

Appendix 16

Course-Specific Appendix for the Single-Subject Master in Renewable Energy (EUREC)

Valid as from winter semester 2017/18;

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 Master programme "European Master in Renewable Energy" (EUREC) is more application-oriented. The degree course aims to train professionals who are able to familiarize themselves with the various areas and issues of renewable energy and to develop these to specialists. Some of the future areas of activity include research, planning and development, participation in regional and international development organisations and processing of interdisciplinary topics on the sustainability of future energy supply systems.

After completing the programme, the students will have a critical understanding of the role of Renewable Energy technologies in a climate and resource constrained energy sector and gain the technical knowledge on different renewable energy technologies. This covers the evaluation of the resource, principles of the conversion process, choice of materials, design of systems, performance of systems in operation as well as the use of models and tools for simulation and sizing. Students acquire a critical understanding of the principles of the socio-economic evaluation of Renewable Energy technologies and of the role of regulatory policy frameworks in the context of Renewable Energy. They have skills in analytical and research methodology, including a reflective and critical approach, relevant for Renewable Energy. After the specialization semester, they have a critical understanding and in-depth expertise in one of the following technologies:

- Photovoltaics (University of Northumbria, Newcastle, United Kingdom)
- Wind Energy (National Technical University, Athens, Greece)
- Grid Integration (University of Zaragoza, Spain)
- Solar Thermal (University of Perpignan, France)
- Ocean Energy (IST Lisbon, Portugal)
- Sustainable Fuel Systems for Mobility (Hanze University of Applied Sciences, Groningen, Netherlands)

During the programme, students acquire the capacity to apply scientific knowledge to a professional situation, as a reflective practitioner, the capacity to work in a multicultural and multidisciplinary team as well as the capacity to communicate information in a clear and structured way in both oral and written format.

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 § 10 Structure and Content of the Modules

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

Module Title	CP	Module Form	Examinations
1st Semester, University of Oldenburg			
pre400 Fundamentals for Renewable Energy	12	VL, Ü, PR	<u>2 examinations:</u> Practical exercise (lab reports and exercises, weight: 75%) and either assignment (10-15 pages) or presentation (15-20 min, weight: 25%)
pre405 Energy Resources and Systems	6	VL	<u>1 examination:</u> Written examination (2h)
pre410 Renewable Energy Technologies I	12	VL, Ü	<u>1 examination:</u> Written examination (3h, weight 75%) as well as Presentation of a paper (15 min. presentation, 15 pages report, weight 25%).
2nd Semester, University of the Specialisation			
Specialisation*	30	PR, VL, Ü, Simulation, SE, project, excursion	examinations according to provider of the specialization

Abbreviations: VL = lecture, Ü = tutorial, PR=laboratory, SE = seminar

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

NTU Athen Wind Energy			
Module Title	CP	Examinations	
pre325 Wind Potential, Aerodynamics & Loading of Wind Turbines	7,5	<u>1 examination:</u> Written examination (3h)	
pre326 Wind Turbine Design, Electrical & Control Issues, Certification	7,5	<u>1 examination:</u> Written examination (3h)	
pre327 Wind Farm Technology, Economics & Environmental Issues	7,5	<u>1 examination:</u> Written examination (3h)	
pre328 Mini Project & Wind Farm Study	7,5	<u>2 examinations:</u> Presentation of a paper (15-20 min presentation + report max. 3500 words) and term paper (15-20 pages). Both examinations have a weight of 50%.	

Instituto Superior Técnico Lissabon Ocean Energy		
Module Title	CP	Examinations
pre331 Ocean Energy Resources	6	<u>2 examinations:</u> Written examination (2,5h, weight: 60%) and term paper (15-20 pages, weight: 40%).
pre332 Modelling and Control of Ocean Energy Systems	6	<u>3 examinations:</u> Written examination 1 (2,5h, weight: 50%), Written examination 2 (2,5h, weight: 40%) and practical exercise (Labreport 10-20 Pages, weight: 10%).
pre333 Ocean Energy Systems Technologies	7,5	<u>1 examination:</u> Written examination (3h)
pre334 Economics, Policy and Environment	4,5	<u>2 examinations:</u> Written examination (2,5h, weight: 60%), Term paper (15-20 pages, weight: 40%)
pre335 Project	6	<u>1 examination:</u> Presentation of a paper (20min presentation and 40min discussion + 30 pages report)

University of Northumbria – Newcastle Photovoltaics		
Module Title	CP	Examinations
pre351 Photovoltaic Cell Technology	10	<u>2 examinations:</u> Written examination (3h, Weight: 60%) and practical exercise (Labreport, Weight: 40%).
pre355 Development and Implementation	10	<u>2 examinations:</u> Term paper (ca. 3000 words) and Presentation of a paper (10min Presentation + 3000 words report). Weight each 50%.
pre354 Photovoltaic System Technology	10	<u>2 examinations:</u> Written examination (3h, weight: 60%), Assignment (10 pages, weight: 40%)

University Perpignan – Perpignan Solar Thermal Energy		
Module Title	CP	Examinations
pre420 Fundamentals	6	2 examinations: Written examination (2h, weight: 50%) and practical exercise (Labreport 10-20 pages, weight: 50%).
pre421 Simulation and System Optimization	6	2 examinations: Term paper (20 pages, weight: 50%) and practical exercise (Labreport 10 pages, weight: 50%).
pre422 Energy	6	3 examinations: Written examination (3h) and practical exercise (Labreport 5 pages) and term paper (20 pages). All examinations have a weight of 1/3.
pre423 Materials	6	1 examination: Written examination (2h)
pre424 Project, case study and innovation	6	2 examinations: Written examination (2h, weight: 1/3) and Assignment (30 pages, weight: 2/3).

University Zaragoza - Zaragoza Grid Integration		
Module Title	CP	Examinations
pre430 Introduction to Electric Power Systems and power electronics	3	<u>2 examinations:</u> Written examination (2h, weight: 95%), practical exercise (exercises, weight: 5%)
pre431 Distributed energy resources (DER)	6,1	<u>3 examinations:</u> Written examination (2h, weight: 42,5%), Presentation (20min + 10min discussion, weight: 50%) and practical exercise (exercises, weight: 7,5%)
pre432 Renewable Energy Integration	5,6	<u>3 examinations:</u> Written examination (2h, weight: 40%), Presentation (20min + 10min discussion, weight: 40%) and practical exercise (exercises, weight: 20%)
pre433 DER Impact on EPS	5,2	<u>3 examinations:</u> Written examination (2h, weight: 50%), Presentation (20min + 10min discussion, weight: 40%) and practical exercise (exercises, weight: 10%)
pre434 Smart Grids solutions	6,1	<u>3 examinations:</u> Written examination (2h, weight: 50%), Presentation (20min + 10min discussion, weight: 40%) and practical exercise (exercises, weight: 10%)
pre435 Energetic Markets	4	<u>2 examinations:</u> Written examination (2h, weight: 50%) and Presentation (20min + 10min discussion, weight: 50%)

Hanze UAS – Groningen Sustainable Fuel Systems		
Module Title	CP	Examinations
pre385 Sustainable Fuel Supply Chains	10	<u>5 examinations:</u> 2 Written examinations each (1,5h, weight: 20%), 3 Presentations of a paper each (presentation max. 20 min + report max. 15 pages, weight: 20%)
pre386 Biochemical & Thermochemical Conversion	10	<u>4 examinations:</u> Written examination 1 (1,5h, weight: 20%), Written examination 2 (1,5h, weight: 30%), Presentation of a paper 1 (presentation max. 20 min + Report max. 15 pages, weight: 20%) and Practical exercise (weight: 30%)
pre387 Power2Hydrogen2Use	5	<u>2 examinations:</u> Presentation (max. 20 min, weight 40%), Practical exercise (weight 60%)
pre384 New Business	5	<u>3 examinations:</u> Presentation of a paper 1 (Presentation max. 20 min + Report max. 15 Pages, weight: 20%), Presentation of a paper 2 (Presentation max. 20 min + Report max. 15 Pages, weight: 40%) and Presentation (max. 20 min., weight: 40%)

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.

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“ (EUREC) 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.

To (3): For determining the overall grade all module grades are considered. The „European Master in Renewable Energy“ (EUREC) degree course does not include any elective subjects.