

## **Appendix 16**

### **Degree-Specific Appendix European Master in Renewable Energy**

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**- Reading version**

#### **Supplement to § 1 Scope of Application**

The second semester is subject to the examination regulations of the respective partner university (see § 2).

#### **Supplement to § 2 Study Objectives**

The European Master in Renewable Energy is designed to provide a sound understanding of the role of renewable energy in the energy sector and technical expertise regarding basic renewable energy technologies. This includes the assessment of resources, the principles of energy conversion processes, the selection of materials as well as the planning, calculation, modelling and simulation of energy systems. Students understand the basics of socio-economic assessment of renewable energy technologies and can evaluate the role and importance of the legal framework. During the specialisation semester, students acquire in-depth knowledge in one of the following technologies:

- Photovoltaics (University of Northumbria, Newcastle, Great Britain)
- Wind Energy (NTU Athens, Greece)
- Grid Integration (University of Zaragoza, Spain)
- Solar Thermal & Associated Renewable Storage (University of Perpignan, France)
- Ocean Energy (IST Lisbon, Portugal)
- Sustainable Fuel Systems for Mobility (Hanze University of Applied Sciences, Groningen, The Netherlands)

The programme aims to train professionals who are able to familiarise themselves with the diverse areas and issues of renewable energies and develop into specialists. The students are enabled to evaluate renewable energies reflexively and critically with suitable analytical methods and to understand the challenges of integrating renewable energies into a decentralised, flexible energy system. The degree programme trains the competences for the application of the acquired specialised knowledge, for the cooperation in international working groups as well as for the clear, structured communication of information in oral and written form. The students are enabled to work scientifically independently, interdisciplinary, problem-oriented and responsibly and to present the results achieved conclusively

#### **Supplement to § 5 Duration, Scope and Structure of the Studies, Part-time Studies**

To (1): The regular time needed to complete the course is three semesters. The total credit point score is 90 CP.

To (2): The degree course may not be completed as a part-time course.

### Supplement to § 8 Acknowledgement of Examinations

To (4): An acknowledgment of examinations, in accordance with paragraphs 1 and 2, may only take place for the first semester at the University of Oldenburg and then only to the extent of a maximum of 15 credit points.

### Supplement to § 10 Structure and Content of the Modules

To (1): The following modules are compulsory in the Master programme:

Module Title	CP	Module Form	Examinations
<b>1st Semester, University of Oldenburg</b>			
pre014 Fundamentals for Renewable Energy	VL, Ü, PR	6	<u>2 examinations</u> (weight 50% each) according to the supplement to §11 Types of Module Examinations
pre017 Physical Principles of Renewable Energy Converters	VL, Ü, PR	6	<u>1 examination</u> according to the supplement to §11 Types of Module Examinations
phy641 Energy Resources and Systems	VL	6	<u>2 examinations</u> (weight 50% each) according to the supplement to §11 Types of Module Examinations
pre410 Renewable Energy Technologies	VL, Ü	12	<u>4 examinations:</u> (weight 25% each) according to the supplement to §11 Types of Module Examinations
<b>2nd Semester, University of the Specialisation</b>			
Specialisation*	Total 30	VL, Ü, Sim, SE, project, excursion	Examinations according to the regulations of the specialisation provider

Abbreviations: VL = lecture, Ü = tutorial, Sim = simulation, SE = seminar, Lab = laboratory practicals

\* The modules from the specialisation universities are to be found in the following tables. After selecting a specialisation all modules within the specialisation are compulsory.

<b>NTU Athen Wind Energy</b>			
Module Title	CP	Examinations	
pre325 Wind Potential, Aerodynamics & Loading of Wind Turbines	7.5	<u>1 examination:</u> Written exam	
pre326 Wind Turbine Design, Electrical & Control Issues, Certification	7.5	<u>1 examination:</u> Written exam	
pre327 Wind Farm Technology, Economics & Environmental Issues	7.5	<u>1 examination:</u> Written exam	
pre328 Mini Project & Wind Farm Study	7.5	<u>2 examinations</u> (weight 50% each): Presentation including Written Analysis and Seminar Paper	

<b>Instituto Superior Técnico Lissabon Ocean Energy</b>		
<b>Module Title</b>	<b>CP</b>	<b>Examinations</b>
pre345 Offshore Wind Energy	6	<u>1 examination:</u> Portfolio
pre346 Wave Energy	6	<u>1 examination:</u> Portfolio
pre338 Marine Current & Tidal Energy	6	<u>1 examination:</u> Portfolio
pre339 Project in Marine Renewable Energies	6	<u>1 examination:</u> Portfolio
Pre735 Elective	6	<u>1 examination:</u> Portfolio
<b>University of Northumbria – Newcastle Photovoltaics</b>		
<b>Module Title</b>	<b>CP</b>	<b>Examinations</b>
pre351 Photovoltaic Cell Technology	10	<u>2 examinations:</u> Written exam (weight 60%) and Practical Exercise (weight 40%)
pre355 Development and Implementation	10	<u>2 examinations:</u> Seminar Paper (weight 50%) and Presentation including Written Analysis (weight 50%)
pre354 Photovoltaic System Technology	10	<u>2 examinations:</u> Written exam (weight 60%) and Term Paper (weight 40%)
<b>University Perpignan – Perpignan Solar Thermal &amp; Associated Renewable Storage</b>		
<b>Module Title</b>	<b>CP</b>	<b>Examinations</b>
pre420 Fundamentals	6	<u>2 Examinations:</u> Written Exam (Gewicht: 50%) and Practical Exercise (Gewicht: 50%).
pre421 Simulation and System Optimization	6	<u>2 Examinations:</u> Seminararbeit (Gewicht: 50%) and Practical Exercise (Gewicht: 50%).
pre422 Energy	6	<u>3 Examinations:</u> Written Exam, Practical Exercise and Seminararbeit. All examinations are weighted at 1/3 each.
pre425 Renewable Storage	6	<u>2 Examinations:</u> Written Exam (Gewicht: 50%) and Practical Exercise (Gewicht: 50%).
pre424 Project, case study and innovation	6	<u>2 Examinations:</u> Written Exam (Gewicht: 1/3) and Term Paper (Gewicht: 2/3).

<b>University Zaragoza - Zaragoza Grid Integration</b>		
<b>Module Title</b>	<b>CP</b>	<b>Examinations</b>
pre430 Introduction to Electric Power Systems and power electronics	3	<u>2 Examinations:</u> Written Exam (Gewicht: 95%), Practical Exercise(Gewicht: 5%)
pre431 Distributed energy resources (DER)	6,1	<u>3 Examinations:</u> Written Exam (Gewicht: 42,5%), Presentation (Gewicht: 50%) and Practical Exercise(Gewicht: 7,5%)
pre432 Renewable Energy Integration	5,6	<u>3 Examinations:</u> Written Exam (Gewicht: 40%), Presentation (Gewicht: 40%) and Practical Exercise(Gewicht: 20%)
pre433 DER Impact on EPS	5,2	<u>3 Examinations:</u> Written Exam (Gewicht: 50%), Presentation (Gewicht: 40%) and Practical Exercise(Gewicht: 10%)
pre434 Smart Grids solutions	6,1	<u>3 Examinations:</u> Written Exam (Gewicht: 50%), Presentation (Gewicht: 40%) and Practical Exercise(Gewicht: 10%)
pre435 Energetic Markets	4	<u>2 Examinations:</u> Written Exam (Gewicht: 50%) and Presentation (Gewicht: 50%)
<b>Hanze UAS – Groningen Sustainable Fuel Systems</b>		
<b>Module Title</b>	<b>CP</b>	<b>Examinations</b>
pre388 Physics and Fuels	5	<u>2 Examinations:</u> Written Exam (Gewicht 80%) and Practical Exercise(Gewicht: 20%)
pre389 Sustainable Fuel Systems Design	5	<u>2 Examinations:</u> Practical Exercise1 (Gewicht 60%) and Practical Exercise2 (Gewicht: 40%)
pre386 Bio Energy Conversion	10	<u>4 Examinations:</u> Written Exam 1 (Gewicht: 20%), Written Exam 2 (Gewicht: 30%), Practical Exercise1 (Gewicht 20%) and Practical Exercise2 (Gewicht: 30%)
pre387 Power2Hydrogen	5	<u>2 Examinations:</u> Written Exam (Gewicht 60%), Practical Exercise(Gewicht 40%)
pre384 New Business Development	5	<u>1Examination:</u> Term Paper

### **Supplement to § 11 Types of Module Examinations**

To (15): The following other examination types are accepted as module examinations:

- Conference contributions: A conference contribution comprises the preparation and presentation of a scientific paper and a conference presentation on the contents of the module in group work. The learning objective here is the joint preparation and communication of scientific findings to the appropriate audience using common media. A joint group grade is awarded for the conference contribution.

The type and scope of the examination performances must be in proportion to the number of credit points to be awarded. Module examinations in modules with 6 or 12 credit points should generally have the following scope:

- Written examinations approx. 90 min,
- Oral examination approx. 20 min,
- Presentation approx. 10 pages of written argument and approx. 15 min lecture,
- Term paper approx. 15 pages,
- Internship report approx. 15 pages,
- Presentation approx. 20 min,
- Seminar paper approx. 15 pages
- Practical exercises approx. 6 exercises
- Conference contribution approx. 15 min presentation and approx. 8 pages of written discussion
- A portfolio comprises 2 to 5 performances (in particular thesis paper (a), short presentation (b), exercises (c), short oral exam (d), short written exam (e), protocol (f), review (g), learning diary (h)). The performances of a portfolio may not exceed the usual scope of an individual examination performance in their entirety.
  - a) A thesis paper is an independent written discussion of a subject-specific problem of 500 to 2000 words.
  - b) A short presentation corresponds to the presentation in paragraph 7 with a length of 500 to 2000 words and a presentation duration of approx. 10 minutes.
  - c) When working on exercises, the student shall demonstrate that he or she can solve the problems scientifically on the basis of the contents and methods learned. The exercises are published via the online learning environment and are to be completed within the specified time limit. As a rule, the processing time of the exercise tasks should not exceed 30 hours in total.
  - d) A short oral examination usually lasts about 10 minutes per candidate. The essential subjects of the examination and the assessment of the examination performance shall be recorded in a protocol.
  - e) In a short examination, the candidate to be examined shall demonstrate under supervision that he or she can in a limited time, with limited aids and with the usual methods of the subject of the subject in a limited amount of time. The duration is usually 30 to 45 minutes.
  - f) A protocol is a written report on a practical experiment of between 500 to 2000 words.
  - g) A review is a written paper on the evaluation of a subject-specific article of 500 to 2000 words.
  - h) A learning diary is an independent documentation of one's own learning progress in written form of 500 to 2000 words.

### **Supplement to § 13 Assessment of Module Examinations and the Master's Dissertation**

The scores from the specialisation universities are transformed into a common grade (§ 13, paragraph (2)) using a Table of Equivalence (see below)

Table of Equivalence for EUREC Master marks [%], German marks in brackets							
Marking Categories	U Oldenburg Core Semester	NTU Athens Wind Energy	IST Lisbon Ocean Energy	U Northumbria Photovoltaics	U Perpignan Solar Thermal	U Zaragoza Grid Integration	Hanze Groningen Sustainable Fuels
Fail	0 - < 45	0-49	0-40	0-49	0-19	0-19	0-54
	45 - < 50		40-49		20-49	20-49	
Satisfactory	50 - < 54,5 (4,0)	50-69	50-60	50-59	50-69	50-69	55-64
	54,5 - < 59 (3,7)						
	59 - < 65 (3,3)		60-69				65-74
	65 - < 69,5 (3,0)						
Good	69,5 - < 74 (2,7)	70-79	70-75	60-69	70-79	70-89	75-84
	74 - < 80 (2,3)		70-75				
Very Good	80 - < 84,5 (2,0)	80-89	75-79	70-79	70-79	70-89	75-84
	84,5 - < 89 (1,7)		75-79				
Outstanding	89 - < 95 (1,3)	90-100	80-100	80-100	80-100	90-100	85-100
	95 - 100 (1,0)		80-100				

### Supplement to § 15 Repetition of Module Examinations, Free-Trial Examinations

To (1): The repeat examination may be undertaken in a different form, in consultation with the module coordinator.

To (5): Free attempts for grade improvement are not possible.

### Supplement to § 20 Registration for Master's Dissertation

To (1): To register for the Master dissertation it is necessary to have examination results worth 30 credit points.

### Supplement to § 21 Master Dissertation

To (2): With the approval of the examination committee, the topic can also be set by another authorized examiner according to § 7, paragraph 1; in this case the second examiner must be a member of the academic teaching staff of the Faculty of Mathematics and Science at the Carl von Ossietzky University of Oldenburg or from the concerned EUREC specialization university, which is involved in the teaching in the respective Master's degree course.

To (4): The Master dissertation must be completed in English.

*This is an unofficial English translation, based on the German "Studiengangsspezifische Anlage European Master in Renewable Energy", dated 12.07.2022. The German document is the legally binding one.*

To (5): The 30 CP for the Master's dissertation module shall be divided as follows: 24 CP for the dissertation and 6 CP for the dissertation defence.

To (10): The dissertation defence usually comprises a 15 minute presentation and a 10 minute oral defence.

### **Supplement to § 23 Overall Result**

To (1): The „European Master in Renewable Energy“ degree course is successfully completed when 90 CP have been gained, as in accordance with this course-specific appendix of the examination regulations, and when all module examinations including the final module have been passed.