

# **University of Plymouth**

Faculty of Science and Engineering  
School of Biological and Marine Sciences

## **Programme Specification**

MRes Marine Renewable Energy (MRE) [4149]

September 2016

## 1. MRes Marine Renewable Energy

**Final award title:** Master of Research in Marine Renewable Energy  
on completion of 180 credits

**Intermediate award title(s):**  
Post Graduate Certificate on completion of 60 credits  
  
Post Graduate Diploma on completion of 120 credits

**UCAS code** N/A  
**JACS code** F730 (50%), H221 (50%)

2. **Awarding Institution:** University of Plymouth  
**Teaching institution(s):** University of Plymouth

3. **Accrediting body:**  
Not accredited

## 4. Distinctive Features of the Programme and the Student Experience

The UK government is committed to a target of 15 % of our energy sourced from renewables by 2020. This target is equivalent to a seven-fold increase in UK renewable energy consumption from 2008 levels: the most challenging of any EU Member State. It can therefore be anticipated that the renewable energy sector will continue to experience a rapid expansion in capacity. Plymouth University continues to have a unique ability to capitalise on its reputation for marine teaching and research to deliver masters graduates whose skills, knowledge and innovation can help drive this expansion.

In 2007, the Universities of Plymouth and Exeter, with financial backing from the South West Regional Development Agency (SWRDA), combined to form the Peninsula Research Institute in Marine Renewable Energy (PRIMaRE). PRIMaRE, which continues in an expanded form also including the Universities of Bath, Bristol, and Southampton provides the research support for Wave Hub ([www.wavehub.co.uk](http://www.wavehub.co.uk)), a test facility for prototype wave energy devices off the North Coast of Cornwall which is fully functional and is receiving its first test wave energy converter in June 2014. As part of the PRIMaRE initiative, six new academic staff were employed at Plymouth University in 2008 to contribute to the development of the marine renewable energy subject area through their research expertise. Two staff were employed in marine science, two in engineering and two in social science and business. Well established staff provides Plymouth University with a strong and unique staff cohort who can continue to offer the first Masters programme in marine renewable energy which draws on all these subject areas.

These Masters programmes are fully cross-disciplinary comprising expertise from engineering, marine science, economics, law and policy. This aligns with the 'whole system' approach identified as the number 1 recommendation in the UK Energy Research Centre report, 'A whole system approach which considers engineering, environmental and socio-economic factors is needed' (<http://tinyurl.com/Final-Report-Marine-Energy>)

The distinctiveness of the programme specifically relates to Plymouth's international reputation for obtaining coastal marine measurements (e.g. waves, currents and tides) and producing graduates that combine practical with numeracy skills. This novelty is borne out by the wide range of dissertation topics which include: physical modelling of mooring loads; tidal stream resource characterization for Guernsey; cetacean risk assessment tool; social attitudes analysis for promoting public participation in project planning; impacts on benthic organisms; and critical analysis of MRE funding in the developing world.

The programmes successfully produce graduates with the broad range of knowledge to be key participants in the global expansion of the Marine Renewable Energy sector. Graduates from the programmes have found stimulating roles for a wide range of employers including device developers (JT '11 served as Operations Engineer at Pelamis Wave Power), specialist consultants (CD '12 has risen to an Associate at BVG Associates), service providers (RH was employed as a mechanical design engineer at Mojo Maritime), project developers (SC '13 has served as Marine Coordinator at Tidal Lagoon Swansea Bay), and research organizations (CG completed his PhD at the University of Highlands and Islands and continued to work on tidal energy as a Research Associate).

The programmes have the following unique selling points:

- the first multidisciplinary Marine Renewable Energy Masters degrees in the world. They have successfully recruited students from around the world and delivered the education necessary to place them in such industry leading organisations as OpenHydro, Pelamis, Marine Energy Matters, RegenSW, RWE Npower Renewables, Clean Earth Energy, Babcock, and Mojo Marine.
- responds to a pressing need for trained individuals to help maintain the UK as the global leader in the development and implementation of MRE
- are consistent with University and Faculty policy as represented by PRIMaRE and the university commitment to the Southwest Marine Energy Park to develop the southwest as a centre for MRE
- will capitalise on existing and planned MRE facilities in the University and the South West: e.g. the COaST laboratories, Wavehub; the research vessel RV Falcon Spirit; the High Performance Computing (HPC) cluster

- will capitalise on ongoing and proposed Plymouth University research as funded by RCUK, Interreg, Horizon2020 and other funding streams (eg. FLOWBEC, QBEX, Marinet, Ofelia, SOWFIA, SQUID, XMED, MERiFIC, Atlantic Cloud)
- represents a major Plymouth University contribution to the promulgation of sustainable technologies in the context of global climate change

## 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' document (p16): [http://www.ehea.info/Uploads/SubmittedFiles/5\\_2013/113542.pdf](http://www.ehea.info/Uploads/SubmittedFiles/5_2013/113542.pdf)

## 6. Programme Structure

The entire MRes programme is 100% coursework assessed:

First semester: 3 x 20 credit core modules (same as MSc route)

Second semester: 120 credit dissertation.

TIMING	MODULES		
<b>Semester 1</b> <b>15 weeks</b> <b>(Including 12 weeks of taught material before Christmas and a 3 week block on project work after Christmas)</b>	<b>MAR 513</b> Research Skills & Methods (15 weeks) Core 20 credits	<b>MAR 526</b> Introduction to Marine Renewable Energy (12 Weeks) Core 20 credits	<b>MAR 527</b> Economics, Law & Policy for Marine Renewable Energy (12 Weeks) Core 20 credits
		Preparation for research project (3 Weeks)	
	<b>PgCert 60 credits</b>		
<b>Semester 2</b>	<b>MAR 525</b> Research Project & Dissertation 120 credits		
<b>Summer</b>			
	<b>MRes 180 credits</b>		

Due to the specialty nature of the MRE field, no entering student has remained on the MRes route despite several applicants having been accepted into the programme on this route. It continues to be offered as it is conceivable that, following the introductory material provided in the first semester, the ideally prepared applicant will be capable to continue on a pure research basis. This option requires minimal additional resource and provides an opportunity for longer more in-depth research projects. Students apply for either the MSc or MRes route and further information on the distinction between these routes is provided at induction. The common Semester 1 gives the opportunity for students to change route during first semester.

It is possible for students to transfer between MSc and MRes pathways prior to the end of Semester 1 with the agreement of the Programme Leader. Students wishing to transfer should endeavour to discuss this with their program manager at the earliest opportunity in the first semester. If the transfer between pathways is agreed by the Programme Leader, this will be notified to, and affected by the Faculty administrator. It should be noted that not all requests will be granted as some students may be deemed suitable for the MSc but unsuitable for an extensive period of self-directed research that is required by the MRes pathway.

## **7. Programme Aims**

The overarching aim of this programme is to produce masters-level students with the knowledge and skills required to carry out further research in the Marine Renewable Energy sector or pursue a professional career in that area.

Specifically, the programme is intended to:

**A1** Develop an understanding and awareness of the political framework, policy, planning, technological and scientific issues surrounding and at the limits of knowledge of the Marine Renewable Energy sector.

**A2** Stimulate the acquisition of the conceptual abilities to contribute to the development and critical evaluation of specific Marine Renewable Energy technologies.

**A3** Provide the opportunity to carry out an advanced MRes research project in the field of Marine Renewable Energy and so contribute to the growing knowledge base in this developing field.

**A4** Develop the employability skills of direct relevance to the MRE industries and research organisations also comprising a commitment to their continuing professional development.

**A5** Produce alumni with the necessary high level skill set to pursue further academic research or scholarship in Marine Renewable Energy.

## **8. Programme Intended Learning Outcomes**

### **8.1. Knowledge and understanding**

On successful completion graduates should have developed:

1. A systematic understanding of knowledge and a critical awareness of current problems and new insights at the limits of knowledge in renewable and marine renewable energy [A1, A2, A3];
2. A comprehensive understanding of either design methodologies and/or observation [A2, A4].

### **8.2. Cognitive and intellectual skills**

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

1. Evaluate critically current research and advanced scholarship in MRE [A2, A3, A5];
2. Evaluate methodologies and develop critiques of them [A3, A4];
3. Propose new hypotheses [A2, A3, A5];
4. Demonstrate originality in their application of knowledge [A2, A3, A4];
5. Demonstrate a practical understanding of how established techniques of research are used to create and interpret knowledge [A1, A2, A3].

### **8.3. Key and transferable skills**

On successful completion graduates should have developed the ability to:

1. Deal with complex issues both systematically and creatively [A2, A3, A5];
2. Make sound judgements in the absence of complete data [A1, A3];
3. Communicate their conclusions clearly to specialist and non-specialist audiences [A3, A4].

### **8.4. Employment related skills**

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

1. The exercise of initiative and personal responsibility [A1, A3, A4];
2. Decision-making and management in complex and unpredictable situations [A4, A5];
3. The independent learning ability required for continuing professional development [A1, A2, A3, A5];
4. The ability to continue to advance their knowledge and understanding, and to develop new skills to a high level within the MRE context [A1, A2, A3, A5]

### **8.5. Practical skills**

On successful completion graduates should have developed the:

1. Capacity for self-direction and originality in tackling and solving problems [A2, A3, A4];
2. Ability to act autonomously and in teams in planning and implementing tasks at a professional or equivalent level [A3, A4].

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

These programmes are primarily aims to recruit science and engineering graduates, although applications will be considered from well-qualified graduates in other disciplines with relevant experience.

Application will be through the usual system for application to Masters degrees within the University. Candidates require an appropriate background in science or engineering to honours degree level (normally 2:1 or above) or equivalent. Candidates are required to submit transcripts of supporting documents such as 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.

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 2010 and has proven track record of recruiting from a truly international cohort of students with half of the 2013-14 cohort coming from outside the UK EU or overseas.

#### **10. Progression criteria for Final and Intermediate Awards**

The MRes in Marine Renewable Energy award requires a minimum of 180 credits and is categorised into grades:

##### ***MSc/MRes 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/MRes 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/MRes:**

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 and at least 50% in the overall module mark, or 50% overall if a coursework only module.

**Exit award titles:**

**Post Graduate Certificate** on completion ( $\geq 50\%$ ) of 60 credits.

**Post Graduate Diploma** on successful completion ( $\geq 50\%$ ) of 120 credits.

**11. Exceptions to Regulations**

None

**12. Transitional Arrangements**

It will be possible for part time students or students who failed modules from the former MRes Marine Renewable Energy to complete their studies within the framework of the new scheme as there are only minor alterations to the programme. In all cases the pending changes to the Marine Renewable Energy scheme will be discussed with part time applicants and advice will be given by the programme leader on the selection of first year modules that will be compatible with the new scheme.

New Programme Modules	Equivalent Module under Old Programme
MAR513 Research Skills & Methods	IMS5101 Research Skills & EAR5101 & Research Methods
MAR526 Introduction to Marine Renewable Energy	MAR501 Introduction to Marine Renewable Energy
MAR527 Economics, Law & Policy for Marine Renewable	MAR502 Economics, Law & Policy for Marine Renewable
MAR525 MRes Dissertation	SCI5201 MRes Dissertation

### 13. Mapping:

13.1 Programme Intended Learning Outcomes vs. Modules	Aims	Semester 1			Semester 2 and Summer
Modules		MAR513 Research Skills & Methods	MAR526 Introduction to Marine Renewable Energy	MAR527 Economics, Law & Policy for Marine Renewable	MAR525 MRes Dissertation
Knowledge and Understanding [sect. 8.1]					
A systematic understanding of knowledge and a critical awareness of current problems and new insights at the limits of knowledge in renewable and marine renewable energy [A1, A2, A3];	A1, A2, A3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A comprehensive understanding of either design methodologies and/or observation [A2, A4].	A2, A4	<input type="checkbox"/>	<input type="checkbox"/>		
Cognitive and intellectual skills [sect. 8.2]					
Evaluate critically current research and advanced scholarship in MRE [A2, A5];	A2, A3, A5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Evaluate methodologies and develop critiques of them	A3, A4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Propose new hypotheses	A2, A3, A5	<input type="checkbox"/>			<input type="checkbox"/>
Demonstrate originality in their application of knowledge	A2, A3, A4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Demonstrate a practical understanding of how established techniques of research are used to create and interpret knowledge	A1, A2, A3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13.2 Assessment against Modules	Aims	Semester 1			Semester 2 and Summer
<b>Modules</b>		MAR513 Research Skills & Methods	MAR526 Introduction to Marine Renewable Energy	MAR527 Economics, Law & Policy for Marine Renewable	MAR525 MRes Dissertation
<b>Formative</b>					
Tutorials	A1, A2,	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Use of specialist equipment or software	A4, A5	<input type="checkbox"/>			
<b>Summative</b>					
Data Analysis & Presentation (incl. written and oral)	A1, A2, A3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scientific Writing, Professional Reports & Dissertations	A1, A2, A3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Planning & Research Proposals	A3, A5	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
Group/team work	A4			<input type="checkbox"/>	
Use of specialist equipment or software	A4, A5	<input type="checkbox"/>			

13.3 Programme Intended Skills vs.	Aims	Semester 1			Semester 2 and Summer
<b>Modules</b>		MAR513 Research Skills & Methods	MAR526 Introduction to Marine Renewable Energy	MAR527 Economics, Law & Policy for Marine	MAR525 MRes Dissertation
<b>Key and transferable skills [sect. 8.3]</b>					
Deal with complex issues both systematically and creatively	A2, A3, A5		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Make sound judgements in the absence of complete data	A1, A3	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
Communicate their conclusions clearly to specialist and non-specialist audiences	A3, A4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Employment related skills [sect. 8.4]</b>					
Exercise of initiative and personal responsibility	A1, A3, A4	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Decision-making and management in complex and unpredictable situations	A4, A5		<input type="checkbox"/>	<input type="checkbox"/>	
Independent learning ability required for continuing professional development	A1, A2, A3, A5	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Ability to continue to advance their knowledge and understanding, and to develop new skills to a high level within the MRE context	A1, A2, A3, A5	<input type="checkbox"/>			<input type="checkbox"/>
<b>Practical skills [sect. 8.5]</b>					
Capacity for self-direction and originality in tackling and solving problems	A2, A3, A4	<input type="checkbox"/>			<input type="checkbox"/>
Ability to act autonomously and in teams in planning and implementing tasks at a professional or equivalent level	A3, A4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>