UNIVERSITY OF LIVERPOOL

BSc (Hons)

Mathematics with Ocean and Climate Sciences

UCAS code G1F7

Entry requirements	Study mode	Duration
A level: ABB	Full-time	3 years

Apply by: **29 January 2025**
Starts on: **22 September 2025**

About this course

Climate change is a major challenge we all currently face. Combing Ocean Sciences with Maths, this programme will equip you with the skills and knowledge to be able to understand some of the most important issues facing the scientific community, providing an excellent foundation for a career in the Ocean Sciences.

Introduction

Predicting climate and climate change is a major challenge facing the scientific community.

The oceans regulate the climate of the planet through storing and transporting heat and carbon as well as modifying properties of the overlying atmosphere. Complex issues such as climate change and sea level rise can only be understood if the role of the ocean and atmosphere is fully appreciated.

This degree provides an understanding of how the ocean and atmosphere operate in the climate system, as well as offering a strong grounding in mathematics. It is offered in collaboration between the Department of Mathematics in the School of Physical Sciences and the internationally renowned National Oceanography Centre in

Liverpool, providing excellent preparation for careers in computer modelling in oceanography, meteorology or environmental monitoring.

You will acquire a broad knowledge of mathematics and the analytical and numerical techniques for solving problems, and the ability to apply those techniques with confidence. You will gain an understanding of how the climate system behaves, how the atmosphere and ocean transport heat, why jets and eddies emerge on a rotating planet, how tracers are transported and mixed, and how these processes affect the growth of phytoplankton.

The degree in Mathematics with Ocean and Climate Sciences at Liverpool is accredited by the Institute of Marine Engineering, Science and Technology.

A number of the School's degree programmes involve laboratory and field work. Fieldwork is carried out in various locations, ranging from inner city to coastal and mountainous environments. We consider applications from prospective disabled students on the same basis as all other students, and reasonable adjustments will be considered to address barriers to access.

What you'll learn

- Problem solving
- Analytical techniques
- Data management
- Numerical techniques
- How the climate system behaves
- How to monitor and detect change in various environments
- Insights into sustainability and mitigation strategies

Accreditation

Accreditation
This programme is accredited by the Institute of Marine Engineering, Science and Technology.

Accreditation in detail

Institute of Marine Engineering, Science and Technology

IMarEST - The Institute of Maring Engineering, Science and Techonology - is the international professional body for all marine professionals.

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Course content

Discover what you'll learn, what you'll study, and how you'll be taught and assessed.

Year one

Students acquire mathematical skills including calculus and dynamic modelling, as well as obtaining a grounding in ocean and climate sciences.

Modules

Compulsory modules	Credits
CALCULUS I (MATH101)	15
CALCULUS II (MATH102)	15
CLIMATE, ATMOSPHERE AND OCEANS (ENVS111)	15
INTRODUCTION TO LINEAR ALGEBRA (MATH103)	15
MARINE ECOSYSTEMS: DIVERSITY, PROCESSES AND THREATS (ENVS122)	15
STUDY SKILLS (OCEAN AND CLIMATE SCIENCES) (ENVS103)	15
NEWTONIAN MECHANICS (MATH122)	15
INTRODUCTION TO CLIMATE CHANGE AND MITIGATION (ENVS189)	15

Programme details and modules listed are illustrative only and subject to change.

Year two

Students develop their mathematical skills including methods of applied mathematics. Students gain skills in processing and manipulating ocean and climate data using an industry standard software (Matlab) and, collect and interpret observations from the open and coastal ocean.

Modules

Compulsory modules	Credits
KEY SKILLS FOR ENVIRONMENTAL DATA ANALYSIS (ENVS202)	15
SAMPLING THE OCEAN (ENVS220)	15
RESEARCH AND CAREER SKILLS (ENVS204)	15
OCEANOGRAPHY, PLANKTON AND CLIMATE (ENVS245)	15
VECTOR CALCULUS WITH APPLICATIONS IN FLUID MECHANICS (MATH225)	15
CLIMATOLOGY (ENVS231)	15

Optional modules	Credits
DIFFERENTIAL EQUATIONS (MATH221)	15
CLASSICAL MECHANICS (MATH228)	15
NUMERICAL METHODS FOR APPLIED MATHEMATICS (MATH226)	15

Programme details and modules listed are illustrative only and subject to change.

Year three

Students apply their mathematical and ocean sciences skills during an independent research project supervised by an Ocean Scientist at the University or from the National Oceanography Centre. Students have the opportunity to engage in activities at sea during a three day research cruise.

Modules

Compulsory modules	Credits
GLOBAL CARBON CYCLE (ENVS335)	15
CONTEMPORARY ISSUES IN OCEAN AND CLIMATE SCIENCES (ENVS366)	15
SEA PRACTICAL (ENVS349)	30
INDEPENDENT RESEARCH PROJECT (ENVS306)	30
OCEAN DYNAMICS (ENVS332)	15

Optional modules	Credits
SIMULATING ENVIRONMENTAL SYSTEMS (ENVS397)	15
MATHEMATICS OF NETWORKS AND EPIDEMICS (MATH338)	15

Programme details and modules listed are illustrative only and subject to change.

Teaching and assessment

How you'll learn

Teaching takes place through lectures, practicals, workshops, seminars, tutorials and computer based learning, with an emphasis on learning through doing.

Students value the learning opportunities provided by field classes, including the rapid feedback on performance. You will typically receive at least 15 hours of formal

teaching each week. Between 30 and 100 hours of fieldwork and hands-on activities are provided each year depending on the discipline.

A typical module might involve two or three one-hour lectures each week, and often a three- hour laboratory or computer-based practical as well. Tutorials typically involve groups of 4-7 students meeting with a member of staff at least every two weeks in year one and two.

In year three, you will undertake an Honours project, which is a piece of independent research (field, laboratory or data analysis) on a topic of your choice, supervised by a member of staff. In year three students meet with their project supervisor on a weekly or more frequent basis. As you progress through your degree, you will be increasingly challenged to engage with current debates, to think critically and to study independently.

A number of the School's degree programmes involve laboratory and field work. The field work is carried out in various locations, ranging from inner city to coastal and mountainous environments. We consider applications from prospective students with disabilities on the same basis as all other students, and reasonable adjustments will be considered to address barriers to access.

How you're assessed

Assessment matches the learning objectives for each module and may take the form of written exams, coursework submissions in the form of essays, scientific papers, briefing notes or lab notebooks, oral and poster presentations and contributions to group projects. Coursework is designed around the types of problems encountered, and the skills needed, in commercial, research and public sector jobs. Emphasis is placed on good laboratory practice and maintaining useful lab notebooks in the context of scientific integrity and scientific data management.

Liverpool Hallmarks

We have a distinctive approach to education, the Liverpool Curriculum Framework, which focuses on research-connected teaching, active learning, and authentic assessment to ensure our students graduate as digitally fluent and confident global citizens.

The Liverpool Curriculum framework sets out our distinctive approach to education. Our teaching staff support our students to develop academic knowledge, skills, and understanding alongside our **graduate attributes**:

- Digital fluency
- Confidence

- Global citizenship

Our curriculum is characterised by the three **Liverpool Hallmarks**:

- Research-connected teaching
- Active learning
- Authentic assessment

All this is underpinned by our core value of **inclusivity** and commitment to providing a curriculum that is accessible to all students.

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Careers and employability

A mathematically-based degree opens up a wide range of career opportunities, including some of the most lucrative professions.

Recent employers of our graduates are:

- Barclays Bank plc
- Deloitte
- Forrest Recruitment
- Marks and Spencer
- Mercer Human Resource Consulting Ltd.
- Venture Marketing Group.
- BAE Systems
- BT
- Guardian Media Group
- Royal Bank of Scotland
- Siemens
- Unilever.

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Fees and funding

Your tuition fees, funding your studies, and other costs to consider.

Tuition fees

UK fees (applies to Channel Islands, Isle of Man and Republic of Ireland)

Full-time place, per year - £9,535
Year in industry fee - £1,905
Year abroad fee - £1,430 (applies to year in China)

International fees

Full-time place, per year - £26,600
Year in industry fee - £1,905
Year abroad fee - £13,300 (applies to year in China)

The tuition fees shown are correct for 2025/26 entry. Please note that the year abroad fee also applies to the year in China.

Tuition fees cover the cost of your teaching and assessment, operating facilities such as libraries, IT equipment, and access to academic and personal support. Learn more about paying for your studies.

Additional costs

We understand that budgeting for your time at university is important, and we want to make sure you understand any course-related costs that are not covered by your tuition fee. This includes the cost of a lab coat, food and drink during compulsory field courses, and dissertation expenses.

Students should expect to cover the following costs.

Lab coat:

Approximately £10-20. Students are advised to purchase a lab coat before the start of their studies. The first lab practical will take place in teaching week one and all students are required to wear a lab coat.

Compulsory field courses:

The School will usually cover the cost of accommodation and travel for year one and three field courses. Students will cover the cost of sustenance.

Project/dissertation costs:

The School may provide a budget of up to £200 for certain field or lab-based projects. Desk-based projects receive no budget from the School.

Find out more about additional study costs.

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Entry requirements

The qualifications and exam results you'll need to apply for this course.

A levels

ABB including Mathematics and one other science. Acceptable sciences: Further Mathematics, Physics, Chemistry, Biology, Geology, Geography, Applied Science, Environmental Science.

Applicants with the Extended Project Qualification (EPQ) are eligible for a reduction in grade requirements. For this course, the offer is **BBB** with **A** in the EPQ.

You may automatically qualify for reduced entry requirements through our contextual offers scheme. Based on your personal circumstances, you may automatically qualify for up to a two-grade reduction in the entry requirements needed for this course. When you apply, we consider a range of factors – such as where you live – to assess if you're eligible for a grade reduction. You don't have to make an application for a grade reduction – we'll do all the work.

Find out more about how we make reduced grade offers.

If you don't meet the entry requirements, you may be able to complete a foundation year which would allow you to progress to this course.

Available foundation years:

- Mathematical Sciences BSc (Hons) (Foundation, 4 year route with Carmel College) BSc (Hons)
- Earth Sciences (4 year route including a Foundation Year at Carmel College) BSc (Hons)

T levels

T levels are not currently accepted.

GCSE

4/C in English and 4/C in Mathematics

Subject requirements

For applicants from England: where a science has been taken at A level (Chemistry, Physics, Biology or Geology), a pass in the science practical of each

subject will be required.

BTEC Level 3 National Extended Diploma

D*DD in relevant diploma

International Baccalaureate

33 points including 5 at Higher Level in Mathematics and one other science, no score below 4.

Irish Leaving Certificate

H1, H2, H2, H2, H3, H3 including H2 or above in Mathematics and a second science

Scottish Higher/Advanced Higher

Not accepted without Advanced Highers at ABB including Mathematics and 1 other science

Welsh Baccalaureate Advanced

Accepted at Grade B with AB at A levels including Mathematics and 1 other science

Access

45 Level 3 credits in graded units in a relevant Diploma, including 30 at Distinction and a further 15 with at least Merit. 15 Distinctions are required in each of Mathematics and a second science. GCSE Mathematics and English at grade C/4 also required.

International qualifications

Select your country or region to view specific entry requirements.

If you hold a bachelor's degree or equivalent, but don't meet our entry requirements, you could be eligible for a Pre-Master's course. This is offered on campus at the University of Liverpool International College, in partnership with Kaplan International Pathways. It's a specialist preparation course for postgraduate study, and when you pass the Pre-Master's at the required level

with good attendance, you're guaranteed entry to a University of Liverpool master's degree.

English language requirements

You'll need to demonstrate competence in the use of English language, unless you're from a majority English speaking country.

We accept a variety of international language tests and country-specific qualifications.

International applicants who do not meet the minimum required standard of English language can complete one of our Pre-Sessional English courses to achieve the required level.

IELTS

6.0 overall, with no component below 5.5

TOEFL iBT

78 overall, with minimum scores of listening 17, writing 17, reading 17 and speaking 19. TOEFL Home Edition not accepted.

TOEFL Paper

Grade 6 at Standard Level or grade 5 at Higher Level

Duolingo English Test

115 overall, with speaking, reading and writing not less than 105, and listening not below 100

Pearson PTE Academic

59 overall, with no component below 59

LanguageCert Academic

65 overall, with no skill below 60

Cambridge IGCSE First Language English 0500

Grade C overall, with a minimum of grade 2 in speaking and listening. Speaking and listening must be separately endorsed on the certificate.

Cambridge IGCSE First Language English 0990

Grade 4 overall, with Merit in speaking and listening

Cambridge IGCSE Second Language English 0510/0511

0510: Grade C overall, with a minimum of grade 2 in speaking. Speaking must be separately endorsed on the certificate. 0511: Grade C overall.

Cambridge IGCSE Second Language English 0993/0991

0993: Grade 5 overall, with a minimum of grade 2 in speaking. Speaking must be separately endorsed on the certificate. 0991: Grade 5 overall.

Cambridge ESOL Level 2/3 Advanced

169 overall, with no paper below 162

LanguageCert

Grade 4 at Standard Level or grade 4 at Higher Level

Pre-sessional English

Do you need to complete a Pre-sessional English course to meet the English language requirements for this course?

The length of Pre-sessional English course you'll need to take depends on your current level of English language ability.

Pre-sessional English in detail

If you don't meet our English language requirements, we can use your most recent IELTS score, or the equivalent score in selected other English language tests, to determine the length of Pre-sessional English course you require.

Use the table below to check the course length you're likely to require for your current English language ability and see whether the course is available on campus or online.

Your most recent IELTS score	Pre-sessional English course length	On campus or online
5.5 overall, with no component below 5.5	6 weeks	On campus
5.5 overall, with no component below 5.0	10 weeks	On campus and online options available
5.0 overall, with no component below 5.0	12 weeks	On campus and online options available
5.0 overall, with no component below 4.5	20 weeks	On campus
4.5 overall, with no component below 4.5	30 weeks	On campus
4.0 overall, with no component below 4.0	40 weeks	On campus

If you've completed an alternative English language test to IELTS, we may be able to use this to assess your English language ability and determine the Pre-sessional English course length you require.

Please see our guide to Pre-sessional English entry requirements for IELTS 6.0 overall, with no component below 5.5, for further details.

Alternative entry requirements

- If your qualification isn't listed here, or you're taking a combination of qualifications, contact us for advice
- Applications from mature students are welcome.

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