

Department of Physics and Astronomy

BACHELOR OF ADVANCED SCIENCE IN PHYSICS

Do you have a talent for Physics?

This is an elite degree suitable for gifted and talented physics students. Student numbers are restricted so you will enjoy personal attention including your own academic mentor throughout your degree. You will benefit from special advanced physics units not available to other students. Many students will go on to an honours degree by completing a fourth year of study and further postgraduate studies in physics. You will have close interaction with academics from three of Macquarie University's major concentrations of research excellence: Astronomy and Astrophysics, Lasers and Photonics and Quantum Information Science. You will have the opportunity to take part in research and gain practical experience working in our leading research laboratories. A summer vacation scholarship and a third year research project are included.

What you study

1st year: lays foundations in physics and mathematics. You will participate in an accelerated learning program including seminars, discussions and a literature-based research project in modern physics. Other optional units include astronomy/astrophysics, engineering, chemistry, computing and biology.

2nd year: continues studies of physics in optics, waves, quantum physics and electromagnetism and other advanced physics topics; and Mathematics. You can enrol in additional units in areas such as: photonics, astronomy, engineering or computing. Students have the opportunity to do a vacation research internship. You will work alongside graduate research students, research fellows and academics in one of our high profile research centres.

3rd year: you will learn advanced topics including quantum mechanics, electromagnetism, solid state physics, atomic physics, general relativity and cosmology. The program includes seminars, discussions of advanced topics and project work. Additional units include astronomy, engineering or computing.

Entry requirements

The Bachelor of Advanced Science in Physics program requires HSC Mathematics Band 4 or equivalent. Higher levels of Physics and Mathematics are strongly recommended. It has one of the highest ATAR cut-offs for a science program in Australia.

Scholarships

Scholarships include: general support, equity, Indigenous students, sport, accommodation or international travel. For more information go to www.futurestudent.mq.edu.au/undergraduate

Research degrees

Further studies in physics, including honours and postgraduate studies, enhance your employment options in a world-wide market. Many Bachelor of Advanced Science students will enrol in a one year honours program after they complete their bachelor degree. This consists of 50% advanced coursework and 50% research thesis. Research projects vary from year to year. For descriptions of sample projects go to www.physics.mq.edu.au/undergrad/honours

Physics at Macquarie University enjoys a high level of international recognition for research excellence. It is a major participant in two Australian Research Council Centres of Excellence, CUDOS (Centre for Ultrahigh bandwidth Devices for Optical Systems) and Engineered Quantum Systems (EQUUS). It is also home to four Macquarie University research centres.

Students with a high achievement in the honours program will be well prepared to go on to complete a PhD program at universities throughout the world. Physics at Macquarie University offers many cutting-edge PhD projects in the following areas: astronomy and astrophysics; biophotonics; photonics; quantum information science; semiconductor and condensed matter physics.

Career options

A Bachelor of Advanced Science in Physics is a passport into a broad range of careers in science, technology, engineering, management and education. Graduates have a higher rate of employment than the national average, use their technical skills and knowledge. Career options include:

- Consulting
- Industrial management or research development
- Medical physics
- Patent assistant/examiner
- Physics and mathematics teacher
- Scientific research/high-tech industry

Major employers

- Hi-tech companies ranging from small start-up companies to multinational companies
- Hospitals and biomedical companies
- IT firms/legal partnerships
- National research laboratories such as Commonwealth Scientific and Industrial Research Organisation (CSIRO) and Defence Science and Technology Organisation (DSTO)
- Universities and schools

The degree requires full-time study over 3 years.



SUGGESTED PROGRAM OF STUDY

BACHELOR OF ADVANCED SCIENCE IN PHYSICS

Required and recommended units of study: Completion of a minimum of 72 credit points including the following **prescribed** and optional units. This major must be completed as part of a degree. The general requirements for the degree must be satisfied in order to graduate.

100 LEVEL

LEVEL		CODE	NAME	CREDIT POINTS SEMESTER 1	CREDIT POINTS SEMESTER 2
Required		PHYS188	Advanced Physics I	1.5	1.5
Required		PHYS140	Physics IA	3	
Required		PHYS143	Physics IB		3
Required	either	MATH135	Mathematics IA	3	
	or	MATH132	Mathematics IA (Advanced)	3	
Required	either	MATH136	Mathematics IB		3
	or	MATH133	Mathematics IB (Advanced)		3
<i>Recommended Additional Units: 3 of the following optional units</i>					
Optional		ELEC141	Digital Fundamentals	3	
Optional		ELEC170	Introduction to Electronic Systems	3	
Optional		CBMS101	Introductory Chemistry	3	
Optional		COMP115	Introduction to Computer Science	3	
Optional		COMP125	Fundamentals of Computer Science		3

200 LEVEL

Required		PHYS201	Physics IIA	3	
Required		PHYS202	Physics IIB		3
Required		MATH235	Mathematics IIA	3	
<i>Recommended Additional Units: 3 of the following optional units</i>					
Optional		PHYS220	Scientific Modelling	3	
Optional		PHYS246	Advanced Physics II		3
Optional		MATH236	Mathematics IIB		3
Optional		MATH232	Mathematical Techniques		3
Optional		ELEC260	Introduction to Mechatronics		3
Optional		ELEC241	Programmable Logic Design		3

300 LEVEL

Capstone		PHYS388	Advanced Physics III	1.5	1.5
Required		PHYS310	Energy and Entropy		3
Required		PHTN301	Electromagnetism and Quantum Physics	3	
<i>Required: 6 credit points from the following units</i>					
		PHYS303	Atomic and Solid State Physics	3	
		PHYS304	Quantum Physics II		3
		PHYS306	Optical Physics		3
		ASTR378	General Relativity and Cosmology		3
		PHTN321	Optical and Photonic Devices and Systems 1	3	
Required		PLANET UNIT			3
Required		PEOPLE UNIT			3
TOTAL CREDIT POINTS REQUIRED FOR THIS DEGREE				72	

Academic and administrative enquiries

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CRICOS Provider Number 00002J

Disclaimer: This publication is correct at time of printing, August 2011. Macquarie University reserves the right to change program details at any time and change its fees without notice.

Please note: This information is intended as a guide only and does not replace the Macquarie University Handbook of Undergraduate Studies. For full degree requirements you should refer to the Macquarie University Handbook of Undergraduate Studies at www.handbook.mq.edu.au

Offerings of units may change from year to year.