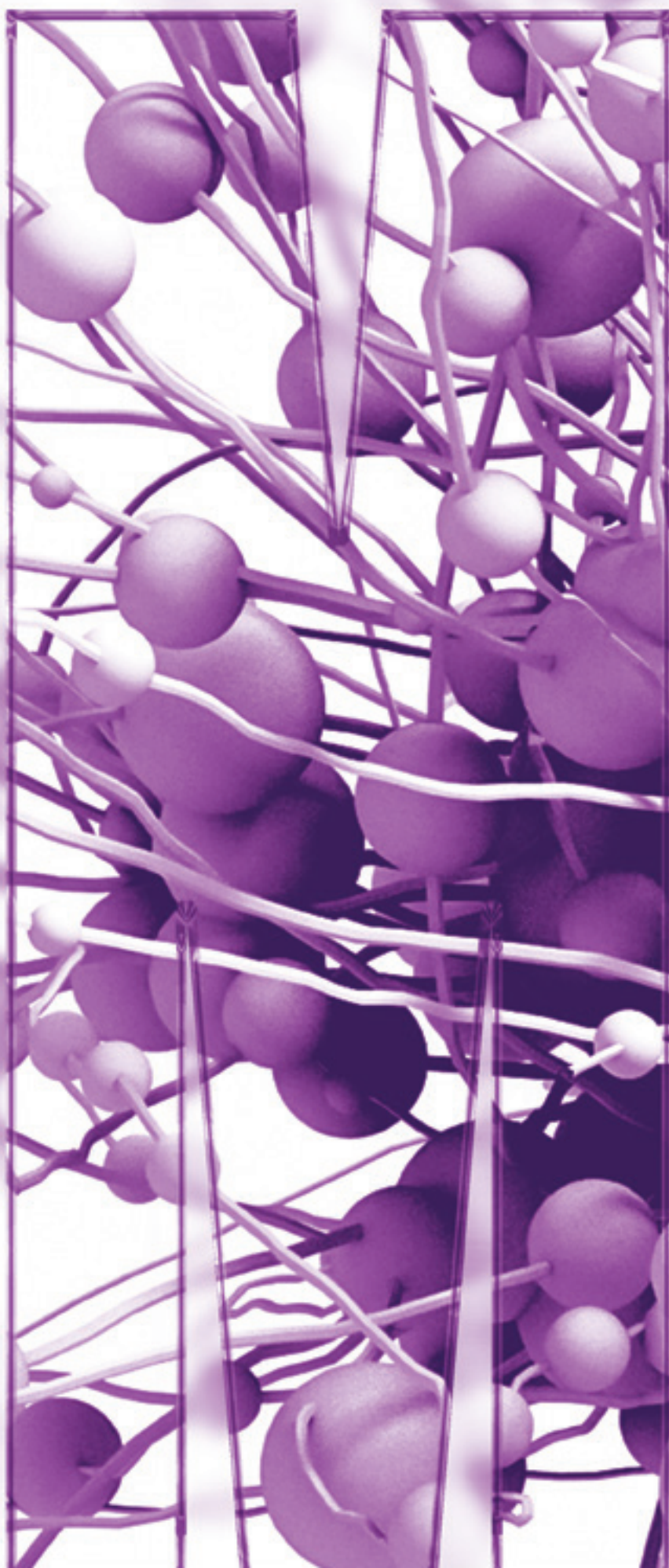


2020
SCIENCE

UNDERGRADUATE
COURSE GUIDE



WELCOME TO MONASH SCIENCE

We're facing a wide range of complex challenges – environmental pressure, climate change, booming population and an ever-changing technological, economic and social landscape.

At Monash Science, we believe in making a difference to the world by using our science training and knowledge to influence our future. Science is about learning how to analyse problems and solve them.

Our future depends on bright minds, innovators and collaborators who can create solutions that will change the world. With a science degree from Monash University, the possibilities to be a driver of change are endless.

You could find yourself on a field trip searching for fossils in Antarctica, exploring gravitational waves using the LIGO Observatory in the US, or influencing national and international policy on environmental issues.

Or you might want to be an entrepreneurial scientist using your training and knowledge in the business, government and not-for-profit sectors.

Our Bachelor of Science degree is one of the most flexible science degrees in Australia.

In addition to this flexible program, we are excited to be bringing the new Bachelor of Applied Data Science, and the Bachelor of Applied Data Science Advanced (Honours) to Monash University.

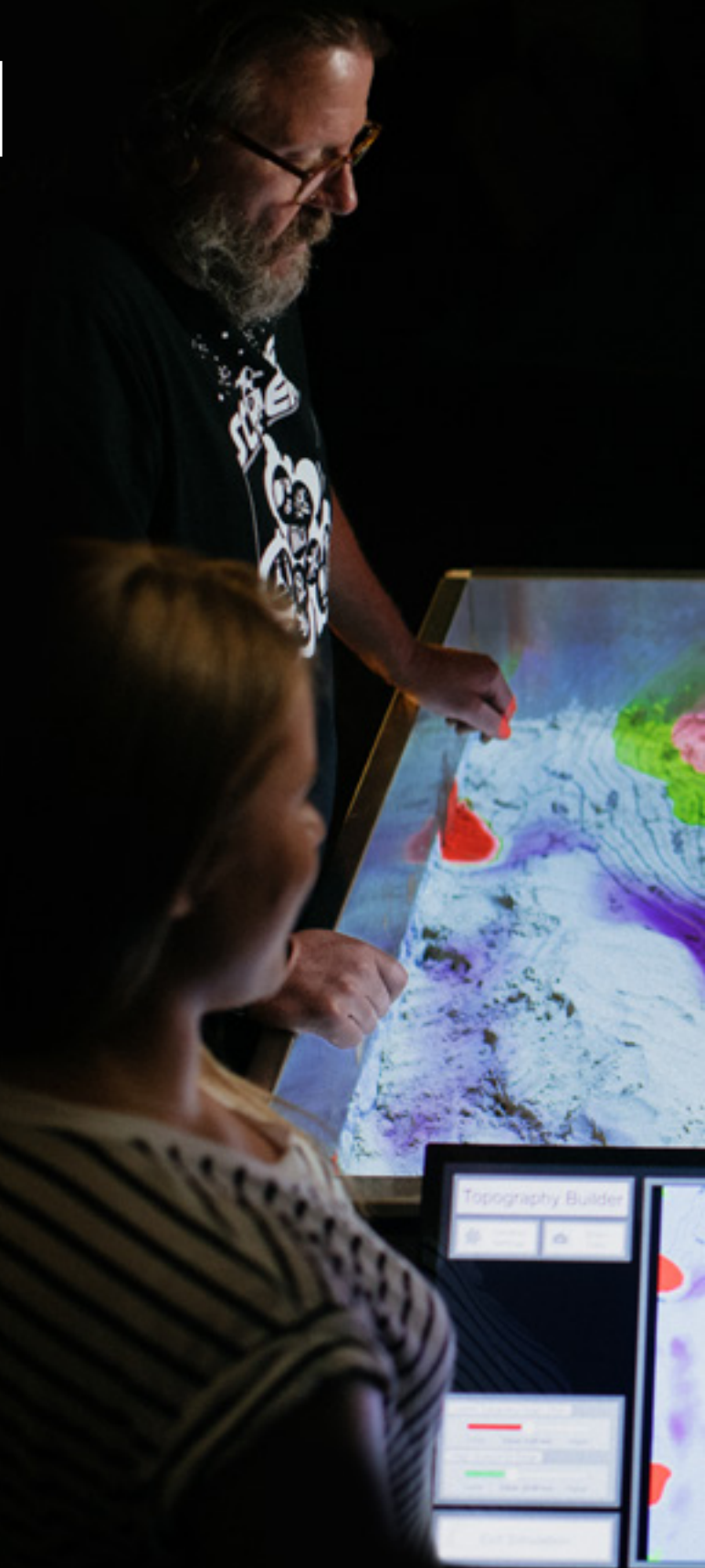
Research and analysis into big data has the capacity to make a positive impact on our daily lives.

Our new data science programs, available from 2020, will deal with the challenges that analysing and understanding large bodies of data present to science, industry, policy, and many other contexts.

When you join Monash Science, you will be immersed in a science precinct that is among the most vibrant and dynamic in the world. Our students are taught, nurtured and mentored by scientists who are at the forefront of their disciplines.

Our world-class staff and teaching environment will provide you with a globally-recognised education and the skills to make a difference in the world through science. I look forward to welcoming you, our future scientists, leaders and world-changers, in 2020.

Professor Jordan Nash
Dean, Faculty of Science
Monash University





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Course information fast facts

Look for these icons on each course page for key information.



Location



Duration (years)



Intakes



Requirements

WHY CHOOSE SCIENCE AT MONASH?





Flexibility

- Our science degrees offer flexibility and choice unrivalled by any other Australian university.
- From 2020 we will be offering new degrees in data science: the Bachelor of Applied Data Science, and the Bachelor of Applied Data Science Advanced (Honours).
- You can study subjects across the scientific spectrum, and even take units from other areas such as arts, music and business, just to name a few.
- We offer double degree options, which means you can graduate with two degrees in less time.
- You can build your course around your passion for science, and not be directed to study subject areas outside science that may not interest you.

Real experience from the world's best

- Learn from academics who are leaders in their scientific disciplines.
- We offer almost twice the number of lab hours as most Australian universities.
- Get involved in a research project – some of our students have been published in leading scientific journals before graduating!

The world is your classroom

- We offer 25 units that can take you from the classroom out into the field – to Heron Island's pristine coral cays, the jungles of Borneo, and the rocky outcrops of the Cinque Terre in Italy.
- Seize the opportunity to assist our senior staff with research into topics as diverse as natural resource exploration in Tanzania, fossicking for fossils in Antarctica and developing solutions to water purity using graphene.
- Take advantage of the Monash Abroad exchange program and study for one or two semesters at our Monash Malaysia campus, or at one of our 100 university partners worldwide.

Australia's best science facilities

Study in our new science precinct.

Science Student Learning Lounge

We have two 24/7 student lounges just for science students, along with many other comfortable breakout spaces for studying or just hanging out.

Earth Sciences Garden

We take a unique approach to teaching. For example, you'll study geology by working in our Earth Sciences Garden – an outdoor classroom like no other; the first of its kind in Australia and the most comprehensive worldwide.

Jock Marshall Reserve

We're home to the three-hectare Jock Marshall Reserve, which allows you to study the natural world in the great outdoors. The reserve also includes a new integrated learning facility.

Green Chemical Futures Building

Budding chemists take note – our home of chemistry is an award-winning, multidisciplinary innovation hub where teaching, research and industry R&D mix in an exciting, creative space.

Physics and Astronomy Collaborative learning Environment (PACE)

It's the end of traditional lectures in our first-year physics and astrophysics classes. Instead you'll benefit from problem-based learning through hands-on activities in a collaborative learning environment, with purpose-built spaces to foster teamwork and improve learning outcomes.

New Horizons Research Centre

This houses the research laboratories of the School of Physics and Astronomy. It brings together world-leading researchers from Monash and CSIRO, with diverse backgrounds in physics, astrophysics, engineering, mathematics, IT and biosciences.

Maths Learning Centre

The Mathematics Learning Centre is a drop-in centre, which offers one-to-one help if you're enrolled in mathematics and statistics units.

The Hutton-Westfold Observatory

The Hutton-Westfold Observatory at our Clayton campus allows you to observe stars and distant galaxies that are 10,000 times fainter than what can be seen with the unaided eye.

GETTING READY FOR THE REAL WORLD

- We provide career coaching and guidance to prepare you for the world after university.
- Build your professional experience with an internship or project. A science industry internship will give you real-world experience and count as credit towards your degree.
- Our 'Career skills for scientists' unit uses work-related activities to enhance valuable skills such as commercial awareness, leadership, teamwork and communication.
- For those interested in experiencing what teaching science is like, our 'Science schools project' unit places you in a classroom within a school.
- Our recruitment agency, Monash Talent, can help you find your dream job when you graduate.
- The jobs database and other services offered by Monash Career Connect assists you with work opportunities during your studies and after graduation.
- We have a proven track record of providing a springboard to a huge range of careers and graduate research in science and beyond. Depending on your major, you may be eligible to join the following professional bodies: Royal Australian Chemical Institute, Australian Institute of Biology, Australian Society for Microbiology, Environment Institute of Australia, and many others.

For more information on our help and support services, visit monash.edu/science/current-students/Social-and-Leadership





SUPPORTING YOU ALL THE WAY

Your success is our success. We partner with you to bring out your best. Science at Monash offers a range of services to help you when you start and throughout your course.

Science Student Services

Our expert course advisors are there to help you shape your course according to your interests, passions and career goals.

Science Transition Program

We've developed an online hub to help you make a smooth transition to uni. Each week when you log in, you'll see tips on where to get lecture notes, how to access library materials, managing your workload, preparing for exams and much more.

Drop-in study centres

We offer drop-in study centres for first-year students where you'll find free tutoring and academic support. If you need assistance with lecture, tutorial or laboratory class content, the tutors in the learning centres can help. Many of them are also instructors in first-year units, so they have

extensive knowledge of the unit, assignments and assessment tasks you need to complete. Tutors can also assist with developing study plans, provide tips on study techniques, and show you how to access the range of University support services available.

Mentors

Our Science Peer Mentoring Program matches you with a senior Science student who can help you get settled in and make friends as you begin your studies.

The six-week program provides you with opportunities to meet like-minded fellow students in a social setting.

For more information on our help and support services, visit monash.edu/science/current-students/Social-and-Leadership

GET INVOLVED

We offer many additional opportunities to develop networks within the University and to help you take your Science degree to the next level.

Becoming a mentor

As a mentor, you play a vital part in helping new students make a smooth transition from high school to university life. You'll meet your mentee weekly and organise fun activities to help them settle in, make friends and have a fun and successful first year. As a mentor, you receive training and support from your own 'super mentor'.

Monash Science clubs and societies

The Monash Science Society (MSS) is one of our largest student clubs, offering a range of activities throughout the year. There are also a number of other science societies such as the Biological Society, CHAMPS, MASS^3, and the Monash Atmospheric Geosciences and Environmental Society (MAGES) that provide a great opportunity to make friends and get involved.

Monash University has more than 150 student clubs and societies, as well as plenty of opportunities to become involved through the many different volunteering and leadership initiatives.

Science Future Leaders Program

Influence and inspire the next generation of scientists by joining the Science Future Leaders Program. Activities undertaken during the year-long program will help you develop a range of skills relevant to leadership in your studies and career. These include a camp, a series of leadership seminars and workshops, and the opportunity to practise leadership within the University, your chosen profession, and/or the wider community.

Science Student Ambassador Program

Science student ambassadors play a key role in promoting science programs and activities to future and current students. You'll gain hands-on experience with public speaking, social media and events. Science student ambassadors receive \$1000 as recognition of their commitment to the role.

monash.edu/science/current-students/Social-and-Leadership/science-student-ambassador-program

For more information on our help and support services, visit monash.edu/science/current-students/Social-and-Leadership



OUR COURSES AT A GLANCE

FOR STUDENTS LOOKING TO BEGIN
STUDY IN 2020.





Clayton



3 years (full-time)



ATAR¹: 85 (Domestic)
80 (International)

IB: 31

MG: 75

COURSE CODE: S2010

COURSE CODE: 099359F

BACHELOR OF APPLIED DATA SCIENCE

If you're interested in mastering big data and helping others to understand it, this is the course for you.

- This program of study will provide you with the skills necessary to solve a wide range of problems.
- It's a comprehensive course which will develop your technical know-how in being able to approach data challenges.
- Through selected streams, you'll develop your passion for the physical sciences, sociological or anthropological studies, business or engineering.
- Working in groups and on individual projects, you'll bring together key skills in IT and mathematics, and apply these to real-life projects.

Subject prerequisites

VCE

English: Units 3 and 4: a study score of at least 30 in English (EAL) or 25 in English other than EAL.

Maths: Units 3 and 4: a study score of at least 25 in Mathematical Methods (any) or Specialist Mathematics.

IB

English: Level 1.

Maths: Level 3.

For prerequisite subject requirements, please refer to page 20.

Our VTAC Subject Adjustment Bonus

This rewards students studying more than one of the following Year 12 science subjects; Algorithms (HESS), Biology, Chemistry, Environmental Science or Physics – this could improve your ranking and eligibility by providing additional points towards your ATAR aggregate.



Clayton



4 years (full-time)



ATAR¹: 90+ (Domestic)
90 (International)

IB: 33

MG: 90

COURSE CODE: S3003

COURSE CODE: 099360B

BACHELOR OF APPLIED DATA SCIENCE ADVANCED (HONOURS)

This is an advanced degree program for those passionate about data science.

- This four-year specialist course brings together studies in IT and mathematics in a series of interdisciplinary problem-solving challenges.
- The degree will give you the skills necessary to provide solutions to a wide range of problems.
- Research and analysis into big data has the capacity to make a positive impact on our daily lives.
- Through selected streams, you'll develop your passion for the physical sciences, sociological or anthropological studies, business or engineering.
- Working in groups and on individual projects, you'll bring together key skills in IT and mathematics, and apply these to real-life projects.
- Satisfactory completion of this course may provide credit toward a Monash master's by coursework degree and will provide the preparation necessary to undertake a master's by research degree or a doctoral (PhD) degree.

Subject prerequisites

VCE

English: Units 3 and 4: a study score of at least 30 in English (EAL) or 25 in English other than EAL.

Maths: Units 3 and 4: a study score of at least 30 in Mathematical Methods or Specialist Mathematics.




IB




English: Level 1.

Maths: Level 3+.

For prerequisite subject requirements, please refer to page 20.

¹ The scores provided in this publication are to be used as a guide only, and are either the lowest selection rank to which an offer was made in 2019 or an estimate. Australian domestic students ATAR. International students should consult monash.edu/study

	Clayton
	3 years (full-time)
	ATAR¹: 85 (Domestic) 80 (VCE International)
	IB: 31
	MG: 75
COURSE CODE: S2000 COURSE CODE: 017092G	

	Clayton
	4 years (full-time)
	ATAR¹: 90 + RC ² (Domestic) 85 + RC ² (International)
	IB: 33
	MG: 85
COURSE CODE: S3001 COURSE CODE: 083682D	

	Clayton
	4 years (full-time)
	ATAR¹: 95 (Domestic) 90 (International)
	IB: 37
	MG: 90
COURSE CODE: S3002 COURSE CODE: 083681E	

BACHELOR OF SCIENCE

The choice, flexibility and depth across the huge range of science disciplines available at Monash means you'll graduate with a degree unique to you, tailored to your individual expertise, interests and career aspirations.

- Flexible, not locked-in from day one to a defined area of science.
- Choose from 25 majors.
- Specialise in up to two majors – you can study an additional major from Science or from another eligible faculty.

Our VTAC Subject Adjustment Bonus

This rewards students studying more than one Year 12 science subject – this could improve your ranking and eligibility by providing additional points towards your ATAR aggregate.

monash.edu/science/subject-adjustment

Subject prerequisites

VCE

English: Units 3 and 4: a study score of at least 30 in English (EAL) or 25 in English other than EAL.

Maths or Science: Units 3 and 4: a study score of at least 25 in one of Biology, Chemistry, Environmental Science, Geography, Mathematical Methods (any), Specialist Mathematics, Physics or Psychology.

IB

English: Level 2.

Science.

For prerequisite subject requirements, please refer to page 20.

BACHELOR OF SCIENCE ADVANCED – GLOBAL CHALLENGES (HONOURS)

This course is the only one of its kind in Australia.

- Combines science with business and industry.
- One internship, which can be an international placement.
- Includes an 'Impact through science' stream that provides high-level training in leadership, persuasive communication, entrepreneurship, policy, ethics and corporate social responsibility.
- Transforms scientific expertise into a thriving business venture or social enterprise.

Visit monash.edu/science to view entry requirements and to read more about our courses.

Subject prerequisites

VCE

English: Units 3 and 4: a study score of at least 35 in English (EAL) or 30 in English other than EAL.

Maths or Science: Units 3 and 4: a study score of at least 30 in one of Biology, Chemistry, Environmental Science, Geography, Mathematical Methods (any), Specialist Mathematics, Physics or Psychology.

IB

English: Level 2.

Maths: Level 3.

Science: higher score required.

For prerequisite subject requirements, please refer to page 20.

BACHELOR OF SCIENCE ADVANCED – RESEARCH (HONOURS)

Do you see yourself making a difference in the world through the advancement of scientific research? If so, this is the course for you.

- Designed for students who intend to pursue a career in research.
- Allows for accelerated learning by progressing earlier to higher-level and advanced units.
- Enhanced opportunities for research projects.
- Research mentoring by leading scientists.
- You must undertake two Science majors.
- Direct entry into a PhD.

The Monash Guarantee (MG) allows entry into select courses by lowering the ATAR for all eligible applicants.

Subject prerequisites

VCE

English: Units 3 and 4: a study score of at least 35 in English (EAL) or 30 in English other than EAL.

Maths: Units 3 and 4: a study score of at least 30 in Mathematical Methods (any).

Maths or Science: Units 3 and 4: a study score of at least 30 in two of Biology, Chemistry, Environmental Science, Geography, Specialist Mathematics, Physics or Psychology.

IB

English: Level 2.

Maths: Level 3+.

Science: higher score required.

For prerequisite subject requirements, please refer to page 20.

¹ The scores provided in this publication are to be used as a guide only, and are either the lowest selection rank to which an offer was made in 2019 or an estimate. Australian domestic students ATAR. International students should consult monash.edu/study

² Range of criteria includes supplementary information form and interview.

COURSE MAP

This is what your studies will look like as a Bachelor of Science student.

You'll have the option to take electives, allowing you to choose subjects outside of Science or extra Science subjects, depending on your interests.

Year 1

Semester 1	Science major	Science	Maths or Statistics	Elective or second major
Semester 2	Science major	Science	Science elective	Elective or second major

Year 2

Semester 1	Science major	Science	Science Communication	Elective or second major
Semester 2	Science major	Science	Science	Elective or second major

Year 3

Semester 1	Science major	Science major	Elective or second major	Elective or second major
Semester 2	Science major	Science major	Elective or second major	Elective or second major

DOUBLE DEGREES

If you have a passion for an area outside of science, or would like to go into a field in which scientific knowledge would be an advantage, a double degree could be the perfect choice for you.

Combining Science with another area of specialisation gives you a distinct set of skills and helps you stand out in today's competitive job market.

Bachelor of Science	Duration	2019 ATAR	2019 VCE International ATAR
Second degrees available			
+ Bachelor of Arts	4	85	80
+ Bachelor of Biomedical Science	4	91.45	90
+ Bachelor of Commerce	4	91.9	90
+ Bachelor of Computer Science	4	85	80
+ Bachelor of Global Studies	4	90.5	85
+ Bachelor of Education (Honours)	4	85 + RC	80 + RC
+ Bachelor of Engineering (Honours)	5	92.65	87.50
+ Bachelor of Information Technology	4	85.3	80
+ Bachelor of Laws (Honours)	5	98	95
+ Bachelor of Music	4	85 ¹ + RC ²	80 + RC ²

To find out more about double degrees, including how they work and their benefits, visit monash.edu/science/double-degrees

¹ The scores provided are to be used as a guide only, and are either the lowest selection rank to which an offer was made in 2019 or an estimate. Australian domestic students ATAR.

International students should consult monash.edu/study

² Range of criteria includes audition.

WHERE YOUR FIRST YEAR

WHAT YOU CAN STUDY IN FIRST YEAR

Biology

Choose from:

- Blueprints for life
- Life on Earth
- Environmental biology

Possible majors

- Biochemistry
- Developmental biology
- Ecology and conservation biology
- Environmental science (extended major)
- Genetics
- Human pathology
- Immunology
- Microbiology
- Pharmacology
- Physiology
- Plant sciences
- Zoology

Example careers

- Agricultural researcher
- Animal technician
- Bioinformatician
- Biotechnologist
- Biotechnology product developer
- Botanist/plant scientist
- Clinical scientist
- Cytogeneticist
- Ecologist entomologist
- Environmental/conservation biologist
- Environmental consultant
- Environmental health promoter
- Evolution and adaptation biologist
- Fauna assessment officer
- Geneticist
- Hospital scientist
- Laboratory research technician
- Marine/freshwater biologist
- Medical researcher
- Microbiologist
- Museum curator
- Park ranger
- Patent officer
- Research scientist
- Science journalist
- Science teacher
- Soil scientist
- University lecturer
- Wildlife manager
- Zoologist

Chemistry

Choose from:

- Chemistry 1
- Chemistry 2
- Chemistry 1 advanced
- Chemistry 2 advanced

Possible majors

- Biochemistry
- Chemistry
- Physiology

Example careers

- Agrochemicals chemist
- Analytical chemist
- Biomedical chemist/analytical chemist
- Biotechnologist
- Biotechnology sales and marketing manager
- Drug development chemist
- Environmental/water chemist
- Explosives chemist
- Food technologist
- Forensic scientist
- Hospital or medical laboratory technician
- Industrial chemist
- Instrument specialist
- Molecular design chemist
- Occupational health and safety officer
- Occupational hygienist
- Paint chemist
- Pharmaceutical and product manufacturer
- Pharmaceutical representative
- Polymer chemist/materials scientist
- Process control specialist
- Quality controller
- Research chemist
- Risk-management consultant
- Science journalist
- Teacher
- Toxicologist
- Waste and resources management
- Consultant
- Water quality and management consultant
- Winemaker

Earth, Atmosphere and Environment

Choose from:

- Earth, atmosphere and environment 1
- Earth, atmosphere and environment 2

Possible majors

- Atmospheric science
- Earth science
- Environmental science (extended major)
- Geographical science

Example careers

- Atmospheric scientist
- Ecotourism operator
- Environmental geoscientist
- Environmental scientist
- Geochemist (analytical laboratories)
- Geological survey scientist
- Geologist (mineral/petroleum exploration)
- Geophysicist
- Geospatial analyst
- Geotechnical engineer
- Government advisor (environmental policy and management)
- Hydrologist
- Hydrogeologist
- Land use planner
- Landcare project manager
- Marine biologist
- Marine geoscientist
- Metallurgist
- Museum scientist
- Natural resource manager
- Palaeontologist
- Park ranger
- Research geologist
- Research geophysicist
- Soil scientist
- Weather forecaster

OF STUDY CAN TAKE YOU

Mathematics

Choose from:

- Functions and their applications
- Analysis of change
- Techniques for modelling
- Techniques for modelling (advanced)
- Discrete mathematics for computer science
- Multivariable calculus
- Multivariable calculus (advanced)
- Introduction to statistical reasoning
- Statistical methods for science

Possible majors

- Applied mathematics
- Financial and insurance mathematics (extended major)
- Mathematics
- Mathematical statistics
- Pure mathematics

Example careers

- Atmospheric scientist
- Biostatistician/data analyst
- Business analyst
- Computational mathematician
- Computer software developer
- Data mining analyst
- Environmental resource
- Model developer
- Financial consultant
- Investment/business analyst
- Market statistician
- Mathematical modeller
- Mathematics teacher
- Meteorologist
- Oceanographer
- Programmer
- Quantitative analyst
- Statistician

Physics

Choose from:

- Classical physics and relativity
- Fields and quantum physics
- Physics for the living world
- Physics for engineering
- Foundation physics
- Earth to cosmos – introductory astronomy
- Life in the universe – astrobiology

Possible majors

- Astrophysics
- Physics
- Physiology

Example careers

- Accelerator physicist
- Acoustics scientist
- Applied physicist
- Astronomer and astrophysicist
- Atmospheric physicist
- Biophysicist
- Electron microscopist
- Energy consultant
- Forensic physicist
- Industrial physicist
- Instrumentation physicist
- Materials scientist
- Medical physicist
- Nuclear physicist
- Optical physicist
- Optical systems specialist
- Patent attorney
- Physics teacher
- Synchrotron scientist
- Telecommunications specialist
- University lecturer

Computational Science

Choose from:

- Introduction to computer science
- Algorithms and programming fundamentals in python

Possible majors

- Computational science

Example careers

- Business analyst
- Business operations
- coordinator
- Consultant business systems
- Analyst
- Graduate project manager
- IT analyst
- IT consultant
- IT domain specialist
- IT support
- Project manager
- Software consultant
- Software developer
- Software test analyst
- Strategic analyst
- Technology consultant
- Web developer

Psychology

Choose from:

- Psychology 1A
- Psychology 1B

Possible majors

- Psychology

Example careers

- Career counselling
- Child psychology
- Clinical neuropsychology
- Clinical psychology
- Counselling psychology
- Educational and developmental psychology
- Forensic psychology
- Health psychology
- Management
- Organisational psychology
- Sport psychology
- Teaching

For more information about majors and sequences, visit monash.edu/science/majors

Please note: some careers may require further study.

A-Z GUIDE OF MAJORS

Within the Bachelor of Science, at least eight units will make up your Science major. You'll also have eight units of free electives, which offer you the flexibility to shape your course in a number of different ways – such as extending your major to add depth, adding a second major or a minor from the same or another course, or studying a range of units from across the University.

APPLIED MATHEMATICS

Apply techniques and models to solve problems from medicine, engineering, information technology and commerce.

- Explain observations or predict future trends.
- Contribute to new theories and adapt existing mathematical approaches to new problems.
- Develop key technical skills in advanced calculus, linear algebra, differential equations and computational methods.



BIOCHEMISTRY

Explore the chemical components and biological processes of all living systems.

- Study the chemistry within the biological processes that form the foundation for all living matter.
- Understand the cause of disease.
- See how effective treatments and vaccines are developed.



DEVELOPMENTAL BIOLOGY

Explore the processes of development from a single cell to an adult organism.

- Investigate cellular and molecular mechanisms underlying normal and abnormal development.
- Apply laboratory practices incorporating cellular, molecular and imaging techniques.
- Study topics such as gene expression, stem cell biology, tissue engineering, regenerative biology and medicine.



ENVIRONMENTAL SCIENCE

Study the interactions between the physical, chemical, geographical and biological components and processes of the environment.

- Explore current environmental challenges such as climate change, water and land management, resource use and sustainability.
- Apply scientific information to the management of our natural systems.
- Understand how environmental science can affect policy and management changes.
- The extended major in environmental science includes the choice of three streams: ecology, climate and environmental earth sciences.



ASTROPHYSICS

Use observations and the laws of physics to understand the universe and its constituents.

- Study celestial objects such as planets and stars, comets, pulsars and quasars, black holes and galaxies.
- Link the smallest and the largest objects in the universe, from strings to super clusters of galaxies.
- Explore the possibility of extra-terrestrial life.
- Use the latest technology – from large telescopes to supercomputers.



ATMOSPHERIC SCIENCE

Explore the relationship between the Earth's atmosphere, weather and climate.

- Study aspects of environmental science, applied mathematics and physics that drive weather and climate.
- Ask the big questions: Is the climate changing, and is it our fault? How can we better forecast day-to-day weather?
- Undertake exciting fieldwork, analyse and model climate, and engage in research.



CHEMISTRY

Study the science of matter and energy.

- Investigate the structure of substances.
- See how atoms and molecules react and interact, and how this affects materials, medicine and technology.
- Learn about synthetic and analytical chemistry, medicinal and biological chemistry, and physical and environmental chemistry.
- Undertake lab work in purpose-built chemistry facilities.



COMPUTATIONAL SCIENCE

Solve scientific problems through computers.

- Construct and apply mathematical models, simulations and data-analysis techniques.
- Learn the fundamentals of algorithmic problem-solving to advanced programming, 3D computer graphics and intelligent systems.
- Undertake parallel computation for massive data analysis and simulation to tackle the world's current and emerging problems.



EARTH SCIENCE

Study the structure, geology, chemistry and biology of the materials that make up our Earth. Earth science offers three streams: physical environment, climate and geosciences, and geographical science.

- Explore how the Earth has changed over geological time, and the processes that created the change.
- Investigate processes such as plate tectonics, volcanism and earthquakes, and how these affect the atmosphere, biosphere, the Earth's surface and oceans.
- Gain an understanding of our major resources, including mineral deposits, oil, gas and water.



ECOLOGY AND CONSERVATION BIOLOGY

Study the ecological and evolutionary interactions between organisms and their environments.

- Explore conservation management.
- Develop ways to reduce the escalating biodiversity loss within our world.
- Study ecosystem structure and function.
- Discover how organisms adapt to changing environments.



FINANCIAL AND INSURANCE MATHEMATICS

Apply mathematical modelling and statistical techniques to understand and assess risk in insurance and financial markets.

- Develop financial and risk models.
- Evolve financial and investment business strategies.
- Demonstrate high-level critical thinking skills to analyse, use and interpret data.



GENETICS

Study genes – their structure, function, transmission and evolution.

- Learn how genetics underpins areas such as biomedical science, conservation biology, forensics and biotechnology.
- Develop advanced practical skills in recombinant DNA technology, transgenic organism analysis, genotyping, genomics and bioinformatics.
- Design and implement both laboratory and computer-based genetic experiments.



GEOGRAPHICAL SCIENCE

Discover the relationships between people, society and the natural environment.

- Study physical and human geography, such as climatology, hydrology, soil science and sustainability theory.
- Learn about atmospheric circulation, climate change, land and water management, the coastal zone, vegetation dynamics, how landscapes change, urbanisation and environmental policy.



HUMAN PATHOLOGY

Study disease processes, including cell death, inflammation, disorders of immunity and neoplasia.

- Learn about organ system failure during disease and injury, and how this knowledge is critical for diagnosis, prognosis and medical intervention.
- Develop a comprehensive knowledge of cell injury, wound healing, fluid and vascular disorders, growth disorders and immunopathology.
- Apply practical laboratory skills such as microscopy, histological staining techniques and diagnosis.



MATHEMATICS

Discover how mathematics is used to describe, model, understand and even create aspects of the world around us.

- Develop key technical skills in advanced calculus and linear algebra.
- Explore techniques for modelling and how to use these techniques to solve complex problems.



MICROBIOLOGY

Learn about micro-organisms, including bacteria, viruses, protozoa, algae and fungi.

- Study their diversity, structure, molecular biology and how they interact with humans and other living organisms.
- Study the rise of antibiotic resistance in medically important bacteria.
- Discover how microbiologists are involved in the development of vaccines.



PHYSIOLOGY

Learn how the body functions in health and disease.

- Explore how body systems adapt when challenged by stresses such as exercise or environmental extremes, and how body functions change in diseased states.
- Examine the nerves and muscles, the brain and hormones, and the body's functionality from the molecular and cellular through to the body systems level.



PLANT SCIENCES

Study the structure, function, genetics and diversity of plants – from algae and mosses through to gymnosperms and angiosperms.

- Discover the differences and similarities between plants living on the land, in the sea and in freshwater environments.
- Learn how plants adapt to particular environments and what factors influence the distribution and diversity of plant species and communities in which they grow.



PSYCHOLOGY

Study the mind and behaviour, including investigations of the brain, learning, memory, reasoning, decision-making, language, developmental and social processes, personality and mental health.

- Examine the practical and ethical applications of psychological research.
- Opportunity to complete the Australian Psychology Accreditation Council (APAC)-accredited study for those wanting to specialise in psychology.



ZOOLOGY

Study the diversity of animals, including their evolution, form, function, behaviour and ecology.

- Explore the interactions of animals with their environments through food chains and competition for resources.
- Understand the impact that parasites and pests have on our natural food supplies.
- Undertake field trips in Australia and overseas.



IMMUNOLOGY

Learn how the immune system protects us from harmful pathogens such as bacteria and viruses.

- Study the immune system's mechanisms in cancers, allergies, autoimmunity and transplant rejection.
- Explore how the function of the immune system can be manipulated to improve development of vaccines and cures for autoimmune diseases.



MATHEMATICAL STATISTICS

Study mathematical theory and the applications of this theory in the real world.

- Explore models involving random, unpredictable components, and learn how to use these models to make informed decisions.
- Develop key technical skills in advanced calculus and linear algebra.
- Apply high-level probability, statistical and stochastic processing techniques to real-life problems.



PHARMACOLOGY

Study the effect of drugs on living organisms and how to scientifically define the term 'drug'.

- Discover how drugs affect cell responses, including whether drug action will be selective and long-lasting, and the nature of side effects.
- Learn about drugs used in the prevention or treatment of an illness and those that are taken for recreation.



PHYSICS

Study space and time, matter and energy.

- Explore the full spectrum of topics, from atom optics and BECs to particle physics and quantum science.
- Investigate recent discoveries such as the Higgs boson and gravitational waves.
- See how physics underpins other science disciplines, including medicine and engineering.
- Develop high-level analytical, numerical modelling and problem-solving skills.



PURE MATHEMATICS

Pure mathematics deals with the abstract, the rigour and the beauty of perfection.

- Explore how pure mathematics becomes the basis for applied mathematics to solve the most concrete problems.
- See how the theory of prime numbers is fundamental to security systems and electronic banking.
- Apply high-level knowledge in advanced analysis, algebra and geometry.

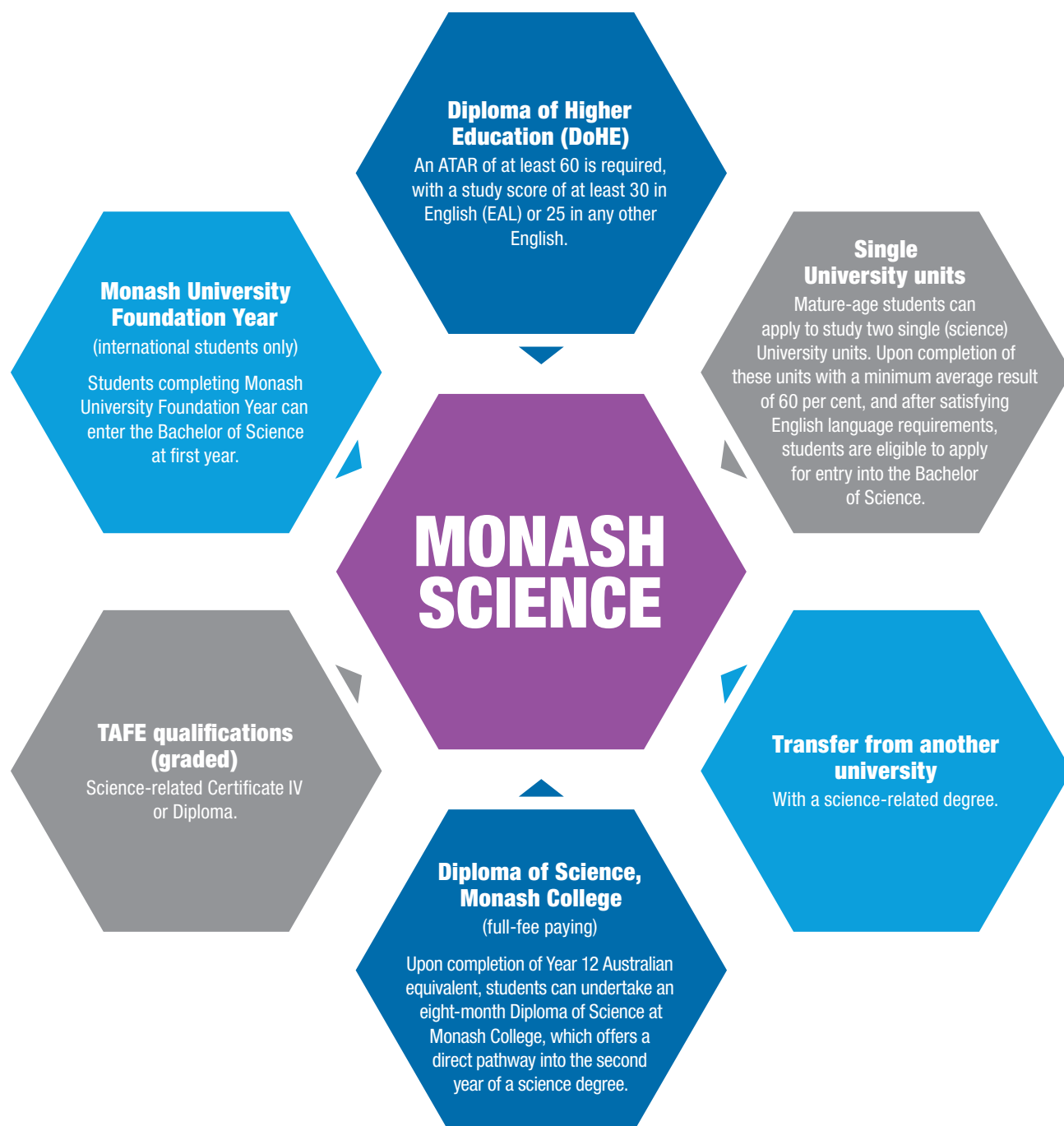
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For more information about Science as a pathway into other study areas, visit monash.edu/science/pathways



PATHWAYS INTO SCIENCE

If you don't achieve the 'right' ATAR, it isn't the end of the world – there are alternative pathways into a Bachelor of Science at Monash.



USING SCIENCE AS A PATHWAY TO OTHER STUDY AREAS

A Monash Bachelor of Science forms a strong foundation for students wanting to work towards further study in medical, pharmaceutical or psychology fields*.



Complete first year
Bachelor of Science



Use your Bachelor of Science year
as a pathway into a range of other
Monash degrees.



Range of careers depending
upon degree of choice.



**Graduate entry Bachelor
of Pharmacy (Honours)**
2 years (full-time)



**Pharmacist or employment
within science-related role**



Complete a Bachelor of Science
3 years (full-time)



**Graduate entry Bachelor
of Medical Science and Doctor
of Medicine (MD)**



Medical practitioner



**Doctor of
Veterinary Medicine**



Veterinary surgeon



Complete a Bachelor of Science
3 years (full-time)
+ Honours in Psychology
1 year (full-time)



Graduate study in psychology
– Master of Psychology
2 years (full-time)



Psychologist

For more information about Science as
a pathway into other study areas, visit
monash.edu/science/pathways

* Entry requirements apply; interested applicants should enquire with destination courses.

PREREQUISITE INFORMATION

All Monash undergraduate courses require you to have previously studied and achieved required standards in certain specified subjects.

Academic prerequisite subjects

	English		Mathematics			Science
	■ Level 1	■ Level 2	■ Level 2	■ Level 3	■ Level 3+	■ Science approved list ¹
VCE	Units 3 and 4: a study score of at least 30 in English (EAL) or 25 in English other than EAL.	Units 3 and 4: a study score of at least 35 in English (EAL) or 30 in English other than EAL.	Units 3 and 4: a study score of at least 22 in Mathematical Methods (any) or Specialist Mathematics, or a score of at least 25 in Further Mathematics.	Units 3 and 4: a study score of at least 25 in one of Mathematical Methods (any) or Specialist Mathematics.	Units 3 and 4: a study score of at least 30 in Mathematical Methods (any).	Units 3 and 4: a study score of at least 25 in one of Science approved list, unless otherwise stated.
IB	<p>At least 4 in one of the following SL subjects:</p> <ul style="list-style-type: none"> English A: Literature, or English A: Language and Literature, or Literature and Performance, <i>OR</i> <p>At least 3 in one of the following HL subjects:</p> <ul style="list-style-type: none"> English A: Literature, or English A: Language and Literature, <i>OR</i> <p>At least 5 in one of the following SL subjects:</p> <ul style="list-style-type: none"> English AB, or English B, <i>OR</i> <p>At least 4 in the following HL subject:</p> <ul style="list-style-type: none"> English B. 	<p>At least 5 in one of the following SL subjects:</p> <ul style="list-style-type: none"> English A: Literature, or English A: Language and Literature, or Literature and Performance, <i>OR</i> <p>At least 4 in one of the following HL subjects:</p> <ul style="list-style-type: none"> English A: Literature, or English A: Language and Literature, <i>OR</i> <p>At least 6 in one of the following SL subjects:</p> <ul style="list-style-type: none"> English AB, or English B, <i>OR</i> <p>At least 5 in the following HL subject:</p> <ul style="list-style-type: none"> English B. 	<p>At least 4 in one of the following SL subjects:</p> <ul style="list-style-type: none"> Mathematics, or Math Studies, or Mathematics: Applications and Interpretations, or Mathematics: Analysis and Approaches, <i>OR</i> <p>At least 3 in one of the following HL subjects:</p> <ul style="list-style-type: none"> Mathematics: Applications and Interpretations, or Mathematics, or Further Mathematics, or Mathematics: Analysis and Approaches. 	<p>At least 4 in one of the following SL subjects:</p> <ul style="list-style-type: none"> Mathematics, or Mathematics: Analysis and Approaches, <i>OR</i> <p>At least 3 in one of the following HL subjects:</p> <ul style="list-style-type: none"> Mathematics: Applications and Interpretations, or Mathematics, or Further Mathematics, or Mathematics: Analysis and Approaches. 	<p>At least 5 in one of the following SL subjects:</p> <ul style="list-style-type: none"> Mathematics, or Mathematics: Analysis and Approaches, <i>OR</i> <p>At least 4 in one of the following HL subjects:</p> <ul style="list-style-type: none"> Mathematics: Applications and Interpretations, Mathematics, or Further Mathematics, or Mathematics: Analysis and Approaches. 	<p>At least 4 at Standard Level (SL) or 3 at Higher Level (HL) from the Science approved list unless otherwise stated.</p> <p>Where Higher score required:</p> <p>At least 5 in Standard Level (SL) or 4 in Higher Level (HL) in Science approved list, unless otherwise stated.</p>

INTERNATIONAL ENTRY REQUIREMENTS

Course	Intake (semester)	Prerequisites (refer to academic prerequisites subject table on page 44)						English Language
		English		Mathematics		Science		
		Level 1	Level 2	Level 2	Level 3	Level 3+	Approved list ¹ or specified	
Bachelor of Applied Data Science	Feb	■			■			IELTS: 6.5 overall and 6.0 (listening, reading, speaking and writing) TOEFL: 79 overall, 21 Writing, 13 Reading, 12 Listening, 18 Speaking
Bachelor of Applied Data Science Advanced (Honours)	Feb	■				■		
Bachelor of Science	Feb, July	■					■	
Bachelor of Science Advanced – Global Challenges (Honours)	Feb		■		■		Higher score in one of Biology, Chemistry, Environmental Science, Geography, Physics or Psychology+	IELTS: 7.0 overall and 6.5 (listening, reading, speaking and writing) TOEFL: 94 overall, 24 Writing, 19 Reading, 20 Listening, 20 Speaking
Bachelor of Science Advanced – Research (Honours)	Feb, July		■			■	Higher score in two of Biology, Chemistry, Environmental Science, Geography, Physics or Psychology+	

¹ Science approved list: Biology, Chemistry, Environmental Systems and Societies (SL only), Further Mathematics (HL only), Geography, Mathematics, Physics or Psychology.

Note: Mathematics or Further Mathematics can only be used if not counted towards the Maths prerequisite.

² The Monash College Diploma Part 1 and Part 2 entry requirements published in this guide are for students commencing their undergraduate destination degree in 2020.



2020 ATAR for International students	GCE A Level	International Baccalaureate (IB) Diploma	All India Senior School Certificate	Indian School Certificate Examination	Advanced Placement, America	SAT, America (Total score out of 1600)	High School Diploma, Vietnam	Hong Kong Diploma of Secondary Education	SMA3, Indonesia – 100% SCALE (60% Pass)	STPM, Malaysia	UEC, Malaysia	Monash College		
												Monash University Foundation Year	Diploma Part 1 ²	Diploma Part 2 ²
80	9	28	75%	70%	7	1190	8.28	18	8.3 or 83%	8.5	4.2	72.5%	75%	Not Applicable
90	12	33	83%	77%	8	1290	8.56	21	8.8 or 88%	9.7	2.6	80%	85%	Not Applicable
80	9	28	75%	70%	7	1190	8.28	18	8.3 or 83%	8.5	4.2	72.5%	80%	50%
90 Supplementary information and interview	12	33	83%	77%	8	1290	8.56	21	8.8 or 88%	9.7	2.6	85%	Not Applicable	
95	14	36	85%	80%	9	1360	8.7	23	9 or 90%	10.3	1.8	85%	Not Applicable	

Monash Science online

monash.edu/science

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MonashUniScience

INSTAGRAM

@monashscience

TWITTER

@Monash_Science

MONASH SCIENCE YOUTUBE

youtube.com/ScienceMonashUni

MONASH ONLINE

monash.edu

FIND A COURSE

monash.edu/study

INTERNATIONAL STUDENTS

monash.edu/study/international

SCHOLARSHIPS

monash.edu/scholarships

OFF-CAMPUS LEARNING

monash.edu/offcampus

MONASH ON YOUTUBE

youtube.com/monashunivideo

FUTURE STUDENT ENQUIRIES

**Australian citizens, permanent residents
and New Zealand citizens**

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