



Undergraduate Study  
Marine Technology

# What is marine technology?

From surfboards to supertankers, cruise liners to cargo containers, marine technologists are responsible for designing, building, operating, maintaining and recycling ships, vessels and other structures on or under the sea's surface.

Marine technologists rely on the principles of mathematics, science and engineering to solve technical problems, and to create designs ranging from delicate automatic control systems to robust oil production platforms, high-speed luxury yachts to offshore patrol vessels, as well as vessels that operate under the sea (remote and manned).

Far from being an industry in decline, marine technology is thriving worldwide. In many areas, including the UK, there are acute shortages of skilled personnel. The result is that the marine industry has a large number of well-paid jobs available for highly qualified engineers.



The University has its own research vessel.

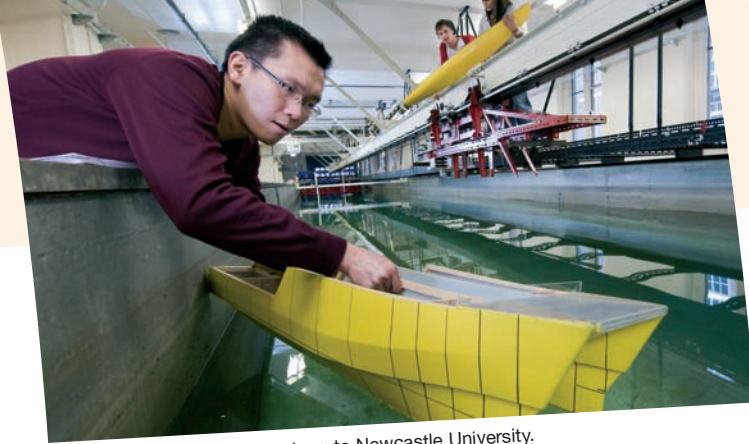
## Why choose Newcastle?

### Teaching excellence

Engineering for the sea has been taught at Newcastle for over a century. This heritage enables us to attract the very best teaching staff, most of whom also have prior industrial backgrounds in the marine sector. Our teaching expertise has gained world recognition and the School has recently, by invitation of the Singaporean Ministry of Education, opened our Marine International campus in Singapore. Our teaching expertise is also highly sought after by industry and we deliver degree-level taught programmes on request to major players in the marine industry, including Rolls-Royce.

### Research-led teaching

Our leading international standing in research excellence was confirmed in the recent Research Assessment Exercise (RAE). The RAE is the UK's official survey of research quality in universities and higher education colleges. The most recent RAE took place in 2008 and confirmed Newcastle University's position as one of the UK's top 20 research institutions. The School of Marine Science and Technology directly contributed to the University's overall success, with 65 per cent of our research being classified as world-leading or internationally excellent – the two highest categories achievable. Our degree programmes are closely linked to the research specialisms of our staff. At Stages 3 and 4 of your degree, their research feeds directly into the teaching programme to guarantee your module choices cover the latest issues affecting the industry.



Many of our facilities are unique to Newcastle University.

### First-class facilities

Many of the facilities we offer are unique to Newcastle University. These include:

- the only operational cavitation tunnel in the UK, used for testing models of ship propellers and other propulsion devices, submarine vehicles and the immersed parts of other marine structures
- a 37-metre towing tank for ship model experiments, conveniently located within the School
- a combined wind, wave and current tank for complex modelling of the full marine environment

We have recently invested £1.5 million to further enhance these facilities with state-of-the-art laser measurement systems. We also have:

- our own research vessel, used for experimental work
- a hydrodynamics laboratory with wave-making and electronic recording equipment
- engineering laboratories, which include facilities to test diesel engines
- a dedicated computer cluster running specialist marine design software
- a specialist technical library and archive



Students relax in the dedicated School common room.

### Professionally accredited programmes

All of our degree programmes are accredited by the Royal Institution of Naval Architects and the Institute of Marine Engineering, Science and Technology, on behalf of the Engineering Council. This means that our graduates are automatically recognised as satisfying the educational requirements leading to Chartered Engineer (CEng) status. This gives an additional benchmark of quality to your degree, making you more attractive to graduate employers. It can also open the door to higher-level jobs, many of which require Chartered Engineer status. For further information visit:

**[www.imarest.org.uk](http://www.imarest.org.uk)**  
**[www.rina.org.uk](http://www.rina.org.uk)**

### Practically oriented courses

Practical experience forms an integral part of all of our degree programmes, accounting for up to 30 per cent of your time. This includes experimentation opportunities using our unique facilities.

“The course is challenging, and in the final year of an MEng degree the group project takes up a lot of time. It is really enjoyable testing the knowledge you’ve gained over the previous years to come up with an original and interesting project.”

**Keir Gravil**  
Naval Architecture MEng Honours



## What degrees do you offer?

We offer four specialised degree programmes at both MEng and BEng levels. No matter which degree you choose you will take a common Stage 1. This ensures that you have a firm foundation in engineering science, mathematics and computing, as well as in the basics of marine engineering and naval architecture. After this common first year you choose one of the Honours Options opposite for the remaining Stages of your degree programme. We also offer a Foundation Year programme (see opposite).

## MEng or BEng?

The Master of Engineering (MEng) programme lasts for four years while the Bachelor of Engineering (BEng) takes three. You can apply for either and you can transfer between MEng and BEng versions of the same Honours Option up to the end of Stage 2, depending upon your examination performance.

If you want to become a Chartered Engineer, the Engineering Council recommends that you study for an MEng degree, as this is the most direct way to become professionally qualified. However, the BEng degree might be more appropriate if you would like to consider Chartered Engineer status at a later stage in your career, if you intend to do a separate Master's degree, or if you are an international student who does not require British Chartered Engineer status (or equivalent European or international professional accreditation).



‘A particular highlight of the degree was the group design project in Stage 4 to design a 100-knot, high-speed pentamaran. It was great to be able to bring together all the things we had learnt in our degree to solve the different engineering challenges in designing a novel ship.’

**Tom Price**

Marine Technology Naval Architecture MEng Honours



## Marine Engineering

MEng Honours: UCAS code H501 (4 years)

BEng Honours: UCAS code H504 (3 years)

These degrees are concerned with engineering challenges specific to the marine environment. For example, the propulsion and auxiliary machinery of ships, and the power and control systems of other marine constructions such as oil platforms, sub-sea systems, and underwater and offshore vehicles.

## Naval Architecture

MEng Honours: UCAS code H503 (4 years)

BEng Honours: UCAS code H502 (3 years)

These degrees are directed towards the design, production and operation of ships and other marine vehicles. Naval Architecture is the widest ranging of the four Honours Options. The principles of stability, structures, response in a seaway, resistance and propulsion can be applied to vessels as diverse as ferries, giant oil tankers, tugs or warships.

## Offshore Engineering

MEng Honours: UCAS code H356 (4 years)

BEng Honours: UCAS code H355 (3 years)

These degrees are geared to the demands of the offshore engineering industry, but with a solid basis in engineering fundamentals. They enable you to design and produce fixed and floating offshore oil and gas production installations, and the craft which service these and other offshore resource developments.

## Small Craft Technology

MEng Honours: UCAS code H524 (4 years)

BEng Honours: UCAS code H520 (3 years)

The techniques of small craft design represent a specialised application of marine technology. The growth in yachts, leisure craft and high-speed craft such as catamarans has been very rapid, and these degrees cover aspects of design and operation, including naval architecture, marine dynamics, propulsion and materials science.

## Marine Technology with Foundation Year

MEng Honours: UCAS code J616

BEng Honours: UCAS code J615

These programmes are for those students who have shown that they have the ability to undertake a degree in marine technology but do not possess the necessary qualifications for direct entry into Stage 1. After successful completion of the Foundation Year you may progress, as appropriate, on to any of our MEng or BEng marine technology programmes.

During the Foundation Year (Stage 0), you take around half of your modules in mathematics, mechanical sciences and applied mechanics. Your remaining modules are assigned from a range of engineering subjects and include a project related to the marine technology degree that you wish to study. You may also choose to study modules from a range of other subjects offered by the University, with the agreement of the Foundation Year Director.

For further details visit [www.ncl.ac.uk/ug/engfoundation](http://www.ncl.ac.uk/ug/engfoundation) or contact the Enquiries Service (see back page).



## What will I study?

Balancing choice and flexibility with the need to equip you with core skills and knowledge, your degree will be made up of both compulsory and optional modules.

- 1 Core modules**, common to all degrees offered by the School, ensure you are equipped with a firm foundation in the skills and knowledge that all marine technologists need.
- Alongside these, you also study **degree-specific modules** relevant to the Honours Option you have chosen. These deliver training and knowledge focused on key issues in your specialist area of study.
- At Stages 3 and 4, you also have the opportunity to tailor your degree towards your personal interests, and to increase your employability, by selecting from a number of **optional modules** in technical and management topics.

At each Stage, you complete modules to a value of 120 credits. Please see the tables opposite for typical modules offered. The credit value of each module is given in brackets after the module title.

## 1 Core modules – all degrees

### Stage 1

**Marine engineering practice (10)** provides a practical introduction to machinery and electrical systems on ships and offshore structures, including main propulsion engines and auxiliary systems.

**Naval architecture (20)** covers the fundamentals of naval architecture, including metacentre theory and stability, hydrostatics, numerical methods, fluid dynamics, potential and Newtonian flows.

**Marine informatics (5)** provides an extensive introduction to the computing programming languages as applied to marine engineering environments.

**Materials in the marine environment (10)** explains the roles of different materials, the micro and macro structure of materials, manufacturing effects and materials failure mechanisms.

**Engineering mathematics (20)** provides the mathematical knowledge and skill base required for professional maritime engineers and includes calculus, differential equations and linear algebra.

**Marine mechanics (15)** covers the underpinning science and practice of mechanics in the marine environment.

**Marine statistics (5)** explores the crucial areas of statistics that are required in the analysis of many maritime engineering scenarios, including ocean wave data for sea-keeping and market analysis.

**Marine production management (10)** covers the production of marine vehicles, manufacturing techniques, production and project planning, quality assurance, and work and materials management.

**Marine engineering science (10)** develops the scientific and mathematical principles for the design and analysis of marine engineering systems.

**Electrical engineering (10)** provides the core concepts in marine electrical engineering including electrical circuits and magnetic machines.

**Introduction to machine design (5)** focuses on enabling engineers to communicate using engineering drawings and uses CAD packages to introduce standard drawing and design principles.

### Stage 2

Marine structures (10); Naval architecture (10); Resistance and propulsion (20); Engineering applications (10); Analytical methods in marine technology (10); Marine informatics (10); Marine production management (10); Introduction to business management (10).

### Stage 3

Project and report (30); Research development and design in the marine environment (10).

### Stage 4 (MEng degrees only)

Group project and report (40); Marine management technology (10); Financial risk management in shipping (10).

## 2 Degree-specific modules

Marine Engineering	Naval Architecture	Offshore Engineering	Small Craft Technology
<b>Stage 2</b>			
Marine engineering practice (10)	Marine dynamics (10)	Marine dynamics (10)	Marine dynamics (10)
Marine engineering science (10)	Marine engineering practice (10)	Marine engineering practice (10)	Marine structures (10)
Electrical engineering (10)	Marine structures (10)	Marine structures (10)	Small craft science (10)
<b>Stage 3</b>			
Marine engineering design (20)	Ship design (20)	Offshore design (20)	Small craft design (20)
Dynamic modelling and simulation (10)	Marine structures (10)	Marine and offshore mechanics (10)	Marine structures (10)
Internal combustion engines (10)	Marine transport business (10)	Marine structures (10)	Marine transport business (10)
Marine engineering (10)	Marine and offshore mechanics (10)	Marine transport business (10)	Small craft powering (10)
Marine transport business (10)	Resistance and propulsion (10)	Offshore engineering analysis (10)	Marine and offshore mechanics (10)
Optional modules (20)	Optional modules (20)	Optional modules (20)	Optional modules (20)
<b>Stage 4 (MEng degrees only)</b>			
Marine machinery systems (20)	Theory of plates and grillages (10)	Advanced hydrodynamics (10)	Theory of plates and grillages (10)
Marine power transmission (10)	Advanced hydrodynamics (10)	Advanced offshore design (10)	Advanced hydrodynamics (10)
Optional modules (30)	Ship performance at sea (10)	Theory of plates and grillages (10)	High-speed and advanced craft (10)
	Optional modules (30)	Optional modules (30)	Optional modules (30)

## 3 Optional modules – all degrees

### Stage 3

**Technical:** Surface generation and fairing (5); Formal safety assessment and design for safety (5); Computer-aided engineering (5); High-speed and advanced craft (10); Drilling engineering (10); Dynamic modelling and simulation (10); Internal combustion engines (10); Small craft powering (10); Marine engineering (10); Microprocessor control (10); Resistance and propulsion (10); Marine structures (10); Maritime safety analysis (10); Offshore vehicle design (10); Offshore studies (10); Marine and offshore mechanics (10).

**Management:** Management of new product introduction (10); Innovation and technology management (10).

### Stage 4 (MEng degrees only)

**Technical:** Further design studies (20); Theory of plates and grillages (10); Advanced computer-aided engineering (10); Marine machinery systems (20); Advanced hydrodynamics (10); Ship performance at sea (10); Structural response analysis (10); Advanced offshore design (10); High-speed and advanced craft (10); Marine power transmission (10); Advanced computer-aided technologies (10); Joining technology (15); Thermal systems engineering (5). **Management:** Business and environmental management (10); Management of new product introduction (10); Management and communications (10). **General:** Industrial automation, robotics and artificial intelligence (15); Design and implementation of experiments (10); Data analysis and interpretations (10).

## How are the degrees taught?

MEng programmes extend over four Stages and BEng programmes over three, with each Stage corresponding to one academic year. The academic year is divided into two semesters, with an assessment period at the end of each.

At Stage 1 all of your modules are compulsory, providing you with a firm foundation in engineering science, mathematics and computing, as well as the basics of marine engineering and naval architecture. Approximately half your modules at Stages 3 and 4 are optional, giving you the chance to choose from a comprehensive list of technical, business and marine management subjects. Course work, including laboratory and computer work, is important throughout all Stages of the degree programmes to emphasise the practical application of theory.

Typically, you can expect to have 15 to 20 contact hours a week, combining lectures, seminars from invited speakers from industry and academia, and practical work. The invited seminars give you the chance to explore or clarify ideas around a particular subject, technique or theory. They often include informal discussions where you can begin to express your ideas amongst your peers, before bringing them to a point where you need to put them across on paper in course work, essays or examinations. You will also spend time on independent guided reading.

At Newcastle we recognise the importance of first-hand experience and organise a variety of visits during your studies. This is a formal component of some taught modules and ensures that you see the applications of marine technology in a range of organisations, including local and national marine production facilities, offshore rigs and platform building sites.

## How will I be assessed?

You are assessed through a combination of written, practical and continuous assessment with examinations at the end of each semester.

In Stage 3 of the BEng and MEng programmes, you undertake a project of your choice and write a report that counts for one quarter of your assessment in Stage 3, allowing you to explore an area of special interest in depth. Previous topics have included: sea-keeping of semi-submersibles for Arctic operation; diving support vessels: technical comparison of a selected design; power generation for sub-sea oilfields; design of a fast catamaran passenger ferry; and improving the safety of river ferries in a developing country. High importance is placed on engineering design and your Stage 3 design module counts for a significant proportion of that year's assessment.

At Stage 4 of the MEng programmes there is a group project to design a specialised vessel, for example a high-speed rapid response ship featuring onboard hospitals, fire and evacuation facilities for dealing with marine incidents and pollution control equipment.

Testing a model ship in our unique 37-metre towing tank.

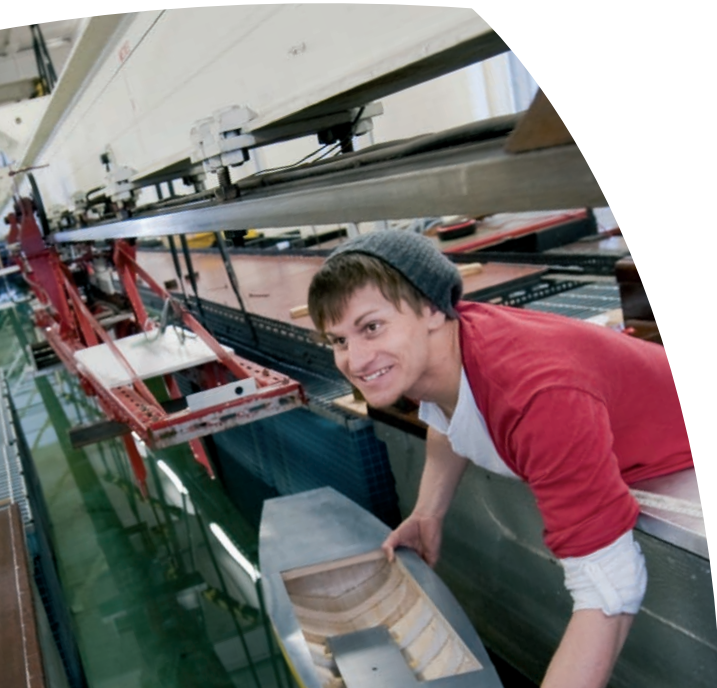


## Does the University have links with industry?

Yes. Our distinguished history of teaching, and the fact that we have produced highly regarded marine technologists for more than a century, allows us to maintain strong links with marine companies throughout the UK and abroad.

We encourage and assist you to seek work experience during the summer vacation. First-hand experience of industry is invaluable and you may use your vacation experience as part of your final-year project. Experience can also count towards recognition as a Chartered Engineer.

In addition, we run an annual two-day marine technology careers fair which attracts around 40 marine companies to campus, specifically to recruit our undergraduates. This event also includes an evening networking event, run by our student society, to allow you to meet up with the company representatives in an informal social environment.



## Are there any sponsorship opportunities?

Yes. We have sponsorship and bursary arrangements with a number of leading marine organisations that recognise the value of Newcastle graduates, including Lloyd's Register, the Royal Institution of Naval Architects, IMarEST, the American Bureau of Shipping and the Society for Underwater Technology. Most of the awards are made at the end of the first year when students' potential has been demonstrated.

The Royal Navy will award bursaries to young officers for our Naval Architecture and Marine Engineering degrees. In addition to these programmes, you can apply for direct sponsorship with major companies such as BAE Systems and British Maritime Technology. The School also offers a number of scholarships each year up to a value of £1,000.

We also have support from the Worshipful Company of Shipwrights and other charitable, regional, national and international companies.

Other funds enable you to obtain practical seagoing experience, such as voyaging to the West Indies or the Mediterranean.

## What personal support will I receive?

On your arrival you will be allocated a personal tutor with whom you have regular meetings throughout the year to discuss your progress. Additional specialised assistance is also available, such as help in mathematics through the Maths-Aid service at the University Library.

There is an active Marine Science and Technology Society (WETSOC) run by our students that provides the chance for students to get to know one another. WETSOC organises local and overseas visits and social events, including an annual dinner, and visits to industry, both in the UK and further afield.

## Entrance requirements

We recognise that students will apply to our degree programmes with a range of qualifications. We consider each applicant on an individual basis, taking into account the information on your UCAS application including past academic performance and potential. We have a very positive approach to mature applicants or candidates seeking to return to higher education. The following information gives an indication of the type and level of entrance qualifications, but we encourage you to contact us to discuss your position if you require any further details or clarification. We are happy to accept deferred entry.

### MEng degrees

**A levels:** AAB including Mathematics and preferably Physics but excluding General Studies. GCSE Physics or Dual Award Science (minimum grade B) required if not offered at A or AS level.

**Scottish qualifications:** AA/AB at Advanced Higher including Mathematics and preferably Physics. Higher Physics required at grade B if not offered at Advanced Higher.

**International Baccalaureate:** 36 points with Higher Level Mathematics and Physics at grade 5 or above.

### BEng degrees

**A levels:** BBB including Mathematics and preferably Physics but excluding General Studies. GCSE Physics or Dual Award Science (minimum grade B) required if not offered at A or AS level.

**Scottish qualifications:** BB at Advanced Higher including Mathematics and preferably Physics. Higher Physics required at grade B if not offered at Advanced Higher.

**International Baccalaureate:** 32 points with Higher Level Mathematics and Physics at grade 5 or above.

We welcome applications from students with qualifications other than those described above, including Access to HE Diplomas, BTEC National Diploma and a full range of European and international qualifications. We are also pleased to advise anyone interested with regard to choosing an appropriate preparatory course of study.

Entrance requirements can vary from year to year, so you should check our website for up-to-date information: [www.ncl.ac.uk/ug/marine](http://www.ncl.ac.uk/ug/marine)

## What if I can't meet the entrance requirements?

It is still possible to study marine technology at Newcastle even if you have not taken mathematics and/or science at an appropriate standard for direct entry into Stage 1. We run both MEng and BEng Marine Technology with Foundation Year programmes, which give students with proven ability in other subjects the opportunity to become engineers. You can progress onto any of the marine technology degrees after successful completion of the Foundation Year.

Non-native speakers of English must have achieved IELTS 6.0 for admission to the Engineering with Foundation Year degrees. Students who do not meet the University's English language requirements for direct entry to Stage 0 of the Foundation Year should apply to the INTO Foundation Programme at the University which combines English language tuition with the study of physical sciences and engineering: [www.into.uk.com/newcastle](http://www.into.uk.com/newcastle)

Further information and entrance requirements for the Foundation Year are available from our website: [www.ncl.ac.uk/ug/engfoundation](http://www.ncl.ac.uk/ug/engfoundation)



## What can I do with my degree?

The marine industry, both in the Britain and abroad, has large numbers of well-paid jobs available for highly qualified engineers including: naval architects, marine engineers, experts in computer-aided design, production specialists and managers with the right expertise. Many of these roles are based in multinational companies which operate all over the world, so if you're looking for a job that will involve overseas travel you couldn't be better placed.

Most of our graduates find employment as engineering specialists or managers in the marine industries, including shipbuilding, ship repair, offshore construction, ship design, small craft and shipping, or offshore companies. A number of our students also go on to postgraduate study to pursue research into new technologies.

The decommissioning of marine structures and specialist vessels is likely to be a growth area for marine technologists. Government departments, classification societies and various regulatory agencies and consultants employ graduates in all aspects of marine technology as surveyors and researchers.

The development of deep-water oil and gas recovery has increased demand for engineers specialising in the design and operation of offshore vessels and processing plants. Offshore renewable energy generation is also an emerging specialisation available to our graduates. Each year an increasing number of our graduates also enter careers in the design and manufacture of yachts, luxury cruisers and high-speed passenger craft.

Our curriculum gives you considerable breadth of engineering knowledge, which is an attractive foundation for careers outside, as well as within, the marine business. Some of our graduates have become successful in other branches of engineering, in addition to entering professions within the computing, financial and management sectors.

**[www.ncl.ac.uk/undergraduate/employability](http://www.ncl.ac.uk/undergraduate/employability)**

## International students

Your choice of university is an important step towards your future. You are not only choosing a programme to study, you are also choosing a place to live. Newcastle has everything you need for successful studies and enjoyable experiences. We welcome students from all over the world and are already home to around 2,700 international students from more than 100 different nations. Find out more at: **[www.ncl.ac.uk/international](http://www.ncl.ac.uk/international)**

## Disabled students

We welcome applications from students with disabilities and this brochure is available in alternative formats on request from the Enquiries Service. Disability Support provides help and advice whilst you are at the University, and make every effort to provide a suitable learning environment for you. If you would like to discuss the facilities on campus and any specific requirements you may have, contact:

Disability Support

Telephone: (UK) 0191 222 7623

(International) +44 191 222 7623

Textphone: (UK) 0191 222 5545

(International) +44 191 222 5545

Fax: (UK) 0191 222 5539

(International) +44 191 222 5539

E-mail: [disability.support@ncl.ac.uk](mailto:disability.support@ncl.ac.uk)

**[www.ncl.ac.uk/disability-support](http://www.ncl.ac.uk/disability-support)**

## Student finance (UK/EU)

For more information on tuition fees, bursaries and scholarships, please see **[www.ncl.ac.uk/undergraduate/finance](http://www.ncl.ac.uk/undergraduate/finance)** or contact the Enquiries Service for a copy of our *Guide to Student Finance*. See also page 6 for information about sponsorship opportunities.



## Further information

For further information on the degree programmes, please contact:

Undergraduate Admissions Tutor  
School of Marine Science  
and Technology  
Armstrong Building  
Newcastle University  
Newcastle upon Tyne NE1 7RU  
United Kingdom

Telephone: (UK) 0191 222 6710  
(International) +44 191 222 6710  
E-mail: [marine@ncl.ac.uk](mailto:marine@ncl.ac.uk)

**[www.ncl.ac.uk/marine/undergrad](http://www.ncl.ac.uk/marine/undergrad)**

To find out more about the University and its facilities, including accommodation, sports and social activities, or the city and surrounding area, take a look at the University's website or request an *Undergraduate Prospectus* from

**[www.ncl.ac.uk/undergraduate](http://www.ncl.ac.uk/undergraduate)**

Enquiries Service  
Newcastle University  
Newcastle upon Tyne NE1 7RU  
United Kingdom

Telephone: (UK) 0191 222 5594  
(International) +44 191 222 5594  
Enquire online at:

**[www.ncl.ac.uk/enquiries](http://www.ncl.ac.uk/enquiries)**

**[www.ncl.ac.uk](http://www.ncl.ac.uk)**

## Visiting the University

If you would like to visit the University before you apply, our Visit Days offer subject talks, an information fair and tours of the campus and accommodation. If we make you an offer, open days for your subject area give you the opportunity to talk to current students and members of staff. You can discuss the degree programmes as well as seeing the University and its facilities.

**[www.ncl.ac.uk/undergraduate/visit](http://www.ncl.ac.uk/undergraduate/visit)**

We would like to thank the following for the use of their illustrative material: School of Marine Science and Technology; Simon Veit-Wilson Photography.

Details are correct at the time of printing (June 2009) but should be checked against the current edition of the *Undergraduate Prospectus* or on the University's website. Details contained in this brochure are for information and guidance purposes only.

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