While she was studying, Simone worked part-time at GlaxoSmithKline in Melbourne. Her advice to undergraduates is to gain work experience early in your course because it will really help you throughout your studies.



SIMONE GUALTIERI
Quality Engineer, BlueScope

Simone chose Monash because it has a fantastic reputation in the field of engineering. But she can also now appreciate the value of the course's hands-on experience and comprehensive theory-based learning.

In her role as a quality engineer, Simone troubleshoots quality-related product issues and oversees decisions made by operators – without compromising safety. Her ongoing project work centres on improving quality and processes, preventing negative cost and waste impacts, and maintaining customer satisfaction.

"I aim to make a positive impact by reinforcing the significance of continuous improvement to quality, processes and waste reduction. I also work hard to foster strong relationships with suppliers and customers to improve problem-solving and innovation," says Simone.



TIMOTHY HERZOG
Bachelor of Engineering
(Honours) and Bachelor
of Science

Timothy has parlayed a long-term interest in how theory and practice work together when building a larger machine or process, to study Engineering. He chose Monash, Australia's top engineering school* as it is the only university that he considered to allow him to pursue both his interests in science and engineering, and offered a dedicated Materials Engineering specialisation.

Since commencing his first year studies, Timothy has had the opportunity to enjoy topics spanning the full spectrum of study and industry experience, undertaking an internship at Woodside Innovation Centre and as a Research Assistant at Monash University where he worked on developing an image-based machine learning tool for BlueScope Steel. He has also worked with CSIRO on his final year project, investigating material characteristics of Titanium when certain nanoparticles are added to adapt the material for 3D printing. Harnessing his industry experience has provided Timothy with the expertise to assist groups of secondary school students in a project designed to produce a self-driving remote control car, gaining valuable skills in Pythonic coding and an understanding of the theory of Machine Learning and methods to apply them.

'After graduating, I'm considering doing my PhD, but regardless of whether I do or not, I know that I intend to enter the growing and exciting field of additive manufacturing, or 3D printing, as most people know it. I find this technology so enticing as it promises a great many new and to be developed applications, and its full potential is yet to be realised'.

*Times Higher Education World University Rankings 2019

NEXT STEPS

COURSE DETAILS

Location: Clayton

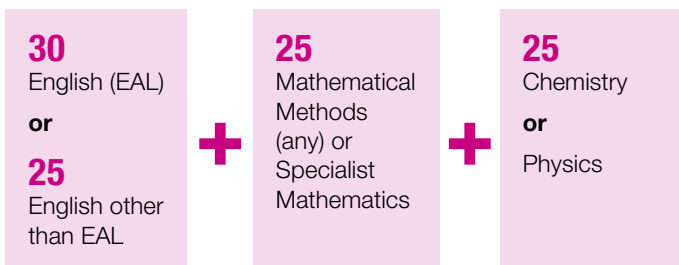
Indicative ATAR: 91.80*

Indicative IB score: 34*

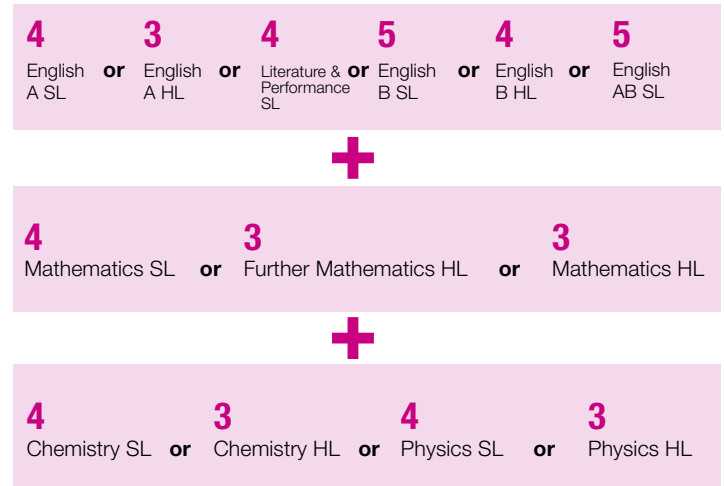
Duration: 4 years

Degree awarded: Bachelor of Materials 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).

ENTERING THE MATERIALS ENGINEERING BRANCH

After you have successfully completed your first year, you may select the materials engineering stream.





MONASH
University

HOW TO APPLY

Domestic (Australian) and onshore international students

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 www.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 Department of Materials Science and Engineering to find out more.

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Email: mateng.enquiries@eng.monash.edu

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