

Department of Physics and Astronomy

BACHELOR OF SCIENCE MAJOR IN PHYSICS

Physics is fundamental to all natural sciences and plays a vital role in the development of new technologies. This program explores basic questions about the intrinsic laws of the universe; and how physics is applied to interdisciplinary fields and put to practical use. This is a core discipline for all science and technology students. You will have the opportunity to explore the underlying principles of all physical phenomena. You will develop skills in problem solving, good laboratory techniques, numerical analysis, technical writing, and oral communication. We are recognised as one of Australia's leading physics departments. Our internationally renowned research and state-of-the-art laboratories underpin our excellent teaching.

Career options

The degree 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. Honours and postgraduate study in physics enhances employment prospects in a world-wide market. Career options for physics graduates include:

- Consulting
- High technology industries
- Industrial management or research development
- Information technology
- Medical physics
- Patent assistant/examiner
- Physics and mathematics teacher
- Scientific research/high-tech industry
- Technology sales
- University postgraduate study and research

Entry requirements

HSC Mathematics Band 4 or equivalent. Students who do not meet this criterion may not be able to complete the degree in minimum time. HSC physics or science is strongly recommended but not essential.

Macquarie University's Academic Advantage bonus point scheme recognises HSC students' academic achievements in subjects that relate to their degree program. Up to five bonus points will be rewarded for high achievement in HSC physics, mathematics and chemistry. Find out more at www.mq.edu.au/academic-advantage

Program of study

The first year: lays the foundations in physics and mathematics. Most students take other units in astronomy, engineering, chemistry, computing or biology.

The second year: continues studies of physics in waves and electromagnetism and quantum mechanics as well as mathematics. You can also enrol in units in areas such as photonics, astronomy, engineering or computing.

The third year: covers advanced topics in physics including quantum mechanics, electromagnetism, solid state physics, atomic physics, general relativity, optics and cosmology. Additional units may include astronomy, engineering or computing.

Scholarships

Macquarie University scholarships include general support, equity, Indigenous students, accommodation, sport or international travel. Go to www.futurestudent.mq.edu.au/undergraduate

Vacation scholarships are offered for students to work on research projects during the summer. For a more information go to www.physics.mq.edu.au/future-vacation

Research degrees in physics

Employers value graduates with honours and postgraduate degrees. Students with suitable academic performance are invited to enrol in a one-year Honours program after they complete a Bachelor of Science major in Physics. This program consists of 50% advanced coursework and 50% research thesis. Research projects vary from year to year. View sample projects at www.physics.mq.edu.au/future/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: the Centre for Ultra-High bandwidth Devices for Optical Systems (CUDOS) and the Centre for Engineered Quantum Systems (EQuS). It has four Macquarie University research centres: Astronomy, Astrophysics and Astrophotonics Research Centre; MQ Photonics; MQ Biofocus; and QSciTech. Exciting master of science and PhD programs are available with research in the areas of: astronomy/astrophysics; biophotonics; photonics; physics; quantum information science; and semiconductor/condensed matter physics.

The degree program requires full-time study over three years.

Steve Davey

Patent and Trademark Attorney, BScLLB, Major in Physics



PHOTO: EEFY ALEXAKIS, PHOTOWRITE

My studies in Physics at Macquarie University equipped me to understand inventions involving mechanics, optics including lasers, electronics and computers. The technical skills and knowledge learned in the course of studying Physics put you in good stead to pursue a career as a Patent and Trademark Attorney. My degree also taught me to push myself further, and increased my confidence. When I'm posed with a difficult new invention I think "I've done Advanced Quantum Physics at Uni, I can do this!"

SUGGESTED PROGRAM OF STUDY

BACHELOR OF SCIENCE MAJOR IN PHYSICS

Required and recommended units of study: Completion of a minimum of 68 credit points including a minimum of 33 credit points required for the Physics major from 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

200 LEVEL

300 LEVEL

LEVEL		CODE	NAME	CREDIT POINTS SEMESTER 1	CREDIT POINTS SEMESTER 2
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
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		MATH236	Mathematics IIB		3
Optional		MATH232	Mathematical Techniques		3
Optional		ELEC260	Introduction to Mechatronics		3
Optional		ELEC241	Programmable Logic Design		3
Capstone		PHYS310	Energy and Entropy (Capstone unit)		3
Required		PHYS301	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 I	3	
Required		PLANET UNIT			3
Required		PEOPLE UNIT			3
TOTAL CREDIT POINTS REQUIRED FOR THIS DEGREE				68	

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.

Academic and administrative enquiries

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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.



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