

University of Plymouth

Faculty of Science and Engineering
School of Biological and Marine Sciences

Programme Specification

MSc Hydrography
2218

September 2021

1. MSc Hydrography

Final award title: Master of Science in Hydrography on completion of 180 credits

Intermediate award title(s):

Postgraduate Certificate on completion of 60 credits

Postgraduate Diploma on completion of 120 credits

UCAS code N/A

JACS code F720

2. **Awarding Institution:** University of Plymouth

Teaching institution(s): University of Plymouth

3. Accrediting body:

Royal Institution of Chartered Surveyors (www.rics.org/)

Chartered Institution of Civil Engineering Surveyors (www.cices.org/)

- Continuity of accreditation by the RICS follows submission of an annual Threshold Return and reportage through regular University/RICS Partnership meetings.
- CICES accreditation was re-validated in December 2015.
- Historical accreditation by the FIG/IHO/ICA has now lapsed due to changes in that accrediting body's requirements.

4. Distinctive Features of the Programme and the Student Experience

This programme provides a comprehensive knowledge and understanding of the scientific and technological basis of hydrography, relevant to research, development and policy needs within the exploration and management of marine resources, construction and archaeology.

Hydrography is the branch of applied sciences which deals with the measurement and description of the physical features of oceans, seas, coastal areas, lakes and rivers, as well as with the prediction of their change over time, for the primary

purpose of safety of navigation and in support of all other marine activities, including economic development, security and defence, scientific research, and environmental protection(http://www.iho.int/srv1/index.php?option=com_content&view=article&id=299&Itemid=289, June 2014)

Hydrography has been crucial to the development of world trade and to the offshore expansion in the search for hydrocarbons. The skills of the hydrographer also underpin the geophysical, topographical and spatial needs of the emerging marine renewables energy sector.

Whilst hydrography was initially deemed the domain of the military, civilian courses have been run by Plymouth University and its forerunners in support of commercial industrials since the late 1970s, primarily and initially in tandem with the demand for experienced hydrographers to support the requirements of the emerging offshore hydrocarbon industries and the quest for oil and gas. The early Postgraduate Diploma subsequently developed into a Masters in 1995.

This well established programme has continued to be developed in response to expressed commercial needs and graduates are sought after throughout the industry on a global basis. It can provide the foundation for a career in hydrographic research and development, port and/or offshore/nearshore surveying and environmental support. Students develop an understanding of the present state of knowledge relating to hydrography in the fields of marine geophysics, oceanography, acoustics, geodesy, and marine resource management. They also consider the wider aspects of hydrography and the implications for data capture, data management, processing, and information systems.

Plymouth benefits from the local marine environment and the programme places great emphasis on learning via original practical research. Students experience a variety of techniques and methods of data collection and analysis relevant to careers in hydrography. As well as benefiting from close links with industry, students gain an appreciation of the relationships between the different areas of study as the programme is composed from a number of different disciplines. Finally, students gain the knowledge and skills to enable them to design, develop and implement a research project at postgraduate level or to graduate into industry, where they may have the basic skills to commission survey activities, undertake data acquisition and present to a client the as found geospatial information.

As a commendation, many of the senior and middle managers within the national and international hydrographic sector are Plymouth University alumni. Graduate destinations include: Sales Manager – Hydrography for Kongsberg Maritime, in Aberdeen; Geodetic Consultant to Exxon, Shell Expro and other hydrocarbon producers; Hydrographer designate to the South African Navy; Hydrographer Hong Kong Hydrographic Office; Lecturer in Hydrography at Otago University (NZ); Senior Hydrographer at Boskalis; Training Officer at Sonardyne. Many graduates have joined the likes of DOF Subsea, EGS Survey, Gardline GeoSciences, Subsea 7 and a number of Fugro regional offices, incl. Perth (Australia), Abu Dhabi, Azerbaijan, Houston, and Aberdeen.

The course therefore has the following unique selling points:

- Plymouth has a long association with marine science and navigation, which is reflected in the many marine organisations based in the city such as the Marine Biological Association, the Plymouth Marine Laboratory and the National Marine Aquarium. Plymouth is also the home port of the nation's Royal Naval Hydrographic fleet and the location of their Hydrographic School, which today trains hydrographic and meteorological officers from a significant number of the world's navies.
- In addition, on the civilian side, we have links to the major players in global hydrography, with a number of equipment manufacturers, suppliers and operators, including the national Hydrographic Office. Many of these have provided project ideas, support and the availability of equipment for the task.
- Each year a significant number of graduates approach the end of their studies, with a guaranteed offer of employment ahead of final examinations.
- Within the programme there is a high focus on practical fieldwork, data acquisition and its processing and analysis. This also extends to the availability of a fleet of vessels, including the university's flagship vessel RV Falcon Spirit, for data acquisition within dissertation projects.
- Plymouth University has invested heavily in state-of-the-art instrumentation, compatible with industrial usage.

5. Relevant QAA Subject Benchmark Group(s)

There is no Masters-level marine benchmark group, the closest subject area that has one being Chemistry:

<http://www.qaa.ac.uk/ASSURINGSTANDARDSANDQUALITY/SUBJECT-GUIDANCE/Pages/Master's-degree-benchmark-statements.aspx>

For the marine undergraduate programmes the relevant benchmark group is 'Earth Sciences, Environmental Sciences and Environmental Studies' and we interpret here with the SEEC level 7 descriptors (p14):

<http://www.seec.org.uk/wp-content/uploads/2013/seec-files/SEEC%20Level%20Descriptors%202010.pdf>

And the Masters' descriptor of the QAA 'Masters' Degree Characteristics' (p16):

http://www.ehea.info/Uploads/SubmittedFiles/5_2013/113542.pdf

6. Programme Structure

The MSc programme includes a mix of continual assessment and formal examination.

MSc route:

Semester 1: 3 x 20 credit modules

Semester 2: 3 x 20 credit modules; two core modules and a choice of 1 from 3

Summer: 60-credit dissertation

TIMING	MODULES		
Semester 1 15 weeks (Including 12 weeks of taught material before Christmas and a 3 week block on project work after Christmas)	MAR 513 Research Skills & Methods (15 weeks) Core 20 credits	MAR 520 Hydrography (12 Weeks) Core 20 credits	MAR 521 Acoustic & Oceanographic Surveying (12 Weeks) Core 20 credits
		Preparation for research project (3 Weeks)	
Semester 2 12 weeks taught 3 weeks on research project	MAR 522 Survey Project Management (12 Weeks) Core 20 credits	MAR 523 Digital Mapping (12 Weeks) Core 20 credits	Option Module (12 Weeks) 20 credits
	MAR524 MSc Dissertation		
Summer	MAR524 MSc Dissertation 60 credits		
	MSc 180 credits		

All core modules are shared with the MSci Ocean Science programme.

Semester 2 Option modules – choice of 1 from 3

1. MAR537 Applied Marine Autonomy
2. MAR517 Coastal Erosion & Protection
3. MAR518 Remote Sensing & GIS

7. Programme Aims

The overarching aim of this programme is to produce masters-level students with the knowledge and skills required to pursue a research or professional career in the hydrographic sector, or within a marine science area.

Specifically, the programme is intended to:

- A1** Develop a comprehensive and detailed scientific knowledge and understanding of hydrographic data capture and an evaluation of survey errors.
- A2** Provide an advanced knowledge of hydrographic sensor capabilities and their limitations.
- A3** Acquire an appreciation of the linkages between physical, biological and anthropogenic aspects of marine environments and their associated measurement technologies.
- A4** Develop a portfolio of management and hydrographic specific skills required to assimilate and apply knowledge over a wide range of relevant disciplines and client requirements.
- A5** Provide postgraduates with the knowledge and skills required to effectively monitor and measure the marine environment in a safe and effective manner.
- A6** Further develop one's ability to effectively plan, execute and conduct complex, high-level hydrographic investigations including the rigorous analysis of data.
- A7** Enlighten and enable postgraduates to interpret complex information and datasets to a level that facilitates decisions related to the managing of marine development
- A8** Develop postgraduates capable of the dissemination of their work to the highest level.
- A9** Produce postgraduates capable of contributing to research and development teams; participating within hydrographic measurement, the exploitation of the marine environment and consultancy; within a professional environment.

8. Programme Intended Learning Outcomes

8.1. Knowledge and understanding

On completion of this course, graduates should have developed:

1. A systematic understanding of knowledge and a critical awareness of current survey requirements and new insights into a knowledge of the physical sciences of data capture [A1, A2, A3]
2. A comprehensive understanding of the marine environment, its measurement and the impact of the environment upon infrastructure development [A1, A2, A3]

3. A comprehensive understanding of observation, measurement, and analysis techniques applicable to hydrography and associated error budgets [A4, A5]
4. Demonstrate a practical understanding of how established techniques of measurement are used to create and interpret knowledge in geo-marine science and with respect to the seabed and/or sub-seabed structure [A4, A5, A6]

8.2. Cognitive and intellectual skills

On completion, graduates should have developed a conceptual understanding that enables them to:

1. Critically evaluate current measurement, research and advanced scholarship within hydrography [A1, A2, A3]
2. Evaluate methodologies and develop critiques of them [A4, A5, A6]
3. Propose new hypotheses for data acquisition, processing and visualisation [A6, A8]
4. Demonstrate originality in their application of knowledge [A6, A8]

8.3. Key and transferable skills

On successful completion graduates should have developed the ability to:

1. Deal with complex hydrographic issues both systematically and creatively [A6]
2. Make sound judgements in the absence of complete datasets [A7]
3. Communicate survey results clearly to specialist and non-specialist audiences. [A8]

8.4. Employment related skills

On completion, graduates should have developed the qualities and transferable skills necessary for employment requiring:

1. The exercise of initiative and personal responsibility for data management and capture [A6, A8, A9]
2. Decision-making and management in complex and unpredictable situations affecting data capture [A5, A6, A9]
3. The independent learning ability required for continuing professional development and application of survey ethics [A4, A7, A8]
4. The ability to continue to advance their knowledge and understanding, and to develop new skills to a high level within the hydrographic sector of industry [A4]

8.5. Practical skills

On successful completion graduates should have developed the:

1. Capacity for self-direction and originality in tackling and solving hydrographic problems [A4, A5]
2. Ability to act autonomously and in teams in planning and implementing tasks at a professional level [A5, A6, A9]
3. Ability to independently use specialist hydrographic and geophysical software and equipment [A5, A6, A9]

9. Admissions Criteria, including APCL, APEL and DAS arrangements

This programme primarily aims to recruit science, technologists and engineering graduates, although applications will be considered from well-qualified graduates in other disciplines with relevant experience and/or professionals with extended relevant experience in geospatial data acquisition and/or processing

Application will be through the usual system for application to Masters degrees within the University. Candidates require an appropriate background in science, technology or engineering to honours degree level (normally 2:2 or above) or equivalent.

Candidates are required to submit transcripts of supporting documents such as a first degree. Non UK qualifications may be crosschecked with universities and by consulting the ENIC –NARIC network. Relevant work experience may be taken into consideration. Candidates are also required to demonstrate their proficiency in English (e.g. GCSE, AS Level, A Level, IB, Cambridge Proficiency Certificate level 4-5, Oxford Higher Certificate, International Certificate Conference (ICC Stage 3 Technical), IELTS scores 6.5.

Candidates with MSci, MEng, MGeol etc that are classed as 4-year undergraduate degrees are suitable applicants as these degrees are not deemed equivalent, by the ELQ criteria, to 180-credit Masters level degrees.

Candidates wishing to top-up their degrees from the Postgraduate Diploma in Hydrographic Surveying, as offered via the Royal Navy FOST HMAS (Flag Officer Sea Training - Hydrography and Meteorology Advanced Survey) Course, at HMS Drake - as accredited within the Plymouth University Colleges partnership - may be liable for APCL of their accrued 120 credits and permitted to register directly for the 60-credit dissertation module, for a further award of MSc Hydrography, on the provision of submission of an acceptable 6-page project proposal document, alongside their application for APCL.

Candidates, having previously accepted an award of BSc Ocean Science (Exploration and Survey), who can demonstrate a minimum of 12-month's related industrial employment in the fields of geophysical survey and 'survey' positioning, during the intervening period, may be exempt from completing the mandatory core hydrography modules within Semester One, namely MAR520 and MAR521, but will be expected to attain an equivalent 40 Level-7 credits from elsewhere within the Marine Science Postgraduate scheme, before progressing to semester two modules, so as to register a total of 180 Level-7 credits. This would then allow for an enhancement and for differentiation from the lower MSci Ocean Science award.

Plymouth University is fully compliant with the National SENDA requirements for the accommodation of disabled students within its degree programmes. All applications will be assessed on academic criteria as described above. Once accepted the students will be put into contact with the Disability ASSIST Services who will liaise with the course leader to identify actions, which need to be taken. Where necessary alternatives to fieldwork will be provided.

The course has run since the late 1970s and has a proven track record of recruiting from a truly international cohort of students.

10. Progression criteria for Final and Intermediate Awards

The MSc in Hydrography award requires a minimum of 180 credits and is categorised into grades:

MSc with Distinction:

This award is achieved by a student gaining an overall average mark on the programme of study of 70% and above, and the mark for the dissertation/major project module is not less than 70%.

MSc with Merit:

This award is achieved by a student gaining an overall average mark on the programme of study of between 60% and 69.99%, and the mark for the dissertation/major project module is not less than 60%.

MSc:

This award is normally achieved by a student gaining an overall average mark between 50% and 59.99%.

To pass a module requires a student to achieve at least 40% in both the exam and coursework elements, where both are present, and at least 50% in the overall module mark, or 50% overall if a coursework only module.

Exit award titles:

Postgraduate Certificate on completion ($\geq 50\%$) of 60 credits.

Postgraduate Diploma on successful completion ($\geq 50\%$) of 120 credits.

11. Exceptions to Regulations

None

12. Transitional Arrangements

n/a

13. Mapping:

13.1. ILO's against Modules Mapping

13.2. Assessment against Modules Mapping

13.3. Assessed Subject Specific Learning Outcomes against Modules Mapping

13. Mapping:

13.1 Programme Intended Learning Outcomes vs. Modules	Aims		Semester 1				Semester 2				
Modules (core modules in bold)			MAR513 Research Skills & Methods	MAR520 Hydrography	MAR521 Acoustic & Oceanographic Surveying	MAR52523 Digital Mapping	MAR522 Survey Project Management	MAR518 Remote Sensing & GIS	MAR517 Coastal Erosion & Protection	MAR537 Applied Marine Autonomy	MAR524 MSc Dissertation
Knowledge and Understanding [sect. 8.1]											
A systematic understanding of knowledge and a critical awareness of current survey requirements and new insights into a knowledge of the physical sciences of data capture	A1, A2, A3			★	★	★	★		◆	◆	★
A comprehensive understanding of the marine environment, its measurement and the impact of the environment upon infrastructure development	A1, A2, A3		★	★	★		★	◆	◆	◆	★
A comprehensive understanding of observation, measurement, and analysis techniques applicable to hydrography and associated error budgets	A4, A5			★	★	★	★		◆	◆	★
Demonstrate a practical understanding of how established techniques of measurement are used to create and interpret knowledge in geo-marine science and with respect to the seabed and/or sub-seabed structure	A4, A5, A6		★	★	★	★	★		◆	◆	★
Cognitive and intellectual skills [sect. 8.2]											
Evaluate critically current measurement, research and advanced scholarship within hydrography;	A1, A2, A3		★		★	★	★	◆	◆	◆	★
Evaluate methodologies and develop critiques of them	A4, A5, A6		★	★	★	★	★			◆	★
Propose new hypotheses for data acquisition, processing and visualisation	A6		★	★			★			◆	★
Demonstrate originality in their application of knowledge	A6		★				★			◆	★

13.2 Assessment against Modules	Aims	Semester 1			Semester 2					
Modules (Core modules in bold)		MAR513 Research Skills & Methods	MAR520 Hydrography	MAR521 Acoustic & Oceanographic Surveying	MAR523 Digital Mapping	MAR522 Survey Project Management	MAR518 Remote Sensing & GIS	MAR517 Coastal Erosion & Protection	MAR537 Applied Marine Autonomy	MAR524 MSc Dissertation
Formative										
Tutorials	A1, A2, A3	★	★	★	★	★		◆	◆	
Use of specialist equipment or software	A4, A5		★	★	★	★	◆		◆	
Summative										
Data Analysis & Presentation (incl. written and oral)	A1, A2, A3, A7, A8	★	★	★	★	★	◆	◆	◆	
Scientific Writing, Professional Reports & Dissertations	A1, A2, A3	★		★	★	★	◆	◆	◆	★
Planning & Research Proposals	A6	★				★				★
Group/team work	A9		★	★		★		◆	◆	
Use of specialist equipment or software	A4, A5	★	★	★	★	★		◆	◆	

13.3 Programme Intended Skills vs.	Aims	Semester 1				Semester 2				
Modules (core modules in bold) *MAR529 suspended for 2019/2020		MAR513 Research Skills & Methods	MAR520 Hydrography	MAR521 Acoustic & Oceanographic Surveying	MAR 523 Digital Mapping	MAR522 Survey Project Management	MAR518 Remote Sensing & GIS	MAR517 Coastal Erosion & Protection	MAR537 Applied Marine Autonomy	MAR524 MSc Dissertation
Key and transferable skills [sect. 8.3]										
Deal with complex hydrographic issues both systematically and creatively	A6			★	★	★	◆	◆	◆	★
Make sound judgements in the absence of complete data	A6, A7	★	★	★	★	★	◆	◆		★
Communicate survey results clearly to specialist and non-specialist audiences	A8	★	★	★	★	★	◆	◆	◆	
Employment related skills [sect. 8.4]										
Exercise of initiative and personal responsibility for data management and capture	A9	★	★	★	★	★	◆	◆	◆	★
Decision-making and management in complex and unpredictable situations affecting data capture	A5, A9				★	★	◆	◆	◆	
Independent learning ability required for continuing professional development and application of survey ethics	A4	★	★	★	★	★	◆	◆	◆	★
Ability to continue to advance their knowledge and understanding, and to develop new skills to a high level within the hydrographic sector of industry	A4	★	★	★	★	★	◆	◆	◆	★
Practical skills [sect. 8.5]										
Capacity for self-direction and originality in tackling and solving hydrographic problems	A4, A5	★	★	★	★	★		◆	◆	★
Ability to act autonomously and in teams in planning and implementing tasks at a professional or equivalent level	A9	★	★	★	★	★	◆	◆	◆	★
Ability to independently use specialist hydrographic and geophysical software and equipment	A5				★	★	◆	◆	◆	★

