

DEGREES OF SUCCESS

University of  
Western Sydney  
Bringing knowledge to life



AREA OF STUDY GUIDE 2012

# SCIENCES



The University of Western Sydney (UWS) provides a welcoming environment for all students, and our campuses, spread across Greater Western Sydney, offer purpose-built facilities designed to give you room to think and learn.

With ground-breaking research, recognised nationally and internationally, our academics are challenging the boundaries of knowledge and laying the pathway to success through teaching and learning excellence.

At UWS you are encouraged to aspire to achieve great things in your career and community.

# SCIENCES COURSE GUIDE 2012

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## Rochelle McCook

Bachelor of Science (Nutrition and Food)

Academic Excellence Scholarship recipient

Aspire Future Leaders Program

Rochelle McCook wants to 'make eating healthy, fun and convenient' for other people, and aspires to write a book about dietetics, and run programs for children and their parents about good nutrition. It will come as no surprise that while at the University of Western Sydney, Rochelle is studying a Bachelor of Science (Nutrition and Food).

She says she chose UWS because of her first impressions at Open Day. 'The people I met were by far the most friendly and helpful that I had seen, and the lecturers seemed to be more approachable than at other universities,' she says.

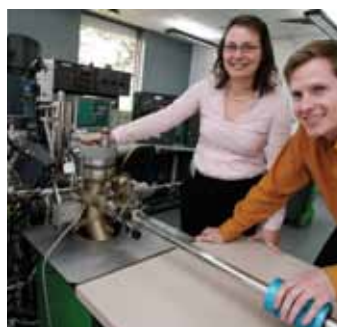
Rochelle says the convenient location of the University campus was also a factor, as is the support network available to students that makes her feel that 'questions never go unanswered.'

Rochelle says the Aspire Future Leaders program has already taught her much about leadership and reaching aspirations. She says she looks forward to the many other skills she believes she will gain through her participation. Rochelle hopes the leadership and management skills offered will help her through her studies and working life.

She says communication skills are an important factor to a good leader, as is the desire to work hard. For the Aspire Future Leaders program, Rochelle wants to contribute enthusiasm and dedication, as well as motivate others.

'Questions never go unanswered.'

# Why Study Sciences



» **UWS has a century-long tradition of agricultural research and services.**

Some of the experimental field sites include:

- » cleared agricultural lands
- » many farm dams within close proximity for replicated studies
- » climate-controlled plant-growth cabinets
- » a post-harvest controlled environment system and physiology laboratories
- » stone fruit and citrus orchards
- » a vineyard
- » an olive grove and cleared plots.

Animals kept on campus include horses, sheep, reptiles and marsupials, and agistment facilities for horses are available at the Hawkesbury campus.

- » **Prepare for a dynamic, exciting and challenging career:** Offering a wide range of contemporary and innovative degrees, the University of Western Sydney's Sciences programs combine advanced academic knowledge with practical real life training. With inspiring academics, smaller class sizes and state-of-the-art facilities, you will have everything you need to pursue an exciting scientific career.

- » **Cool toys for serious work:** UWS has a number of high-tech instruments that provide scientists with the opportunity to perform cutting edge research. The Secondary Ion Mass Spectrometer (SIMS) provides chemical analysis of surfaces, and just below the surface, of a range of materials with a sensitivity up to parts per billion. The unique Confocal Bio-Imaging Facility is a multi-user imaging and microanalysis facility allowing researchers to study how genes, molecules and proteins work and interact in living cells and organisms. The Nuclear Magnetic Resonance (NMR) Facility is arguably the best of its kind in the Southern Hemisphere, and contains three spectrometers that can be used to study areas such as drug binding, diffusion in porous systems ranging from sandstone to polymers to brain tissue, plants and water flow, and supercooled liquids and biological tissues.

- » **The drive for clean energy:** The Solar Energy Research program is driving national innovation in developing and testing clean energy alternatives. Efficiency of converting sunlight into usable energy needs to be increased, and standard testing procedures are required to compare different solar energy systems. An important challenge to solar energy research, at UWS and globally, is the verification of experimental results. Most researchers use high intensity lamps to simulate sunlight, but it is almost impossible to accurately generate the broad spectrum of wavelengths found in sunlight. The solar testing station at UWS will precisely control and measure natural sunlight focused on to experimental solar devices. The facility will test and accurately compare semi conductor solar cells developed at UWS and other research institutions. The Solar Energy Testing Facility provides world class facilities.

# at UWS?



- » Forensic Science facilities include a new Crime Scene House and:
  - » an imaging laboratory for investigations and reconstruction
  - » an instrumentation laboratory, which features a glass analysis system that can identify glass types
  - » polarisation microscopy systems to examine, for example, hairs
  - » high resolution cameras
  - » machines for examination of fingerprints
  - » a source of monochromatic light that can be tuned to examine evidence, which can quickly reveal aspects and make visible evidence that is invisible in normal light
  - » cutting-edge forensic photography technology.



- » Learn from leaders in the field: The University has a reputation for teaching and learning excellence and we invest in the continuous innovation and improvement of our teaching staff and systems. You will be challenged and stretched to learn from inspiring, enthusiastic teaching staff at the forefront of their fields. The University has an extensive and diverse array of analytical capabilities that address a wide range of industry needs. Staff provide expert advice on the right techniques to use, conduct experiments, and then work with clients and research partners on the interpretation of results.



- » Leading climate change research: Climate change and the availability of clean energy are among the biggest problems currently facing Australia. The new Hawkesbury Institute for the Environment at UWS will act as a beacon for the best and brightest climate change and energy researchers from around Australia and the world. The Hawkesbury Institute for the Environment is researching a suite of crucial environmental problems, including those related to landscape revegetation and reforestation, bio-fuel production, remediation of contaminated soils and adaptation to climate change.



- » Make today's dreams tomorrow's reality: Interested in discovering a leading-edge, specialised science career? With a UWS Science, Medical Science or Natural Science degree your career options – like science itself – are virtually limitless, including medical research or clinical disease diagnostics, climate change and environmental science, water or food quality analysis, forensic science and gene science, and medical nanotechnology.

# Bachelor of Science (Advanced Science)

The laws of science don't constrain advancement, they merely define the limits of our understanding. The University of Western Sydney's Advanced Science degree is your opportunity to expand those limits and to find new laws.

Course	UAC Code	Campus	Duration	ATAR
B Science (Advanced Science)	728050	Campbelltown	3F/6P	90.10
	728051	Hawkesbury	3F/6P	90.00
	728052	Parramatta	3F/6P	91.70
Professional Recognition				
Depending on majors and electives chosen, graduates may satisfy the requirements for admission to various professional bodies, such as the Australian Mathematical Society and the Statistical Society of Australia, the Royal Australian Chemical Institute, the Australian Society of Microbiology, the Australian Institute of Biology, the Australian Institute of Physics, the Australian Society for Biochemistry and Molecular Biology and the Royal Zoological Society of New South Wales.				

Key: B = Bachelor of; F = Full-time; P = Part-time. Note: 'part-time' refers to study load not to timetabling of evening classes.

Advanced Science allows you to study the same discipline areas as the Bachelor of Science, but to a deeper level. It gives you highly specialised skills and knowledge in a science relevant to your career and research interests, and is specifically designed to meet the needs of students with a high ability and motivation in science and a desire for a career in scientific research.

The program includes advanced coursework, academic extension activities and a significant amount of research training. A mentoring program will link you with an experienced academic staff member and research groups including medical school academics.

Each year a number of interview places for admission to the UWS B Medicine/B Surgery will be reserved for students in the first year of the Advanced Science program who meet specified criteria.

## Further Studies

An additional Honours year is available to high achieving students. The application and proposal need to be provided to the relevant academic in the final year of your Bachelor degree. Information about Honours options will be provided to you as you progress through your Bachelor degree, or you can find out more at [myfuture.uws.edu.au/honours](http://myfuture.uws.edu.au/honours)

If you are interested in pursuing a career in teaching you can consecutively study both the Bachelor of Science – Pathway to Teaching (Secondary) and Master of Teaching (Secondary) over four years. See the Teaching and Education Course Guide for more details.

## Major Studies

In the Advanced Science degree you choose one of the Bachelor of Science programs at the beginning of your first year:

- » Biological sciences
- » Chemistry
- » Environmental science
- » Forensic science
- » Mathematical science
- » Nutrition and food science
- » Zoology.

See each of the specific degrees in this guide for details on campus location, majors and career opportunities. Note it is possible to change your major later in the course.

Students must maintain a grade-point average (GPA) greater than 5 to remain in the course; those who do not maintain this average will be transferred to the corresponding Bachelor of Science. Students who do not meet the entry standards of Bachelor of Science (Advanced Science) but who are offered a place in a Bachelor of Science can transfer into the advanced program after first year if they achieve a GPA greater than 5 and there are places available. At enrolment students will be required to sign a declaration acknowledging the requirement to maintain a GPA greater than 5.

### Career Opportunities

This course is designed to provide early training for a career in scientific research. After a subsequent Honours year, and possibly a PhD, you may conduct research in:

- » private industry
- » universities
- » national and international scientific organisations.

In addition, graduates may also enter career paths such as:

- » science-based work in industry
- » government environmental agencies
- » forensic work
- » patent work
- » quality control
- » environmental consulting laboratories
- » medical laboratories
- » scientific equipment companies
- » teaching and health disciplines such as medicine and pharmacy (with additional training).

Please see the specific Bachelor of Science programs for career opportunities specific to the programs on offer.



## Melia Condon

### Bachelor of Science (Advanced Science)

### Vice-Chancellor's Leadership Scholarship recipient

### Aspire Future Leaders Program

Melia Condon originally chose Advanced Science because it provided a pathway to Medicine after first year. The decision to study Medicine was sparked on a school mission trip to Darwin where she witnessed first-hand the terrible health problems facing Aboriginal communities. The visit convinced Melia that medicine was the right career for her.

However, Melia is now enjoying the course so much that she plans to complete her current degree and then undertake a graduate medical course. She says she was 'originally looking into undergraduate medicine, but after talking to a UWS student doing this science degree I realised that it was a great way to transition from high school to uni, so I'm going to finish this degree and then go into a graduate medicine degree'.

Melia says she hasn't decided yet what she'll do after she finishes studying. 'Right now I'm keeping my options open – maybe I'll end up specialising in surgery or paediatrics.'

When researching her options, Melia applied for and was granted a Vice-Chancellor's Leadership Scholarship, providing \$10,000 per year for five years. This scholarship has not only made it possible for Melia to attend university, but has also enabled her to live on campus and have a better experience. 'Without the scholarship, it would have been very difficult for me to go to uni. I can focus more on my study, so I'm very grateful,' Melia says.

If you are considering Science at UWS, Melia offers one piece of advice – do thorough research and talk to current students. 'I know what an impact hearing previous students speak had on my decision to come to UWS.'

# Bachelor of Science

Offering a flexible and contemporary education in modern science with a variety of campus locations, the UWS Bachelor of Science degree allows you to specialise in a particular area of science or gain a broad based education in a range of sciences. You can even complement your science studies with subjects from non-science disciplines such as the arts, humanities and social sciences.

The UWS Bachelor of Science is a versatile degree that is designed for maximum flexibility for those students who are interested in the area of Science but haven't decided on a specific course of study. You can tailor your own degree to suit your areas of interest and develop a unique range of interdisciplinary skills.

Course	UAC Code	Campus	Duration	ATAR
B Science	728055	Campbelltown	3F/6P	70.25
	728056	Hawkesbury	3F/6P	70.00
	728057	Parramatta	3F/6P	70.30
Professional Recognition				
Depending on the major and electives chosen, graduates may satisfy the requirements for admission to various professional bodies, such as the Australian Mathematical Society and the Statistical Society of Australia, The Royal Australian Chemical Institute, The Australian Society of Microbiology, The Australian Institute of Biology, the Australian Institute of Physics, the Australian Society for Biochemistry and Molecular Biology and the Royal Zoological Society of New South Wales.				

Key: B = Bachelor of; F = Full-time; P = Part-time. Note: 'part-time' refers to study load, not to timetabling of evening classes.

The UWS Bachelor of Science will allow you to develop fundamental skills in quantification and analysis, as well as the capacity for critical analysis, problem solving and independent thought – the skills employers are looking for. Throughout the course, you will acquire and process knowledge in areas relevant to research and industry, and you will gain technical skills, confidence and independence in conducting laboratory work and field work.

You will also become proficient in organising and interpreting complex data and you will develop the communication skills required to present this data to an audience. Importantly, the UWS Bachelor of Science degree is very hands-on, offering you unique opportunities to participate in ground breaking research with UWS academics, well known for their research credentials and scientific developments, or at outside institutions.

These practical, skills based programs will enable you to move readily into the workforce.

## Further Studies

An additional Honours year is available to high achieving students. The application and proposal need to be provided to the relevant academic in the final year of your Bachelor degree. Information about Honours options will be provided to you as you progress through your Bachelor degree, or you can find out more at [myfuture.uws.edu.au/honours](http://myfuture.uws.edu.au/honours)

If you are interested in pursuing a career in teaching you can consecutively study both the Bachelor of Science – Pathway to Teaching (Secondary) and Master of Teaching (Secondary) over four years. See the Teaching and Education Course Guide for more details.

## Major Studies

This program is dedicated to the understanding and development of a broad range of sciences. Choose from any of the majors or design your own academic program within the Bachelor of Science. Majors are offered in aquatic biology, biochemistry and molecular biology, conservation biology, general biology, microbiology, nutrition and physiology, chemistry, geochemistry, climate change, forensic science and mathematics.

There are other majors and sub-majors offered in Science that can add diversity and/or focus to your degree. There is also a range of sub-majors from other disciplines such as the arts, business, humanities and social sciences to choose from, though these may require cross campus study and are subject to availability and timetabling.

Students who (a) have not undertaken HSC level maths, or (b) have attempted General Mathematics or Mathematics but achieved no higher than band 2 or 3 (or equivalent) will be required to take a study pattern that includes preparatory studies in mathematics in readiness for the higher level mathematics required in this program.

For detailed information about the course structure and subjects, visit [myfuture.uws.edu.au](http://myfuture.uws.edu.au)

Holders of relevant qualifications (i.e. Advanced Certificate, Diploma, Advanced Diploma, or equivalent) may apply for academic credit. The level of academic credit offered depends on the key program being undertaken, but may be quite significant, as in the case of the chemistry major where a TAFE Diploma in Chemical Technology may attract up to 40 per cent academic credit. Transfer to Bachelor of Science (Advanced Science) is available for meritorious students.

### Indigenous Australian Studies

Enrolment in the Indigenous Australian Studies (IAS) major, sub-major or units is available to all UWS undergraduate students who have open electives. Find out more at [studyias.com.au](http://studyias.com.au)

### Career Opportunities

Please see the specific Bachelor of Science programs for career opportunities specific to the programs on offer.

Graduates may enter career paths such as:

- » science-based work in industry
- » government environmental agencies
- » forensic work
- » patent work
- » quality control
- » environmental consulting laboratories
- » medical laboratories
- » scientific equipment companies
- » teaching and health disciplines such as medicine and pharmacy (with additional training).



## James Oliver

### Bachelor of Science (Gene Science), Bachelor of Science (Honours) Class 1 Currently Undertaking PhD

For people looking to study Science James Oliver believes UWS has the unique advantage of being involved in so many fields, in both undergraduate and postgraduate work, across three campuses.

'My undergraduate degree gave me the opportunity to meet people with similar interests that will be helpful through my career. It really pushed me to meet contacts in companies I was interested in and give them the ability to recognise me as a possible future employee,' he says.

'My undergraduate achievements gave me the unique opportunity to enrol in the Honours program in which I received first class honours and was invited to enrol in the PhD program with a scholarship.'

James said he chose to study at UWS initially for its choice in courses and location to home. 'I stayed with UWS for a number of reasons: the supportive academic staff that endeavour to encourage all students to learn, the location, and an atmosphere based on equality and potential, not just on marks.'

'The Science academics at UWS are some of the best minds.'

'The Science academics at UWS are some of the best minds with previous careers at the CSIRO and private firms and they always lecture with up-to-date technologies making sure you always have access to the material. The labs are new and fully equipped with some of the latest equipment. The student atmosphere is full of fun and support.'

# Bachelor of Science (Biological Sciences)

The biological sciences are diverse, fascinating, rapidly changing, and essential to our understanding of living systems at scales ranging from the molecular to the global. They play a vital role in our understanding of the environment, as well as animals, plants and micro-organisms, and are essential to a wide range of contemporary industries.

This degree offers a solid grounding in the basic sciences, including biology, microbiology and biochemistry and environmental science. You may choose to maximise the biological science content of your degree or combine biological sciences with studies in another discipline.

## Further Studies

An additional Honours year is available to high achieving students. The application and proposal need to be provided to the relevant academic in the final year of your Bachelor degree. Information about

Course	UAC Code	Campus	Duration	ATAR
B Science (Biological Sciences)	728066	Campbelltown	3F/6P	nc
	728065	Hawkesbury	3F/6P	nc
	728067	Parramatta	3F/6P	nc

## Professional Recognition

Depending on the units chosen within the course, graduates can satisfy the requirements for membership of professional bodies such as the Australian Society for Microbiology and the Australian Institute of Biology. Graduates may also join other professional societies such as The Australian Society for Biochemistry and Molecular Biology, Australian Biotechnology Organisation, Australian Society for Medical Research and the Royal Zoological Society of New South Wales.

Key: B = Bachelor of; F = Full-time; P = Part-time; nc = new course. Note: 'part-time' refers to study load, not to timetabling of evening classes.

Honours options will be provided to you as you progress through your Bachelor degree, or you can find out more at [myfuture.uws.edu.au/honours](http://myfuture.uws.edu.au/honours)

If you are interested in pursuing a career in teaching you can consecutively study both the Bachelor of Science – Pathway to Teaching (Secondary) and Master of Teaching (Secondary) over four years. See the Teaching and Education Course Guide for more details.

## Major Studies

Some of the major studies in this degree include aquatic biology, biochemistry and molecular biology, conservation biology, general biology, microbiology, and nutrition and physiology.

There is a range of majors and sub-majors offered in Science that can add diversity and/or focus to your degree. There is also a range of sub-majors from other disciplines such as the

arts, business, humanities and social sciences to choose from, though these may require cross campus study and are subject to availability and timetabling.

Students who (a) have not undertaken HSC level maths, or (b) have attempted General Mathematics or Mathematics but achieved no higher than band 2 or 3 (or equivalent) will be required to take a study pattern that includes preparatory studies in mathematics in readiness for the higher level mathematics required in this program.

## Indigenous Australian Studies

Enrolment in the Indigenous Australian Studies (IAS) major, sub-major or units is available to all UWS undergraduate students who have open electives. Find out more at [studyias.com.au](http://studyias.com.au)

## Career Opportunities

Research and technical officers with knowledge in environmental/conservation science, biochemistry, molecular biology, microbiology, and cell biology are well sought after, with multi-skilled graduates finding success as analysts/scientists in:

- » hospital
- » veterinary
- » forensic
- » pathology
- » quality control
- » environmental monitoring laboratories.

Examples include roles in universities, research institutes, biotechnology companies and government departments. Other possible careers include scientific journalists/writers; technical sales persons for scientific, biotechnology and medical supply companies; scientific/technical managers; secondary science teachers (with a further teaching qualification); patents officers and government policy advisors.

# Bachelor of Science (Chemistry)

This program recognises the importance of chemistry in our environment and provides a framework for intellectual inquiry and a means of helping improve people's lives.

It also provides a strong background in the key topic areas of contemporary chemistry, including aspects of chemical theory, practical laboratory skills and applications in contemporary research, industry and the environment. A research project is available to students in the final year of the degree.

## Further Studies

An additional Honours year is available to high achieving students. The application and proposal need to be provided to the relevant academic in the final year of your Bachelor degree. Information about Honours options will be provided to you as you progress through your Bachelor degree, or you can find out more at [myfuture.uws.edu.au/honours](http://myfuture.uws.edu.au/honours)

If you are interested in pursuing a career in teaching you can consecutively study both the Bachelor of Science – Pathway to Teaching (Secondary) and Master of Teaching (Secondary) over four years.

Course	UAC Code	Campus	Duration	ATAR
B Science (Chemistry)	728075	Campbelltown	3F/6P	nc
	728076	Parramatta	3F/6P	nc

## Professional Recognition

Corporate membership of The Royal Australian Chemical Institute after completion of at least three years of approved professional experience. This professional recognition provides a wide range of career opportunities in both the private and government sectors in areas such as quality control, research and development, environmental analysis, scientific instrumentation, forensic science and technical sales.

Key: B = Bachelor of; F = Full-time; P = Part-time; nc = new course. Note: 'part-time' refers to study load, not to timetabling of evening classes.

See the Teaching and Education Course Guide for more details.

## Major Studies

A Bachelor of Science (Chemistry) will prepare you to take part in the process of intellectual inquiry by using scientific knowledge to solve current problems. This degree consists of studies in analytical, inorganic, organic and physical chemistry, with a strong emphasis on practical skills, and prepares you for a professional career in a wide range of chemistry based industries.

There is a range of majors (including geochemistry) and sub-majors offered in Science that can add diversity and/or focus to your degree. There are double majors in a range of areas that include biochemistry and molecular biology, general biology, microbiology, and nutrition and physiology.

There are also many sub-majors from other disciplines such as the arts, business, humanities and social sciences to choose from, though these may require cross campus study and are subject to availability and timetabling.

Students who (a) have not undertaken HSC level maths, or (b) have attempted General Mathematics or Mathematics but achieved no higher than band 2 or 3 (or equivalent) will be required to take a study pattern that includes preparatory studies in mathematics in readiness for the higher level mathematics required in this program.

## Indigenous Australian Studies

Enrolment in the Indigenous Australian Studies (IAS) major, sub-major or units is available to all UWS undergraduate students who have open electives. Find out more at [studyias.com.au](http://studyias.com.au)

## Career Opportunities

Examples include roles in industries related to:

- » petroleum exploration and refining
- » pharmaceuticals and cosmetics
- » chemical, paint, plastics and mining.

A major in geochemistry will prepare you for a career in the minerals and mining industry where graduates are in high demand. A double major or sub-major with biochemistry and molecular biology or microbiology will prepare you for a career in the pharmaceutical, health or food industries. Alternatively, graduates who elect studies in the physical sciences, mathematics or business are well placed for careers in the manufacturing industry.

Other areas of employment include research and development, chemical, environmental and forensic analysis, scientific and technical sales, and consumer affairs.

# Bachelor of Science (Environmental Science)

Solving the world's environmental problems will require professionals who are trained in the sciences underlying these issues and who understand the wider human contexts of the challenges faced. The program will open up a wide range of career opportunities for those with environmental, conservation and ecological interests.

A solid grounding in the underlying science is essential for people intending to work in this field, as they will need to integrate across a range of disciplines, to devise solutions spanning the scientific and social issues involved.

Course	UAC Code	Campus	Duration	ATAR
B Science (Environmental Science)	728080	Hawkesbury	3F/6P	nc
Practical Experience				
Graduates meet the educational requirements for membership of the Environment Institute of Australia and New Zealand (EIANZ); further professional work experience is required for full membership of the Institute.				

Key: B = Bachelor of; F = Full-time; P = Part-time; nc = new course. Note: 'part-time' refers to study load, not to timetabling of evening classes.

## Further Studies

An additional Honours year is available to high achieving students. The application and proposal need to be provided to the relevant academic in the final year of your Bachelor degree. Information about Honours options will be provided to you as you progress through your Bachelor degree, or you can find out more at [myfuture.uws.edu.au/honours](http://myfuture.uws.edu.au/honours)

If you are interested in pursuing a career in teaching you can consecutively study both the Bachelor of Science – Pathway to Teaching (Secondary) and Master of Teaching (Secondary) over four years. See the Teaching and Education Course Guide for more details.

## Major Studies

Some of the major studies in this degree include conservation biology, environmental analysis, regulation and policy, environmental chemistry, climate change science, microbiological and spatial data analysis, environmental geochemistry, biodiversity

and adaptation, and ecology including aquatic ecology.

There is a range of majors (such as climate change and environmental management) and sub-majors (such as sustainability) offered in Science that can add diversity and/or focus to your degree.

There is also a range of sub-majors from other disciplines such as the arts, business, humanities and social sciences to choose from, though these may require cross campus study and are subject to availability and timetabling.

Students who (a) have not undertaken HSC level maths, or (b) have attempted General Mathematics or Mathematics but achieved no higher than band 2 or 3 (or equivalent) will be required to take a study pattern that includes preparatory studies in mathematics in readiness for the higher level mathematics required in this program.

## Indigenous Australian Studies

Enrolment in the Indigenous Australian Studies (IAS) major, sub-major or units is available to all UWS undergraduate students who have open electives. Find out more at [studyias.com.au](http://studyias.com.au)

## Career Opportunities

Career opportunities include roles in both the great outdoors and the office.

Choices are as diverse as environmental protection officer, environmental auditor, environmental planning consultant, pollution control officer, state-of-environment assessor, land care officer, water quality manager, conservation officer, protected area manager, and environmental scientist in environmental protection authorities, land and water management agencies, research organisations, private environmental consultancies, waste management operations, national parks and conservation services.

# Bachelor of Science (Forensic Science)

The UWS Bachelor of Science (Forensic Science) degree, with its very own Crime Scene House, is a comprehensive undergraduate science degree that offers a hands-on introduction to collecting evidence and conducting investigations – ensuring graduates are well prepared for the real-life equivalent. A number of recent students now work as Scene of Crime Officers for the NSW Police Force.

Course	UAC Code	Campus	Duration	ATAR
B Science (Forensic Science)	723000	Hawkesbury	3F	80.35
<b>Practical Experience</b>				
<p>The Crime Scene House on Hawkesbury campus enables you to practise realistic crime scene investigation. You will gain an understanding of critical aspects of forensic investigation by processing crime scenes, including evidence collection and integrity, fingerprinting, footwear impression evidence, blood stain pattern interpretation, DNA collection, drug sampling, tool mark evidence, scene sketching and crime scene photography.</p> <p>A range of forensic case studies provides you with access to physical evidence exhibits, and introduces you to the realities of a forensic science case. You will develop professional skills and practices, including evidence handling and integrity, using an evidence exhibit registry, case file management and preparation, accreditation requirements, court presentation, using contemporaneous notes, report writing, and writing police/expert statements.</p>				

Key: B = Bachelor of; F = Full-time.

Criminalistics (the practical application of forensic investigation) often adopts more novel scientific practices and provides valuable linkage evidence to forensic cases. You will engage in a range of criminalistic topics including forensic photography, hair and fibre comparison, footwear and tyre impression evidence, fingerprinting, blood spatter interpretation, tool mark examination, biological evidence, drug identification, DNA analysis, explosive residues, GSR (gun shot residue), and buried evidence.

The practical aspects of the Crime Scene House are blended with solid theory, balancing and integrating both laboratory and field-based work. You will benefit from a range of learning strategies, including theoretical concepts associated with science, forensic science, law and criminology – all under the guidance of our academic staff, whose lengthy forensic backgrounds offer reassuring real-world experience. What's more, the course is supported by an External Advisory Committee consisting of leading forensic science practitioners, including state and federal law enforcement agencies and forensic laboratories.

Places within the Bachelor of Science (Forensic Science) are limited and highly competitive, so students interested in this area of study may, as an alternative, complete a Bachelor of Science and use their electives to complete a major in Forensic Science.

### Further Studies

An Honours year is available to high achieving students. Information and details on how to apply for Honours will be provided to you as you progress through your Bachelor degree, or you can find out more at [myfuture.uws.edu.au/honours](http://myfuture.uws.edu.au/honours)



# Mitchell Gibbs

## Bachelor of Science (Forensic Science)

Mitchell believes everybody has the same potential to make a difference and be successful in life. 'It is just how you use your potential which determines whether you will achieve more than someone else,' he says.

Ever since he was six or seven, Mitchell has been interested in Forensic Science. He chose to study Forensic Science at UWS because 'it has a fantastic forensic science department and degree. It was also located near where I lived and I received a great scholarship to help with costs'.

His advice for prospective students wishing to pursue studies in Forensic Science is to 'get what you can out of the course and always do the best you can'.

**'Get what you can out of the course and always do the best you can.'**

'A lot of getting anywhere in life is just by who you know. The networks you are involved with. My brother met someone from the NSW Police Force who was interested to know that he had a brother studying Forensic Science.

'As a result I contacted the person, who worked hard to provide an opportunity for me to work with the police. He also contacted the University to arrange it with them.

'I am now working with a small team, known as SLR, which works both on the crime scene and in the lab. I will be helping in recovering evidence. My advice is to use the contacts you make to help you along the way.'

### Major Studies

The major studies may include Biology, Chemistry, Digital Forensic Photography, Forensic Science, Forensic and Environmental Analysis, Crime Scene Investigation, Molecular Biology and Toxicology.

There are six elective subjects and the course structure allows you to broaden your studies in four distinct science discipline areas including Biology, Chemistry, Criminalistics and Microbiology.

For detailed information about the course structure and subjects, visit [myfuture.uws.edu.au](http://myfuture.uws.edu.au)

### Indigenous Australian Studies

Enrolment in the Indigenous Australian Studies (IAS) major, sub-major or units is available to all UWS undergraduate students who have open electives. Find out more at [studyias.com.au](http://studyias.com.au)

### Career Opportunities

As a graduate of the UWS Forensic Science degree, you will be well equipped to work within a range of forensic and other scientific disciplines for employers such as:

- » Australian Federal Police (AFP), NSW Police, and all other state and territory police services
- » Customs
- » Environmental Protection Authority (EPA)
- » WorkCover
- » Australian Quarantine and Inspection Service (AQIS)
- » state and federal health departments
- » government analytical chemical laboratories.

Career options include forensic scientist, crime scene investigator, private investigator, forensic consultant, ranger, drug analyst, environmental investigator, police officer, drug tester in human and animal sports, forensic researcher and academic.

Because of the wide skill base offered in this degree, graduates can also work in analytical chemistry and microbiology laboratories, quality control and assurance, biochemistry and molecular biology, scientific research, education, and the chemical industry.

# Bachelor of Science (Mathematical Science)

The Mathematical Science program provides a strong background in key analytical techniques that have contemporary applications such as the handling and interpretation of data and the modelling of real-world problems such as global warming.

Course	UAC Code	Campus	Duration	ATAR
B Science (Mathematical Science)	728090	Campbelltown	3F/6P	75.00
	728091	Parramatta	3F/6P	75.00
Professional Recognition				
Graduates may be eligible for membership of the Australian Mathematical Society and the Statistical Society of Australia depending on the units studied.				

Key: B = Bachelor of; F = Full-time; P = Part-time. Note: 'part-time' refers to study load, not to timetabling of evening classes.

This program allows you to specialise in mathematics, statistics or a combination of both. You will develop skills that allow you to model and solve real world problems using mathematical techniques. This will allow a wide range of career options in commercial and government institutions.

## Further Studies

An additional Honours year is available to high achieving students. The application and proposal need to be provided to the relevant academic in the final year of your Bachelor degree. Information about Honours options will be provided to you as you progress through your Bachelor degree, or you can find out more at [myfuture.uws.edu.au/honours](http://myfuture.uws.edu.au/honours)

If you are interested in pursuing a career in teaching you can consecutively study both the Bachelor of Science – Pathway to Teaching (Secondary) and Master of Teaching (Secondary) over four years. See the Teaching and Education Course Guide for more details.

## Major Studies

The major studies may include computational decision making, knowledge discovery and data mining, mathematics, statistics.

There is a range of majors and sub-majors offered in Science that can add diversity and/or focus to your degree. There is also a range of sub-majors from other disciplines such as the arts, business, humanities and social sciences to choose from, though these may require cross campus study and are subject to availability and timetabling.

## Indigenous Australian Studies

Enrolment in the Indigenous Australian Studies (IAS) major, sub-major or units is available to all UWS undergraduate students who have open electives. Find out more at [studyias.com.au](http://studyias.com.au)



## Ken Cervantes

### Graduate UWS Bachelor of Mathematics & Information Technology Bachelor of Science (Honours) Mathematics

Ken Cervantes has some simple yet profound advice for those undertaking the study of Science at UWS. 'Every unit counts. Competitive jobs will require competitive results, begin with the end in mind,' he says. 'In the words of Albert Einstein "Strive not to be a success, but rather to be of value". Live a balanced life: work, rest, play, and give back.'

For Ken the major factor in choosing UWS initially was location. 'I needed to be close to home to help care for my mother who was battling cancer at the time. As I lived locally, this became a defining element. However, it was the location, combined with the growing prestige of UWS, as well as having two sisters who completed their studies at UWS that confirmed the decision to study at UWS.'

'My time at UWS has been a season that has proven to be fruitful in its harvest. Through the foundation of education, exposure of opportunities and calibre of academics, I find myself entering the work force prepared and confident.'

'In my third year of my Bachelor of Mathematics and Information Technology course, I was given the opportunity of joining the I2C project (Innovation to Commercialisation), where as a team of undergraduates we needed to step through the whole software development life cycle process and implement an entrepreneurial idea to prototype and presentation. The technical and soft skills I developed throughout that opportunity have been key discussion points in recent interviews and has given me an added edge over other applicants.'

'While at UWS I have learned that there is strength within that leads me to greater things than I have dared to dream.'

### Career Opportunities

There is a broad range of opportunities for graduates in Mathematical Science which include roles in finance, information security, mining, meteorology, health and genetics.

Graduates are also well placed to pursue careers as:

- » mathematicians
- » statisticians
- » operational research analysts
- » quantitative/financial analysts
- » financial consultants
- » business analysts
- » market analysts
- » investment analysts
- » risk analysts
- » sales and production forecasting officers
- » production systems planning officers.

Graduates may also choose careers as secondary school mathematics teachers after completing a Master of Teaching (Secondary).

# Bachelor of Science (Nutrition and Food Science)

Healthy eating is a vital part of good health and there is more to healthy eating than you realise. This degree will help you understand nutrition and the science behind food.

This course aims to provide students with sound knowledge and practical background in nutrition and food sciences to pursue a wide range of careers in; community nutrition and health promotion ensuring healthy diets and lifestyles for good health, development of healthy and innovative new foods, or ensuring food quality and safety.

Nutrition and Food covers a range of subjects that include the nutritional benefits of particular foods, the development of new food products, food safety and medical conditions such as diabetes and heart disease, that are affected by diet.

## Indigenous Australian Studies

Enrolment in the Indigenous Australian Studies (IAS) major, sub-major or units is available to all UWS undergraduate students who have open electives. Find out more at [studyias.com.au](http://studyias.com.au)

Course	UAC Code	Campus	Duration	ATAR
B Science (Nutrition and Food Science)	720012	Hawkesbury	3F/6P	66.30
Practical Experience				
Students must take a minimum of 10 weeks of approved industrial experience.				

Key: B = Bachelor of; F = Full-time; P = Part-time; nc = new course. Note: 'part-time' refers to study load, not to timetabling of evening classes.

## Further Studies

An additional Honours year is available to high achieving students. Information about Honours options will be provided to you as you progress through your Bachelor degree, or you can find out more at [myfuture.uws.edu.au/honours](http://myfuture.uws.edu.au/honours)

If you are interested in pursuing a career in teaching you can apply for the Master of Teaching (Secondary) on completion of this degree. See the Teaching and Education Course Guide for more details.

## Major Studies

In the first half of the program, students develop a strong foundation in the biological and chemical sciences plus introductory studies in nutrition and food sciences. Students are then able to select a specialisation depending on their interests and career aspirations, either in Human Nutrition, Food Science or Food Technology secondary teaching.

A major in **Human Nutrition** investigates healthy eating as a vital part of good health and health promotion. The program covers specialised studies in applied and community nutrition, metabolism and human physiology. A major in **Food Science** explores the science behind food, its preparation and manufacture. The program covers specialised topics in food processing, quality assurance, product development, postharvest, packaging, microbiological and chemical analysis of foods.

A major in **Food Technology** Secondary Teaching brings together food science and nutrition with education studies to meet the graduate requirements for teaching food technology. The program includes specialised studies in food processing, food product development, nutrition, contemporary food issues, growing crops for school garden projects, plus the food marketplace relevant to the Australian food industry.

The program prepares graduates to also teach biology or chemistry as additional first or second teaching areas, or design and technology depending on electives selected.

Academic credit may be offered for relevant TAFE or other qualifications (e.g. a diploma in a relevant field may attract academic credit) making the degree an attractive re-skilling option.

## Career Opportunities

Some career opportunities with a Nutrition and Food degree include:

- » community nutrition and health
- » food product research and development
- » food quality assurance
- » professional positions in consumer relations
- » health promotion and education
- » regulatory affairs
- » technical sales representatives
- » consulting
- » secondary teaching in food technology (requires the completion of a teaching qualification).

# Bachelor of Science (Zoology)

The Zoology degree recognises the increased demand for scientific based knowledge of how to conserve, protect and care for animals, including native wildlife, and companion and production animals.

This program will allow students to develop in-depth scientific understanding of how animals function and interact with their environment, from their ecology and evolution, to physiology and biochemistry of tissues and major organs systems, as well as structure and function of biomolecules and cells.

The program gives particular emphasis to the study of ecology, evolution, physiology, growth, reproduction, genetics, and conservation biology.

On-campus animal facilities include those for reptiles, small marsupials, small rodents, horses, sheep and cattle, as well as over 1,000ha of native, rural and aquatic habitat.

Course	UAC Code	Campus	Duration	ATAR
B Science (Zoology)	720018	Hawkesbury	3F/6P	nc
Practical Experience				
Depending on the subjects chosen, graduates are eligible to apply for membership of one or more professional societies including the Royal Zoological Society of New South Wales, the Australasian Wildlife Management Society, the Australian Mammal Society, Australasian Wildlife Disease Association, the World Aquaculture Society and the Zoological Society of London among others.				

Key: B = Bachelor of; F = Full-time; P = Part-time; nc = new course. Note: 'part-time' refers to study load, not to timetabling of evening classes.

## Further Studies

An additional Honours year is available to high achieving students. The application and proposal need to be provided to the relevant academic in the final year of your Bachelor degree. Information about Honours options will be provided to you as you progress through your Bachelor degree, or you can find out more at [myfuture.uws.edu.au/honours](http://myfuture.uws.edu.au/honours)

If you are interested in pursuing a career in teaching you can consecutively study both the Bachelor of Science - Pathway to Teaching (Secondary) and Master of Teaching (Secondary) over four years. See the Teaching and Education Course Guide for more details.

## Major Studies

The major studies may include animal physiology, animal biodiversity, wildlife ecology and conservation, animal behaviour, animal adaptation to climate change.

There is a range of majors and sub-majors offered in Science that can add diversity and/or focus to your degree. There is also a range of sub-majors from other disciplines such as the arts, business, humanities and social sciences to choose from, though these may require cross campus study and are subject to availability and timetabling.

Students who (a) have not undertaken HSC level maths, or (b) have attempted General Mathematics or Mathematics but achieved no higher than band 2 or 3 (or equivalent) will be required to take a study pattern that includes preparatory studies in mathematics in readiness for the higher level mathematics required in this program.

## Career Opportunities

Examples include roles in animal nutrition, animal reproduction technology, animal genetics, animal behaviour, animal health product development, animal physiology, zoology, natural resource management, scientific officer and science communication management and in veterinary related areas. Graduates are also prepared for work as field or laboratory technicians, animal carers, in conservation agencies and environmental consulting companies.

With further study (Honours, Masters [Hons] or a PhD) you can also become a research scientist working across a diverse variety of areas.

# Bachelor of Medical Science (Advanced)

The UWS Advanced Medical Science degree allows all the flexibility of the Medical Science degree and is designed for high achieving students who want to extend themselves.

This is a challenging program that includes advanced coursework, extension activities and additional research training. You will be linked to experienced researchers and be mentored throughout the Advanced Medical Science program.

Each year a number of interview places for admission to the UWS B Medicine/B Surgery will be reserved for students in the first year of the Advanced Medical Science program who meet specified criteria.

## Major Studies

The Bachelor of Medical Science (Advanced) requires that students select one of the four majors below. This course then builds upon that framework by integrating research activities and other advanced studies related to the area of the major.

Course	UAC Code	Campus	Duration	ATAR
B Medical Science (Advanced)	728000	Campbelltown	3F/6P	nc
	728001	Hawkesbury	3F/6P	nc
Professional Recognition				
Depending on your chosen major and electives, you may satisfy the requirements for admission to various professional bodies. Graduates with the Medicinal Chemistry major qualify for membership of the Royal Australian Chemical Institute.				

Key: B = Bachelor of; F = Full-time; P = Part-time; nc = new course. Note: 'part-time' refers to study load, not to timetabling of evening classes.

**Biomedical Science** – available at Campbelltown and Hawkesbury campuses. The biomedical science major integrates medical microbiology, biochemistry, human metabolism, physiology, pathology and molecular biology as they affect the human body and its condition. Students may choose several pathways to achieve extra emphasis in specialised areas such as immunology or human molecular biology.

**Medicinal Chemistry** – available at Campbelltown campus. This major begins by building a foundation in chemistry, physiology, cell biology and anatomy, then develops into areas such as pharmacology, biochemistry, organic chemistry and advanced medicinal chemistry. It takes an integrated approach to the chemistry of drugs, disease and the human body.

**Anatomy and Physiology** – available at Campbelltown campus. This major develops the fundamentals of chemistry and biology, then focuses on an advanced study of anatomy and physiology, extending into specialised areas such as neuroanatomy and anatomy of the head and neck. Flexibility allows a choice of increased emphasis on physiology or anatomy.

**Nanotechnology** – available at Campbelltown campus. The major studies include the pathological basis of disease and functional proteins and genes and physiology coupled with nanotechnology.

To be eligible for admission to B Medical Science (Advanced) a student must have attained a minimum ATAR of 90. Excellence in particular subjects may provide students with an opportunity to accelerate their studies.

Students must maintain a grade-point average (GPA) greater than 5 to remain in the course; those who do not maintain this average will be transferred to the corresponding Bachelor of Medical Science. Students who do not meet the entry standards of Bachelor of Medical Science (Advanced) but who are offered a place in a Bachelor of Medical Science can transfer into the advanced program after first year if they achieve a GPA greater than 5 and there are places available. At enrolment students will be required to sign a declaration acknowledging the requirement to maintain a GPA greater than 5.

For detailed information about the course structure and subjects, visit [myfuture.uws.edu.au](http://myfuture.uws.edu.au)



Mark Ferrara

## Bachelor of Science (Advanced Science)

### Aspire Future Leaders Program

Mark Ferrara says he has a passion for chemistry, and loves to know 'what substances are needed to perform certain reactions, and how they work and affect the body'. His love of science and chemistry has led him to choose Advanced Science at UWS, and he already intends to do an additional year of study for Honours, and maybe even continue on for a PhD. Mark says he hopes for a fulfilling career in medical or pharmaceutical research, working for the government or a private company, as part of a team of scientists working towards ending some of our greatest problems.

For Mark, being a part of the Aspire program is a way to give back to UWS, and is a 'great opportunity to meet new people with similar drive, ambition and focus'. He says one of the aspects of the program that interests him most is being a public face of the University, as well as the prospect of speaking at his old high school about UWS.

In assessing the potential the Aspire program has for success, Mark says 'It's a group that's exciting to be a part of. I mean, we're companions that can only encourage and motivate each other further, so I think the only way will be up'.

'A great opportunity to meet new people with similar drive, ambition and focus.'

### Further Studies

An Honours year is available to high achieving students. Information and details on how to apply for Honours will be provided to you as you progress through your Bachelor degree, or you can find out more at [myfuture.uws.edu.au/honours](http://myfuture.uws.edu.au/honours)

You will also have the option of teaching secondary school science if you study the appropriate subjects and complete a Master of Teaching (Secondary). Please refer to the Teaching and Education Course Guide for details.

### Career Opportunities

This course is designed to provide early training for a career in scientific research. After a subsequent Honours year, and possibly a PhD, you may conduct research in:

- » private industry
- » universities
- » national and international scientific organisations.

As a UWS Medical Science graduate, you will have a variety of career options to choose from, including roles in:

- » medical research
- » hospitals
- » pathology laboratories
- » veterinary pathology laboratories
- » pharmaceutical and cosmetics industries
- » government health departments
- » medical sales
- » research and laboratory positions with organisations such as the CSIRO and the Australian Nuclear Science and Technology Organisation (ANSTO).

# Bachelor of Medical Science

Covering a range of scientific disciplines, the Medical Science degree allows you to choose subjects that suit your career goals.

If you are fascinated by the underlying science of medicine, and would like to pursue a career in medical research, hospital or pathology laboratories, the pharmaceutical or cosmetics industries, scientific sales or quality assurance, then consider the UWS Medical Science program.

## Major Studies

The degree allows you to undertake any of the B Medical Science programs including:

**Biomedical Science** – available at Campbelltown and Hawkesbury campuses. The biomedical science major integrates medical microbiology, biochemistry, human metabolism, physiology, pathology and molecular biology as they affect the human body and its condition. Students may choose several pathways to achieve extra emphasis in specialised areas such as immunology or human molecular biology.

Course	UAC Code	Campus	Duration	ATAR
B Medical Science	728005	Campbelltown	3F/6P	70.25
	728006	Hawkesbury	3F/6P	70.05
Professional Recognition				
Depending on your chosen major and electives, you may satisfy the requirements for admission to various professional bodies. Graduates with the Medicinal Chemistry major qualify for membership of the Royal Australian Chemical Institute.				

Key: B = Bachelor of; F = Full-time; P = Part-time. Note: 'part-time' refers to study load, not to timetabling of evening classes.

**Medicinal Chemistry** – available at Campbelltown campus. This major begins by building a foundation in chemistry, physiology, cell biology and anatomy, then develops into areas such as pharmacology, biochemistry, organic chemistry and advanced medicinal chemistry. It takes an integrated approach to the chemistry of drugs, disease and the human body.

**Anatomy and Physiology** – available at Campbelltown campus. This major develops the fundamentals of chemistry and biology, then focuses on an advanced study of anatomy and physiology, extending into specialised areas such as neuroanatomy and anatomy of the head and neck. Flexibility allows a choice of increased emphasis on physiology or anatomy.

Students who (a) have not undertaken HSC level maths, or (b) have attempted General Mathematics or Mathematics but achieved no higher than band 2 or 3 (or equivalent) will be required to take a study pattern that includes preparatory studies in mathematics in readiness for the higher level mathematics required in this program.

## Indigenous Australian Studies

Enrolment in the Indigenous Australian Studies (IAS) major, sub-major or units is available to all UWS undergraduate students who have open electives. Find out more at [studyias.com.au](http://studyias.com.au)

For detailed information about the course structure and subjects, visit [myfuture.uws.edu.au](http://myfuture.uws.edu.au)

## Further Studies

An Honours year is available to high achieving students. Information and details on how to apply for Honours will be provided to you as you progress through your Bachelor degree, or you can find out more at [myfuture.uws.edu.au/honours](http://myfuture.uws.edu.au/honours)

You will also have the option of teaching secondary school science if you study the appropriate subjects and complete a Master of Teaching (Secondary). Please refer to the Teaching and Education Course Guide for details.

## Career Opportunities

As a UWS Medical Science graduate, you will have a variety of career options to choose from, including roles in:

- » medical research
- » hospitals
- » pathology laboratories
- » veterinary pathology laboratories
- » pharmaceutical and cosmetics industries
- » government health departments
- » medical sales
- » research and laboratory positions with organisations such as the CSIRO and the Australian Nuclear Science and Technology Organisation (ANSTO).

# Bachelor of Medical Science (Nanotechnology)

It is predicted that nanotechnology will have a bigger impact on society than the industrial revolution and the computer age. Medical Nanotechnology is the application of the methods and techniques of Nanotechnology to the medical and health areas.

Course	UAC Code	Campus	Duration	ATAR
B Medical Science (Nanotechnology)	728010	Campbelltown	3F/6P	nc

Key: B = Bachelor of; F = Full-time; P = Part-time; nc = new course. Note: 'part-time' refers to study load, not to timetabling of evening classes.

This degree offers a solid grounding in the basic sciences, including biology, chemistry, physics and biochemistry. You may choose to maximise the content of any of these areas in your degree or combine with studies in another area.

### Further Studies

An additional Honours year is available to high achieving students. The application and proposal need to be provided to the relevant academic in the final year of your Bachelor degree. Information about Honours options will be provided to you as you progress through your Bachelor degree, or you can find out more at [myfuture.uws.edu.au/honours](http://myfuture.uws.edu.au/honours)

### Major Studies

The major studies include the pathological basis of disease and functional proteins and genes and physiology coupled with nanotechnology.

Students who (a) have not undertaken HSC level maths, or (b) have attempted General Mathematics or Mathematics but achieved no higher than band 2 or 3 (or equivalent) will be required to take a study pattern that includes preparatory studies in mathematics in readiness for the higher level mathematics required in this program.

### Indigenous Australian Studies

Enrolment in the Indigenous Australian Studies (IAS) major, sub-major or units is available to all UWS undergraduate students who have open electives. Find out more at [studyias.com.au](http://studyias.com.au)

### Career Opportunities

Examples include medical researchers, nanotechnologists, smart and effective product developers, managers and consultants in biotechnology, defence, petroleum, pharmaceutical, health, chemical, materials and engineering-focused industries. There is currently a high demand both nationally and internationally for graduates with appropriate nanotechnology skills and techniques.

This course is designed to provide early training for a career in scientific research. After a subsequent Honours year, and possibly a PhD, you may conduct research in:

- » private industry
- » universities
- » national and international scientific organisations.

# Bachelor of Natural Science (Advanced)

Our world and its resources are under ever increasing pressure, and we need new people with new ideas to address these challenges. We are seeing a bigger population, technology advancements and environmental issues, all of which are placing unprecedented pressure on our natural resources. An Advanced degree in the Natural Sciences will enable you to understand these competing pressures and contribute to the development of sustainable strategies to drive change.

Course	UAC Code	Campus	Duration	ATAR
B Natural Science (Advanced)	720000	Hawkesbury	3F/6P	nc

Key: B = Bachelor of; F = Full-time; P = Part-time; nc = new course. Note: 'part-time' refers to study load not to timetabling of evening classes.

This is a challenging program that includes advanced coursework, extension activities and fundamental research training. You will be linked to experienced academic researchers and take part in the University's exciting research activities. The degree will allow you to undertake any of the Natural Science programs in Animal Science, Environmental Management or Sustainable Agriculture and Food Security.

### Further Studies

Further studies can be pursued (Honours, Masters (Hon) or PhD degree) leading to a research or academic career. An Honours year is available to high achieving students. Information and details on how to apply for Honours will be provided to you as you progress through your Bachelor degree, or you can find out more at [myfuture.uws.edu.au/honours](http://myfuture.uws.edu.au/honours)

You will also have the option of teaching secondary school science if you study the appropriate subjects and complete a Master of Teaching (Secondary). Please refer to the Teaching and Education Course Guide for details.

### Major Studies

The degree will allow you to undertake any of the Natural Science programs in Animal Science, Environmental Management or Sustainable Agriculture and Food Security. At the beginning of first year you will choose your area of specialisation and this will direct the particular subjects that are studied. It may be possible to change your specialisation later in the course.

There is a range of majors (such as aquatic biology, conservation biology and zoology) and sub-majors (such as sustainability) offered in Natural Science and Science. There is also a range of sub-majors from other disciplines such as the arts, business, humanities and social sciences to choose from, though these may require cross campus study and are subject to availability and timetabling.

Students must maintain a grade-point average (GPA) greater than 5 to remain in the course; those who do not maintain this average will be transferred to the corresponding Bachelor of Natural Science. Students who do not meet the entry standards of Bachelor of Natural Science (Advanced) but who are offered a place in a Bachelor of Natural Science can transfer into the advanced program after first year if they achieve a GPA greater than 5 and there are places available. At enrolment students will be required to sign a declaration acknowledging the requirement to maintain a GPA greater than 5.

For detailed information about the course structure and subjects, visit [myfuture.uws.edu.au](http://myfuture.uws.edu.au)

### Career Opportunities

A UWS Bachelor of Natural Science will open a world of opportunity for you. This degree will equip you with the ability to apply your skills in ways that effect real change. The Bachelor of Natural Science (Advanced) produces graduates who can work in a range of applied natural science disciplines related to our environment and rural sustainability. Specific career opportunities are outlined in the specialised course entries for Bachelor of Natural Science programs in Animal Science, Environmental Management and Sustainable Agriculture and Food Security.

So whether you would like to work in the private or public sector, this program can open opportunities in:

- » environmental science, management and health
- » horticulture
- » rural and urban development
- » food industries
- » agricultural industries
- » agronomy
- » supply chain logistics
- » animal science
- » nature conservation
- » urban and regional planning
- » land management
- » public health and nutrition
- » wildlife ecology.



## Lori McKern

### Bachelor of Natural Science (Animal Science)

#### Aspire Future Leaders Program

Lori McKern's lifelong love of the outdoors, nature and animals led her to study Animal Science at the University of Western Sydney. She says she found the degree appealing as it was good preparation for a number of different careers. Although unsure of exactly what she wants to do when she completes her studies, Lori has an interest in working with animals in Customs and Quarantine programs. She says that no matter what her future career involves, she wants it to 'be outdoors'.

Lori was brought up within the horse racing industry, and has also been involved in the greyhound racing industry. As well as working part time in a pharmacy, Lori works at greyhound racing tracks, helping with a friend's business selling products related to dog racing such as dietary supplements and bedding.

Like many others in the Aspire Future Leaders program, Lori has a long history of leadership throughout high school. In years 8 to 10, she was involved in her school's junior leadership program, working with community and charity events.

Lori's advice to a future student in the area of Animal Science would really be to do your homework and research into the course and its structure as the core of the degree has changed. 'Make sure it is what you are after. The major work in second and third year is a very worthwhile component that can set up contacts and builds professional relationships for your career ahead.'

'The degree is good preparation for a number of different careers.'

# Bachelor of Natural Science (Animal Science)

Interactions between people and animals are increasing as we become more dependent on animals for companionship and food production, and strive to understand the greater pressures being placed on our unique native wildlife.

Students have access to campus animal facilities including reptiles, marsupials, horses, sheep, cattle and deer and off-campus animal professionals and organisations such as wildlife parks, zoos, farms and horse studs. Students also have access to a wide range of electives that will allow entry into a variety of careers, including international opportunities in the many fields of animal science.

Course	UAC Code	Campus	Duration	ATAR
B Natural Science (Animal Science)	720019	Hawkesbury	3F/6P	65.10
<b>Practical Experience</b>				
In their final year of study, students undertake a real world engaged learning project in a selected area of animal science. The project provides students with first-hand professional experience in project management and problem solving, and builds on the strong foundations established in their first two years of study.				
<b>Professional Recognition</b>				
Depending on the subjects chosen, graduates are eligible to apply for membership of one or more professional societies including the Royal Zoological Society of New South Wales, the Australasian Wildlife Management Society, the Australian Mammal Society, Australasian Wildlife Disease Association, the World Aquaculture Society and the Zoological Society of London among others.				

Key: B = Bachelor of; F = Full-time; P = Part-time. Note: 'part-time' refers to study load, not to timetabling of evening classes.

## Further Studies

Further studies can be pursued (Honours, Masters (Hon) or PhD degree) leading to a research or academic career. An Honours year is available to high achieving students. Information and details on how to apply for Honours will be provided to you as you progress through your Bachelor degree, or you can find out more at [myfuture.uws.edu.au/honours](http://myfuture.uws.edu.au/honours)

You will also have the option of teaching secondary school science if you study the appropriate subjects and complete a Master of Teaching (Secondary). Please refer to the Teaching and Education Course Guide for details.

## Major Studies

The major studies may include animal behaviour, animal health and welfare, animal nutrition, animal production, animal reproduction, human animal interactions, vertebrate biodiversity, wildlife science.

There is a range of majors (such as conservation biology and zoology) and sub-majors (including sustainability) offered in Natural Science and Science that can add diversity and/or focus to your degree. There is also a range of sub-majors from other disciplines such as the arts, business, humanities and social sciences to choose from, though these may require cross campus study and are subject to availability and timetabling.

For detailed information about the course structure and subjects, visit [myfuture.uws.edu.au](http://myfuture.uws.edu.au)

## Career Opportunities

Some examples of career opportunities include:

- » manager, technical advisor or research officer in animal welfare agencies
- » national parks and wildlife services
- » animal health and nutrition companies
- » zoo keeper
- » wildlife ecologist
- » manager of livestock production or breeding enterprise
- » regulatory affairs concerning animal therapeutics or disease control.

## Indigenous Australian Studies

Enrolment in the Indigenous Australian Studies (IAS) major, sub-major or units is available to all UWS undergraduate students who have open electives. Find out more at [studyias.com.au](http://studyias.com.au)

# Bachelor of Natural Science (Environment and Health)

The air we breathe, the water we drink, the food we eat, and the places we live, work and play all have major impacts on our health and wellbeing. Health scares such as swine/bird flu, obesity, cancers and asthma have all been connected to our environmental conditions.

The Environment and Health program concentrates on the mitigation of human health impacts of global climate change through to the more localised issues of air and water quality, waste management, food security, environmental noise and healthy communities.

Course	UAC Code	Campus	Duration	ATAR
B Natural Science (Environment and Health)	720006	Distance	3F/6P	67.90
<b>Practical Experience</b>				
In their final year of study, students undertake a real world project for a professional client in a selected area of environmental health. The project provides students with first-hand professional experience in project management and problem solving. Students also complete 10 weeks (or equivalent) of general placement.				
<b>Professional Recognition</b>				
Graduates will be eligible for full membership of Environmental Health Australia (EHA).				

Key: B = Bachelor of; F = Full-time; P = Part-time. Note: 'part-time' refers to study load, not to timetabling of evening classes.

## Further Studies

Further studies can be pursued (Honours, Masters (Hon) or PhD degree) leading to a research or academic career. An Honours year is available to high achieving students. Information and details on how to apply for Honours will be provided to you as you progress through your Bachelor degree, or you can find out more at [myfuture.uws.edu.au/honours](http://myfuture.uws.edu.au/honours)

## Indigenous Australian Studies

Enrolment in the Indigenous Australian Studies (IAS) major, sub-major or units is available to all UWS undergraduate students who have open electives. Find out more at [studyias.com.au](http://studyias.com.au)

## Major Studies

The major studies may include air pollution, community studies, emergency management, environment and health law, environmental monitoring, environmental planning, environmental protection, epidemiology, food safety, noise, occupational environment, risk assessment, sustainable environmental management, toxicology, urban development and water pollution.

For detailed information about the course structure and subjects, visit [myfuture.uws.edu.au](http://myfuture.uws.edu.au)

## Career Opportunities

Many environmental health professionals are employed as Environmental Health Officers in areas such as:

- » all levels of government including health departments and the defence forces
- » private companies
- » consultancies

- » non-government organisations (such as the International Red Cross).

Other environmental health career options include:

- » environmental health policy, strategy and law development positions
- » food safety staff for a food manufacturer, supermarket chain, airline or other private company
- » public health practitioners
- » environmental risk consultants
- » environmental health consultants
- » management
- » research.

The current shortage of environmental health practitioners provides opportunities for early employment. Graduates from this program are in high demand both in Australia and overseas.

# Bachelor of Natural Science (Environmental Management)

History has shown that if we don't effectively manage our environment, we will degrade it – possibly to the point where it can no longer sustain us. Environmental managers are concerned with ensuring the ecological sustainability of human development.

The Environmental Management degree is designed to develop students' problem solving skills, and to equip graduates to work with community members and professional practitioners. This work will be based on developing innovative policy and strategies that address the increasingly complex causes of today's environmental problems. Issues include urban development, global climate change, persistent organic pollutants (POPs), decreasing biodiversity and deteriorating air and water quality.

Course	UAC Code	Campus	Duration	ATAR
B Natural Science (Environmental Management)	720009	Hawkesbury	3F/6P	nc
<b>Practical Experience</b>				
In their final year of study, students undertake a real world project for a professional client in a selected area of environmental health. The project provides students with first-hand professional experience in project management and problem solving. Students also complete 10 weeks (or equivalent) of general placement.				
<b>Professional Recognition</b>				
Graduates are eligible for associate membership of the Environmental Health Australia (EHA) and meet the academic requirements for membership of Environment Institute of Australia and New Zealand (EIANZ).				

Key: B = Bachelor of; F = Full-time; P = Part-time; nc = new course. Note: 'part-time' refers to study load not to timetabling of evening classes.

## Further Studies

Further studies can be pursued (Honours, Masters (Hon) or PhD degree) leading to a research or academic career. An Honours year is available to high achieving students. Information and details on how to apply for Honours will be provided to you as you progress through your Bachelor degree, or you can find out more at [myfuture.uws.edu.au/honours](http://myfuture.uws.edu.au/honours)

You will also have the option of teaching secondary school science if you study the appropriate subjects and complete a Master of Teaching (Secondary). Please refer to the Teaching and Education Course Guide for details.

## Indigenous Australian Studies

Enrolment in the Indigenous Australian Studies (IAS) major, sub-major or units is available to all UWS undergraduate students who have open electives. Find out more at [studyias.com.au](http://studyias.com.au)

## Major Studies

The major studies include assessment and management of aquatic environments, water quality assessment and management, introduction to wildlife, sustainable land use, Indigenous land management, environmental planning, climate change science, environmental regulation and policy, environmental risk management and urban development.

There is a range of majors (such as aquatic and conservation biology) and sub-majors (such as sustainability) offered in Natural Science and Science that can add diversity and/or focus to your degree. There is also a range of sub-majors from other disciplines such as the arts, business, humanities and social sciences to choose from, though these may require cross campus study and are subject to availability and timetabling.

Previous completion of tertiary studies may qualify you for academic credit of up to 18 months making this an attractive re-skilling option for graduates from other disciplines.

For detailed information about the course structure and subjects, visit [myfuture.uws.edu.au](http://myfuture.uws.edu.au)

## Career Opportunities

Examples cover roles in the new 'green-collar' industries which include:

- » local and state government land and water management agencies
- » private environmental consultancies
- » waste management operations
- » National Parks and Wildlife Service
- » Rural Fire Service.

Professional responsibilities may include environmental protection, environmental auditing, or environmental planning.

# Bachelor of Natural Science (Sustainable Agriculture and Food Security)

By 2050 global food demand is forecast to be 70% greater than current demand. This increase must be achieved from a degraded natural resource base and with a reduction in greenhouse gas emissions. To effectively address these issues will require a fundamental shift in the way we view and manage the environment, agriculture, food and health.

## Indigenous Australian Studies

Enrolment in the Indigenous Australian Studies (IAS) major, sub-major or units is available to all UWS undergraduate students who have open electives. Find out more at [studyias.com.au](http://studyias.com.au)

Course	UAC Code	Campus	Duration	ATAR
B Natural Science (Sustainable Agriculture and Food Security)	720015	Hawkesbury	3F/6P	nc
Practical Experience				
In their final year of study, students undertake a real world project for a professional client. The project provides students with first-hand professional experience in project management and problem solving.				

Key: B = Bachelor of; F = Full-time; P = Part-time; nc = new course. Note: 'part-time' refers to study load not to timetabling of evening classes.

Interconnections between food security and agriculture, social stability, health, plants and animals, and the environment will be emphasised. Students will gain critical thinking skills and the ability to contribute innovative solutions to the complex challenge of future sustainable agriculture and food security.

## Further Studies

Further studies can be pursued (Honours, Masters (Hon) or PhD degree) leading to a research or academic career. An Honours year is available to high achieving students. Information and details on how to apply for Honours will be provided to you as you progress through your Bachelor degree, or you can find out more at [myfuture.uws.edu.au/honours](http://myfuture.uws.edu.au/honours)

You will also have the option of teaching secondary school science if you study the appropriate subjects and complete a Master of Teaching (Secondary). Please refer to the Teaching and Education Course Guide for details.

## Major Studies

The major studies are an integrated suite focusing on sustainable agriculture and food security including crop and animal production, agronomy, animal science, soil and water in the landscape, plant health and biosecurity, post harvest, global nutrition and food and community.

There is a range of majors and sub-majors (such as agricultural economics and sustainability) offered in Natural Science and Science that can add diversity and/or focus to your degree. There is also a range of sub-majors from other disciplines such as the arts, business, humanities and social sciences to choose from, though these may require cross campus study and are subject to availability and timetabling.

For detailed information about the course structure and subjects, visit [myfuture.uws.edu.au](http://myfuture.uws.edu.au)

## Career Opportunities

Examples include employment in a diverse range of agriculture and food related organisations, in natural resource management, agricultural production, food security, public health and nutrition, and community development. The breadth and interdisciplinarity of the degree will prepare you for roles in policy, communication, planning, and implementing programs across a broad domain depending on the subjects chosen. Graduates can find employment in corporations or environmental consulting companies, working in government agencies both federal and state advising on agriculture, food and sustainability-related issues, in local government in both urban and rural areas, and in non-government organisations (NGOs) working both nationally and internationally.

After a subsequent Honours year, and possibly a PhD, you may conduct research in:

- » private industry
- » universities
- » national and international scientific organisations.



## Pip Chalk

Graduate: Bachelor of Applied Science (Environmental Management & Tourism), Bachelor of Science (Honours1), Master of Tourism Planning

Renowned wildlife researcher Pip Chalk believes it was her studies at UWS that allowed her to expand her practical knowledge and skills of wildlife. Pip was able to transfer the knowledge and skills into the theoretical world of academic research on human dimensions of wildlife management and anthrozoology. 'By presenting at national and international conferences on these topics I have been able to build relationships with key figures in these fields and increase my network of contacts in order to enhance my research and future career prospects,' she says.

'I chose UWS for my studies as it offered a diverse animal science program and was conveniently located to my area of study.'

Pip believes the field of human dimensions research and anthrozoology are emerging fields of science in Australia. 'There is great scope for students looking to get into a fascinating and much needed area. As humans and wildlife are coming into increasing areas of conflict it is imperative that this relationship be understood in order to mitigate any issues to ensure peaceful co-existence for humans and animals.'

# Double Degrees

Your study options at UWS are increasing. Now you can tailor your studies to your specific goals by combining more degrees.

In 2012, the Bachelor of Science degree can be combined with a Bachelor of Arts, Bachelor of Business and Commerce, Bachelor of International Studies, or Bachelor of Laws.

For detailed information about the course structure and subjects, visit [myfuture.uws.edu.au](http://myfuture.uws.edu.au)

Course	UAC Code	Campus	Duration	ATAR
B Science/B Arts	728100	Parramatta	4F	70.50
B Science/B Business and Commerce	728110	Campbelltown	4F	70.50
	728111	Parramatta	4F	70.50
B Science/B Laws	725035	Campbelltown	5F	90.05
	725040	Parramatta	5F	90.05
B Science/B International Studies	728115	Parramatta	4F	70.60

Alternatively, you may consecutively study a Bachelor of Science (Pathway to Teaching Secondary) and a Master of Teaching (Secondary).

Course	UAC Code	Campus	Duration	ATAR
B Science (Pathway to Teaching Secondary)	729035	Campbelltown	3F	78.00
	729040	Hawkesbury	3F	79.00
	729045	Parramatta	3F	78.50
M Teaching (Secondary)	952920	Penrith	1A/1.5F/ 3P	N/A

Key: B = Bachelor of; M = Master of; F = Full-time; A = Accelerated; P = Part-time; N/A = Not applicable, alternative entry. For more information, please refer to the Teaching and Education course guide or visit [myfuture.uws.edu.au](http://myfuture.uws.edu.au)

For more information please call the UWS Course Information Centre on 1300 897 669 or email [study@uws.edu.au](mailto:study@uws.edu.au)

# Providing Support Through Scholarships

The University of Western Sydney is not only about obtaining an education. We challenge ourselves to engage students who will get involved and make a difference to the University and wider communities.

UWS has a unique set of scholarships on offer with many differing criteria. They reflect our strong commitment to academic excellence and opportunity for Greater Western Sydney students. Our scholarships support students who have diverse interests and skills, and who can and do make an active contribution.

UWS works closely with business, industry, and the community to ensure we offer scholarships that meet the needs of our students. Our scholarships provide our students with support and give them the opportunity to establish professional relationships while they study.

Take the time to examine our scholarships and make the most of your opportunities for success. For details on UWS Scholarships, including the eligibility requirements and how to apply, refer to [www.uws.edu.au/scholarships](http://www.uws.edu.au/scholarships) or call 1300 897 669.



## Jessica Shepherd-Mowle

Bachelor of Science (Advanced)

Aspire Future Leaders Program

Aspire Future Leaders member Jessica Shepherd-Mowle says she chose a UWS science degree because she was looking for clear cut answers.

'I like it how it's so broad, there's so many different areas you can go into, there's so much potential for creativity and discovery and to make a difference.'

As a leader, Jessica says her strengths are in connecting with other people, taking the advice of others onboard and then working out a best course of action. She has loved being involved in the Aspire program.

Currently studying a Bachelor of Science (Advanced) at the University of Western Sydney, Jessica says she couldn't be more enthusiastic about her course.

'UWS is innovative with its research, and with my degree you get to undertake four research projects during your second and third years, which makes you a well-rounded graduate and gives you a foot-up to be employed later.'

# Aspiring Leaders

Aspire Future Leaders at the University of Western Sydney™ is a unique professional development and personal enrichment program that has been specifically designed to cultivate and enhance the leadership qualities of students.

By being a part of Aspire, you will have the opportunity to be involved in:

- » the annual three-day Aspire Welcome Retreat
- » professional and personal development workshops
- » valuable networking opportunities with the professional community

- » VIP Invitations to UWS Open Days and other annual events
- » volunteering opportunities through community engagement
- » internships and work experience opportunities.

Aspire is an opportunity for young, talented people with leadership abilities and ambitions, to become part of an elite group of high-achieving undergraduate students. For details on the Aspire program and eligibility requirements, please refer to [serious.uws.edu.au](http://serious.uws.edu.au) or call 1300 897 669.

# Applicant Checklist



## Find out about our courses

# 1

- Read the information within this Guide
- Talk with Careers Advisors, your parents and teachers/mentors
- Refer to the Future Students site, visit [myfuture.uws.edu.au](http://myfuture.uws.edu.au)



## Talk to us

# 2

- Attend UWS events – find out more at [myfuture.uws.edu.au/events](http://myfuture.uws.edu.au/events)
- Call the UWS Course Information Centre on 1300 897 669 or email [study@uws.edu.au](mailto:study@uws.edu.au)
- Get the inside information on Alternative Entry Pathways to UWS, Triple Advantage and bonus points, Scholarships and Aspire



## Apply to UWS

# 3

- Apply through UAC, visit [www.uac.edu.au](http://www.uac.edu.au)
- Place your UWS Preferences
- Check your eligibility and submit a scholarship application, visit [www.uws.edu.au/scholarships](http://www.uws.edu.au/scholarships)

## For International Students

If you are an international student completing one of the following qualifications in 2011, you must apply through UAC International:

- » an Australian Year 12 in or outside Australia
- » an International Baccalaureate
- » a New Zealand National Certificate of Educational Achievement (NCEA) Level 3

All other international students must apply direct to the University of Western Sydney. UWS International application forms, 2012 International tuition fees and further information about studying in Australia can be found at [www.uws.edu.au/international](http://www.uws.edu.au/international)

If you have any questions about applying as an international student call 02 9852 5499 or email [internationalstudy@uws.edu.au](mailto:internationalstudy@uws.edu.au)

For international students, you can lodge your international student application online at [www.uac.edu.au/international](http://www.uac.edu.au/international)

The University of Western Sydney reserves the right at all times to withdraw or vary courses listed within this publication. Variations may include but are not limited to location of its courses on UWS campuses or other locations. In the event that a course within this publication is to be changed or withdrawn, applicants will be advised by mail to the address specified by them on their UAC application before the last date for the change of preferences for the main round. In respect of course location change, students should be aware of the need to accommodate such changes for the whole or part of courses for which they enrol. The University also reserves the right to update, amend or replace online versions of this publication without notice.

University of Western Sydney  
Locked Bag 1797  
Penrith NSW 2751 Australia  
[www.uws.edu.au](http://www.uws.edu.au)

Course Information Centre  
1300 897 669  
[study@uws.edu.au](mailto:study@uws.edu.au)

## See you at

- ▣ UWS Day Campbelltown, 7 June 2011
- ▣ Parent Information Evening, 7 & 14 July 2011
- ▣ UWS Open Day, 28 August 2011
- ▣ UWS Campus Tours, October 2011
- ▣ UWS Day Penrith, 9 November 2011
- ▣ Course Decision Day, 3 January 2012

More information: [myfuture.uws.edu.au/events](http://myfuture.uws.edu.au/events)

## Interact with us to experience UWS Life

- ▣ Visit the Future Students Site: [myfuture.uws.edu.au](http://myfuture.uws.edu.au)
- ▣ Visit the Events Mini-Site: [myfuture.uws.edu.au/events](http://myfuture.uws.edu.au/events)
- ▣ Find us on Facebook: [www.uws.edu.au/facebook](http://www.uws.edu.au/facebook) 
- ▣ Connect with us on Twitter: [www.twitter.com/UWSNews](http://www.twitter.com/UWSNews) 
- ▣ Take a Virtual Tour: [virtualevents.uws.edu.au](http://virtualevents.uws.edu.au)
- ▣ Watch our YouTube videos: [www.uws.edu.au/youtube](http://www.uws.edu.au/youtube) 
- ▣ Call the Course Information Centre: 1300 897 669
- ▣ Email the Course Information Centre: [study@uws.edu.au](mailto:study@uws.edu.au)

