



Appendices Teaching and Examination Regulations MSc Energy and Environmental Sciences 2020-2021

Final version – July 2020

Appendix I: Learning outcomes of the MSc Energy and Environmental Sciences (EES) (art. 3.1)

INTRODUCTION

Appendix 1 presents the two parts of the EES learning outcomes. The first part of the learning outcomes is specific and concerns knowledge and skills. These learning outcomes are covered in the obligatory part of the EES programme.

The second part of the learning outcomes is more general. It focusses on the final skills a student is capable of (i.e. doing research independently). This part is mostly covered by the research projects.

OBJECTIVES

The aims of the EES programme result in the following objectives:

Specific academic knowledge and skills for the master's degree program EES.

The graduate is able:

Sa) to analyze:

1. Energy and resource use in societies and ecosystems and their impacts on the climate/planet;
2. (Dis)advantages of the use of various energy sources using the people, planet, profit approach;
3. Current and future developments in the energy/environmental research field;
4. Policy developments in the energy/environment field.

Sb) to assess whether changes in systems will affect energy and resource use and their consequences.

Sc) to discuss the role of other academic (non-natural science) disciplines in the energy and/or environmental research field.

Sd) to distinguish career perspectives within the energy/ environmental field.

General academic skills for the master's degree program EES

The graduate is able:

G1. to write a review about literature in relevant subfields.

G2. to effectively gain information within the field of Energy and Environmental Sciences (EES).

G3. to formulate a research plan based on a general problem description in a subfield of EES.

G4. to analyze and assess state-of-the-art research information and draw conclusions from these results.

G5. to collaborate in a multidisciplinary team.

G6. to communicate his/her findings to the scientific community (oral presentation, written reports and debates).

G7. to design, conduct and evaluate experiments/scenarios/other scientific methods.

G8. to evaluate his/her own results and conclusions compared to knowledge in the literature.



G9. to function scientifically in a situation in which knowledge and research skills within the field of EES are required.

G10. to consider its own position in society to come to a sensible choice of profession.

Appendix II: Tracks/Specializations of the degree programme (art. 3.5)

The Master does not have tracks/specializations.

Appendix III: Content of the degree programme (art. 3.6)

Appendix V: Entry requirements and compulsory order of examinations (art. 4.4)

Table 2: Overview of the obligatory courses

Course Unit	ECTS	Practical	Entry Requirements
<u>Obligatory courses</u>			
Data Analysis and Statistical Methods (DASM) (WMEE001-05)	5	Yes	None
Impacts of Energy and Material Systems (IEMS) (WMEE002-05)	5	Yes	None
Sustainable Use of Ecosystems (SUE) (WMEE003-05)	5	Yes	None
Sustainability and Society (S&S) (WMEE005-05)	5	Yes	None
Systems Integration and Sustainability (SIS) (WMEE006-05)	5	Yes	None

Table 3: Overview of the different variants.

	ECTS		
<u>Variant 30/30</u>			
Obligatory courses	25		
Specialisation course, see Table 3	5 or 10 or 15 (at least one module is required)		
Optional courses, see Table 4 and 5	For optional and specialisation		



	course(s) in total 35 ECTS are needed.		
Research Project 1 (WMEE905-30)	30	Yes	DASM, IEMS, SUE, S&S, SIS and specialisation module(s)
Research Internship/Research Project 2 (WMEE906-30)	30	Yes	DASM, IEMS, SUE, S&S, SIS, specialisation module(s), electives, Research Project 1
<u>Variant 40/30</u>			
Obligatory courses	25		
Specialisation course, see Table 3	5 or 10 or 15 (at least one module is required)		
Optional courses, see Table 4 and 5	For optional and specialisation course(s) in total 25 ECTS are needed.		
Research Project 1 (WMEE905-40)	40	Yes	DASM, IEMS, SUE, S&S, SIS and specialisation module(s)
Research Internship/Research Project 2 (WMEE906-30)	30	Yes	DASM, IEMS, SUE, S&S, SIS, specialisation module(s), electives, Research Project 1
<u>Variant Science, business and policy</u>			
Obligatory courses	25		
Optional course, see Table 4 and 5	5		
Research Project 1 (WMEE905-30)	30		DASM, IEMS, SUE, S&S, SIS
Introduction Science & Policy (WMSE002-10)	10		
Introduction Science & Business (WMSE001-10)	10		



Internship Business and Policy (WMSE901-40)	40		Research project 1, Introduction Science & Policy, Introduction Science & Business
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In addition to the above scheme the following rules apply:

- Depending on the student’s background and the topic of the intended research project(s) a package of specialisation modules and electives (See Table 3, 4 and 5) is composed. This package of specialisation and optional courses is discussed with the tutor (a senior staff member) and has to be approved by both the tutor and the Board of Examiners.
- The student is allowed to choose optional course(s) from another Master degree programme, which is (are) not mentioned in Table 3, 4 or 5. The student needs to motivate his/her choice. The tutor and the Board of Examiners have to approve this choice.
- Research project 1 must be an internal project, performed at an ESRIG (Energy and Sustainability Research Institute) group under supervision of one of the examiners of the degree programme. For the assessment two examiners of the degree programme must be involved.
- Research Internship/Research Project 2 may be performed at an ESRIG group but may also be performed outside the university at a company, consultancy firm, government institution, research institute or another university. The supervisor from the external organization has to be on academic level. The university supervisor has to be one of the examiners of the degree programme. For the assessment two examiners of the degree programme must be involved. If this part will be performed abroad the student has to get approved the research proposal by the board of examiners of the degree programme before he/she will start.
- The subject of the SBP- internship must be clearly related to the scientific domain of the EES master programme (see Appendix I, 1). Therefore, two examiners must be involved in the assessment of the internship: one SBP-examiner and one examiner of the degree programme.
- To pass the final assessment of the EES programme the student has to have completed the following modules: Colloquia Energy and Environmental Sciences (WMEE017-00), Career Perspectives (EES) (WMEE018-00) and Scientific Integrity (WMEE019-00).

Appendix IV: Electives (art. 3.7)

Table 3. Overview of the specialisation courses

Course unit	EC	Practical	Entry Requirements
Modeling Energy and Material Systems (MEMS) (WMEE009-10)	10	Yes	
Global Change (GC) (WMEE008-05)	5	Yes	



Optional courses offered by EES

Table 4. Overview of the optional courses offered by EES.

Course unit	EC	Practical	Entry requirements
Climate Modelling (CM) (WMEE012-05)	5	Yes	
Conceptualizing and Modeling Human-Environmental Systems (WMEE011-05)	5	No	
Energy and Complexity Nexus (ECN) (WMEE18002)	5	Yes	
Experimental Methods of Trace Gas Research (EMTGR) (WMEE007-05) (only offered two-yearly; again in 2021-2022)	5	Yes	
Fuel Cell Systems (WMEE015-05)	5	No	
Nuclear Power Technology (WMEE014-05)*	5	No	
Radiocarbon Dating and Analysis (WMEE013-05)	5	No	

*It is not allowed to choose Nuclear Power Technology if the student already passed the Nuclear Energy course in his Bachelor or Master's degree programme at the UG.

Optional courses offered by other degree programmes

Students can select other elective courses from other degree programmes. For the number of EC, Practical, Entry requirements, see the course catalogue Ocasys. Table 5 gives an overview of possible optional courses.

Table 5. Overview of possible optional courses offered by other degree programmes
 All 5 EC, unless another amount is mentioned.

Electives of other degree programmes in the Faculty of Science and Engineering

WMBY018-06	Advanced Statistics
WMCE001-05	Bio-based Products
WMCH027-05	Biocatalysis and Green Chemistry
WMIE018-05	Bioprocess Technology
WBBY016-05	Conservation Biology**
WMSE001-10	Introduction Science and Business
WMSE002-10	Introduction Science and Policy
WMMB008-05	Marine Ecosystem Service and Global Change



WMCH011-05	Photovoltaics Science and Energy**
WMPH027-05	Physics of Lasers
WMMB009-05	Polar Ecosystems
WBPH029-05	Principles of Measurement Systems***
WBCS033-05	C++ Fundamentals
WMEC006-05	Skills in Science Communication
WMPH030-05	Statistical methods in physics
WMIE021-05	Systems engineering
WMIE006-05	Technology Based Entrepreneurship
WMME018-05	Thermodynamics of Energy Conversion
WMPH040-05	Ultrafast Time-Resolved Spectroscopy
TEM0105	Basicursus Master Lerarenopleiding
TEM0205	Masterstage 1

**It is not allowed to choose Conservation Biology when the student already passed this course in his Bachelor degree programme at the UG.

***It is not allowed to choose Photovoltaics Science and Energy when the student already passed Solar Cells in his Bachelor degree programme at the UG.

****It is not allowed to choose Principles of Measurement Systems when the student already passed this course in his Bachelor degree programme at the UG.

Electives of Faculty of Economics and Business:

EBM148A05	Economics of Regulating Markets
EBM166A05	Energy & Finance
EBM167A05	Energy Transition & Innovation
EBM201A05	Global Supply Chain Man & Sustainability
EBM192A05	Marketing and Consumer Well-being
EBM202A05	Sustainable Energy Supply

Electives of Faculty of Spatial Sciences:

GEMDILEIP	Dilemmas in Infrastructure Planning
GEMREENVPL	Reinventing Environmental Planning
GEMSOCIMAS	Social Impact Assessment
GEMTRWATM	Transitions in Water Management
GEMIPS	Interdisciplinary perspectives on sustainability

Electives of Faculty of Behavioural and Social Sciences:

PSMSB-2	Environmental psychology
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Appendix VI: Admission to the degree programme (art. 2.1.B)

Additional selection criteria, next to the entry requirements in article 2.1.A and 2.2.

Requirements for admission to the Msc Energy and Environmental Sciences:

Holders of the following Bachelor's degrees from the University of Groningen are considered to have sufficient knowledge and skills and will be admitted to the Master's degree programme in Energy and Environmental Sciences:

- Biology
- Life Science and Technology
- Biomedical Engineering
- Pharmacy
- Chemistry
- Chemical Engineering
- Physics
- Applied Physics
- Astronomy
- Mathematics
- Applied Mathematics
- Computing Science
- Industrial Engineering and Management Science
- Artificial Intelligence

Appendix VII Transitional provisions (art 7.1)

No provisions needed.

Appendix VIII

Application deadlines for admission (art. 2.6.1)

Starting date 1 September 2021

Deadline of Application	Non-EU students	EU students
Energy and Environmental Sciences	May 1st 2021	May 1st 2021

Decision deadlines (art. 2.6.3)

Deadline of Decision	Non-EU students	EU students
Energy and Environmental Sciences	June 1st 2021	June 1st 2021