Programme-specific appendix to the OER 2019-2020

For the Master of Science programme

Environmental and Energy Management (MEEM)

1. Structure and Units of Study of the programme

1a Program content

The MEEM programme aims at preparing students to become professionals able to organize, manage and lead socio-technical change in the environmental, energy and water domains, towards sustainable development. The core of this one-year, English-taught programme consists of three interconnected domains of sustainable development: environment, energy and water. The programme teaches the interrelated management and governance of these three crucial natural resources. Graduating in one of the three domains will prepare students for working with multidisciplinary teams in business, government, consultancy or (PhD) research anywhere in the world.

1b Study Load

The MEEM has a total study load of 60 EC.

***Table 1*: The MEEM course list for 2019-2020**

Q	Course code	Name	EC	Exam
COURSES				
1	201700114	Environmental Management	4	S + PG
1	201900112	Sustainability and Law	3	S + PG
1	201700116	Energy Management	4	S + PG
1	201900111	Water Management	4	S + PG
2	201900152	Environment and Technology	3	S + PG
2	201900128	Policy and Sustainability	3	PS
2	201900137	Ecology, Society and Sustainable Development	3	PGR/PG + PS
2	201700043	Academic Research Skills	4	PGR + PS
SPECIALIZATION				
3	201900129/130/131	Case study period (Energy, Environmental or Water)	10	PGI/PGR
3-4	201900139/140/141	Master Thesis (Energy, Environmental or Water)	18	BAM
PERSONAL DEVELOPMENT (4 EC to be chosen from the following courses)				
2-3	*201900170*	*Dutch language Course for MEEM (NT2-A1)*	*1.5*	S + O
2-3	*201900171*	*Sustainability Research Forum*	*1.5*	VAR
2-3	*201900172*	*Serious Sustainability Gaming*	*2*	VAR
2-3	*201900173*	*Environmental Certification*	*1*	PG
2-3	*201900174*	*Systematic literature reviewing*	*1*	PS
2-3	*201900175*	*Project Proposal writing*	*0.5*	PS
2-3	*201900176*	*Understanding the European Union*	*1*	PS
2-3	*201900177*	*Gender and sustainable development goals*	*1*	PR

This structure is foreseen for students who begin the program in September 2019. The following abbreviations are used under the 'Exam format' column:

- S = written exam
- PGI = group assignment, including a written group report and (in so far as possible) individual assessment of the manner in which the student participated in the group exercise
- PG = group assignment, including a written group report and the assessment of this report for the group
- O = oral exam
- PS = individual assignment, including a written report
- PGR = group assignment and oral report of this through a presentation
- PR = individual assignment and oral report of this through a presentation
- BAM = reviewed in accordance with the procedures laid down in the regulations applicable to the Master's assignment.
- VAR = various of the above used within one course

1c Programme structure

The MEEM is divided into three components:

1. course work (quartile 1 & 2)
2. Specialization (case study & Master thesis) (quartile 3 & 4)
3. Personal Development (quartile 2 and 3)

The course work is common to all students; the case study and research project are based on the specialization streams.

During the course-work period, the core substantive courses are structured around the theme of management of socio-technical change towards sustainable development. They provide the (mainly) disciplinary knowledge in the environmental, water and energy management domains. Next to these courses, the course on Academic Research Skills is more integrative in nature and the programme

also offers a course called Personal Development Electives, within which students can choose subunits of study. In general, there are many interlinks between courses.

While the course work period is common for all students, in the next two phases, of the case studies and the thesis research project, students choose a specialization:

1) *Environmental Management*
   The environmental management specialization teaches students to understand the problems and challenges involved in the greening of industry strategies regarding the environmental and social sustainability, to analyse the management strategies at different scales (firm, supply chain, sector and region) towards a more socially inclusive (stakeholders engagement) an greener industry, to design environmental and socially inclusive management systems that cope with the industrial challenges of delivering sustainable products and services and manage the greening of industry by engaging systematically the relevant stakeholders and by implementing the adequate sustainable management strategy.
2) *Energy Management*
   The energy management specialization teaches students to understand the problems and challenges involved in the transition to sustainable energy-supply at different scales (market, region, community or organization), to analyse energy supply chains at different scales in their transitional problems and needs, to design adequately sustainable solutions for sustainable energy supply at different scales and to manage the transition to sustainable energy supply at different scales.
3) *Water Management*
   The water management specialization teaches students to understand the problems and challenges involved in reaching out for sustainable water resources and a safe and affordable water supply, to analyse the governance of water systems and water supply services and to assess the potential for improvement, to design options for improvement, based on promising key concepts, design approaches and design principles in water management and water governance, applying multidisciplinary and multi sectoral perspectives, and to manage the implementation of strategies, plans, measures and instruments and continuation of good water governance.

Both in the case study period and in the thesis project there may be opportunities to substantively make links between different specializations.

Content of practical exercises: A characteristic of the instructional approach in the MEEM programme is a strong link between theory and practice. This calls for active and collaborative learning, and teaching methods that enable this. Thus, in most courses practice-oriented application of concepts is used to teach participants (how) to use them in practice and to reflect upon the context in which tools and concepts are or can be used. This, in turn, gives rise to discussion in class, in which participants learn from each other and from the situation and solution strategies used in various countries. Active and collaborative learning by students is promoted by including e.g. assignments, workshops/interactive classes, case study and the research project.
Given the fact that MEEM takes a view that connects global with local issues and that invites students from across the world, many programme elements specifically connect to local issues across the world, such as of participants' home situations.

The program has a MSc accreditation in the domain of "social science oriented environmental science".

1d Pre-master

The UT MEEM Pre-master 'Towards Managing Sustainability in a Technological Context' is dedicated to prepare students for the Master of Environmental and Energy Management. The programme is relevant to prospective MEEM-students with a skills and/or knowledge gap between their current competences and the admission requirements of the MEEM programme. Thepre-master programme consists in total of 30 EC, with two modules of 15 EC, each with three courses of 5 EC, as displayed in Table 0.1.

Table 0.1 – MEEM premaster

Module Academic skills (15EC)	Module Context Sustainable development (15EC)
Academic reading skills(5EC)	Introduction into Sustainable development (5EC)
Academic writing skills(5EC)	Introduction Physical aspects of energy and sustainable development (5EC)
Academic research skills(5EC)	Introduction into Discourses in sustainability politics and policies (5EC)

Depending on student background a decision is taken about whether a student needs to first complete all, a few or just one course(s) of the premaster-programme before being admissible to MEEM. In 2017-2018 a first trial run of the premaster took place, with only a handful of students. In 2018-2019 the premaster has become a formal part of the BMS program.

2. Goals/objectives and final attainment targets

2a Goals/objectives

MEEM's unique profile follows from the vision that socio-technological change is necessary to achieve sustainable development, and that its mission is to educate environmental professionals, who can organize and manage such socio-technological change. This mission is set out in a programme that:

1. focuses on ecological sustainability by studying environmental, energy and water management, first broadly and next by specializing on one domain, to meet grand sustainability challenges (especially climate change, but also resource depletion, urbanization, ecological and socio-economic stress and resilience),
2. with a multidisciplinary approach that features social sciences (with an emphasis on governance, policy, law and management), against a natural (technology and ecology) science background,
3. from a global-local perspective on sustainability, in an international classroom,
4. combining academic and professional competences and skills, to not only research but also design, organize, manage and lead socio-technological change,
5. and doing all of this in an intensive one year programme.

Following its vision and mission, the aim of the MEEM is to have students develop the necessary professional knowledge and skills through active learning at an academic level, taking into account their educational, professional, and geographical backgrounds, to be able to work on and design solutions for multi-disciplinary problems in environmental, energy or water management.

The aims and final attainment targets of the MEEM express the necessary competences for MEEM graduates to function effectively at an academic level in the public and /or private sector of environmental, energy or water management, including in (applied) academic research in those fields.

2b Final attainment targets

The aim of the programme is reflected in its final attainment targets. The final attainment targets for the Master of Environmental and Energy Management are:

Domain Specific Final attainment targets

1. Graduates have knowledge of and insight in the relevant key concepts and theories of policy studies and law and can describe and categorize relevant policy instruments, describe the legal basis of common policy instruments used in environmental, energy and water management and are able to assess their usefulness and feasibility in various contexts.
2. Graduates have basic knowledge of and insight in a variety of clean(er) and treatment technologies relevant for environmental, energy and water management, and tools that can be used for assessing the options for improving the environmental and energy impacts of products and production processes. They are able to make basic calculations for some of these tools and to make judgments about what technological solutions are appropriate for specific situations.
3. Graduates have knowledge of and insight in relevant key terms and concepts of organizational theory, operations management and financial analysis. They are able to apply these to analyze

(energy, water and environmental projects in) an organization, define needs for change and advise about implementation.
4. Graduates have knowledge of and insight in the relevant key concepts, theories and tools, strategies and management systems for corporate environmental, energy and water management. Graduates are able to analyze an existing situation and design solutions for (a specific issue in) environmental, water or energy management.

Integration / multidisciplinarity related Final attainment targets
5. Graduates understand the concept of sustainable development and the relationships between resource utilization, production processes, societal processes and environmental pressure and are able to apply combinations of concepts and theories in environmental, water and energy management to the situation in their home country or other specific real life situations.
6. Graduates are able to integrate knowledge from various disciplines and to understand interrelationships in sustainable development processes, and are capable of formulating an action programme, policy, project or recommendations for environmental, energy or water management issues in their context based on this integrated knowledge.

Academic and Professional Final attainment targets
7. Graduates have academic and research skills, such as critically reflecting on literature, designing a research proposal and executing and reporting on an (applied) research project.
8. Graduates are able to independently access relevant scientific literature to obtain additional knowledge and apply this to the problem at hand.
9. Graduates can take the responsibility for the continuous development of their own knowledge and skills.
10. Graduates are able to make a relevant contribution as an individual or as a member of an multi-disciplinary team to analyzing and solving complex environmental or energy problems in an organization or region. They are able to function in an international team, with English as the language of communication.
11. Graduates are able and willing to recognize the ethical aspects related to their activities.
12. Graduates are able to give a structured written and oral presentation in English about individual or team-work. They also adhere to existing academic traditions, such as providing proper credits and references.
13. Graduates are able to reflect on matters and issues in the domain, are able to form an opinion and to contribute to both scientific and practitioners' discussions and e.g. to critically reflect on the role of technology in the process towards sustainable development
14. Graduates have knowledge of the principles of relevant professional skills, like communication, management and consulting skills, and have some basic experiences in applying these

Table 2: **Dublin Descriptors and final attainment targets of MEEM**

Descriptor	***levels***
Descriptor 1: Knowledge and understanding Have demonstrated knowledge and understanding that is founded upon and extends and/or enhances that typically associated with Master's level, and that provides a basis or opportunity for originality in developing and/or applying ideas, often within a research context	1,2,3,4,5,6,14
Descriptor 2: Applying knowledge and understanding Can apply their knowledge and understanding and problem solving abilities in new of unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study; have the ability to integrate knowledge and handle complexity	1,2,3,4,5,6,7,8 11,12,13,14
Descriptor 3: Making judgments Can formulate judgments with incomplete or limited information, including reflections on social and ethical responsibilities linked to the application of their knowledge and judgments	1,5,6,7,10,11,13
Descriptor 4: Communication Can communicate their conclusions, and the knowledge and rationale underpinning these, to specialist and non-specialist audiences clearly and unambiguously	7,10,12,13,14
Descriptor 5: Learning skills Have the learning skills to allow them to continue to study in a manner that may be largely self-directed of autonomous	7,9

As can be seen from table 2, the final attainment targets of the MEEM match those of the Dublin

Descriptors for master's programmes. Also, in developing the final attainment targets, the Criteria for Academic Bachelor's and Master's Curricula of the 3TU were used to check consistency and comprehensiveness.

3. Examination and exams

3a. Examination

The programme has one examination, the Master's examination at the end of the year. The Master's examination is deemed to have been successfully completed if the exams of the units of study, including the Master's thesis, have been taken successfully

3b. Exam formats

The exam formats of each of the units of study (courses) in the MEEM programme is shown in table 1.

Because the MEEM belongs to the Faculty of Behavioural Management and Social Sciences, it operates within the general rules on education and exams as set by the University and the Faculty, the UT master's OER/EER (Onderwijs- en Examen Reglement / Education and Exam Rules). Specific regulations, procedures and requirements with respect to MEEM exams are laid down in the 'exam regulations' in the study guide.

The duration of the programme is one year. With regard to the units of study in the category of course work (so, excluding the case study and the thesis project), in principle there is a maximum of two opportunities to pass an exam: the regular exam and the re-exam. Students are automatically registered for the regular exams and, if needed, and consequently only in case of a fail mark on the first exam opportunity, for the re-exams. When a student does not attend an (re-)exam without informing the lecturer beforehand, then this (re-) exam will nonetheless be classified as a valid exam opportunity. An opportunity for a second re-exam in one specific course within the same year as the previous exams is possible only when the involved student has, in that same year, obtained a pass for all other courses, has in that same course failed both earlier exams, and when the programme director is satisfied that the student has made serious efforts at these earlier exams. A request for a second re-exam must be made with the programme director, within one month after the last exam result that satisfies the requirement of having passed all other course is published in OSIRIS.

1. As regards a no-pass on a deliverable upon an assignment a division is made between having to create a fully new deliverable (upon a new assignment), applicable to small/short assignments, and improving a failed deliverable upon one and the same assignment. In the course descriptions for each course further information is provided on which of the two options applies; if no specification is given the option for small assignments applies. In all cases feedback is given on the failed deliverable.

If a unit of study has been completed (i.e. passed with at least a 5.5 or 6.0) this grade is final.

In case of special personal circumstances, students may be allowed an extra opportunity than following from the above text (under 3b) to take an exam or do an assignment. To apply for this, the student must make a request, in writing, to the Examination Board of the programme. In the case study period and the research project, there is no second opportunity to repeat compulsory elements of these courses. Again, in case of special personal circumstance (beyond personal control, such as serious illness or accidents) the Examination Board and programme management will try to find a solution upon a student's request.

The procedures for the part of the exam called Research project (master's thesis) are outlined in the specific manual 'Guidelines for the Research project'. The procedures described in this manual are assumed to be part of the Students' charter.

3c. Period of validity of test results

In conformity with paragraph 4.8 of the common elements of this EER, in the master of Environmental and Energy Management, a result of a unit of study has no limitation. Separate tests within a unit of study are valid only within the academic year in which they were obtained. In case of compelling personal circumstances the Examination Board may allow an extension of the latter term of validity.

3d. Required sequence of exams

There are no prior knowledge prerequisites in the MSc other than being admitted to the programme

4. General information

4a Admission to the programme

- Admission requests for the program are assessed by an admission committee that consists of both programme coordinators and two examiners.

- The standard admission criteria are as follows:
  - have at least a Bachelor's degree in a related discipline in the following programmes of natural, technical, environmental or social sciences at a research university of university of applied science:

    A. Natural, Technical and Environmental Sciences
    Bachelors in the field of Engineering Sciences, Technical Sciences, Natural Sciences (chemistry, physics, geology, biology, ecology, etc.), Environmental Studies / Sciences, agricultural / forestry Sciences, Earth Sciences, natural resources management, Environmental Health Sciences

    B. Social Sciences
    Bachelors in the field of Business / Business Administration / Commerce, Policy Studies / Political Science, Economics, Law, Management / accounting sciences, Public Management, Environmental / Natural Resource / agriculture / forestry Management, Public Health, (physical, regional, economic) Planning sciences.

    NB1 - When the bachelor degree in a program of the above lists has been obtained at the level of a university of applied science, then admission may be possible only upon completing (parts of) the MEEM premaster program (with a minimum of 5 and a maximum of 30 EC). The admission committee provides assessments on whether this is necessary and if so, to what extent – the MEEM program director takes the final decision.

    NB2 - Second class lower bachelors provide access to the MEEM programme only when complemented with respectively 2 years of relevant work experience or ample (≥5 yrs) relevant work experience and a convincing motivation.

    NB3 Applicants with a Bachelor that is not in the Natural, Technical, Environmental or Social Sciences, as listed in the above can only be admitted when possessing at least 5 years of directly relevant work experience, or upon completion of (parts of) the MEEM premaster program. The admission committee advises on admissibility to this program; the MEEM program director takes the final decision.

  - proper proficiency in the English language, at least a minimum score of 6.5 on the Academic IELTS test, or a score of at least 90 on the Internet based TOEFL-iBT test. Upon request the admissions committee provides assessments on whether an at least equivalent level of proficiency is secured in another way, such as by native language or language in a completed bachelor or master programme.

- For a positive assessment the relevant diplomas and transcripts as proof of the above have to be

certified. In case work experience is a necessary condition to admittance (see NB2), a CV and motivation letter are required.

To prevent enrolment of students who are not fit for MEEM, all students have to enclose with their admission form a motivation letter and a CV in which they demonstrate that they have sufficient affinity with (reflection on) sustainability sciences.

The management of the programme may, in divergence from what is stated in the above, grant to prospective students that do not yet fulfil the requirements for admission, the opportunity to follow certain parts of the master.

4b Language

The MSc Environmental and Energy Management is taught in English. Not only does this mean that courses are given in English, but also that all course materials (textbooks, readers, etc.) will be in English, as well as all tests, exams and practical exercises (specifically the Master's project/thesis)
.

4c International agreements

The MEEM programme has a positive attitude towards international cooperation and actively explores opportunities for this.
Starting 2009-2010, cooperation with the University of Padjadjaran (Bandung, Indonesia) in the form of a Double Degree programme, was launched and is still successful today. Further, many of the lecturers involved in the MEEM programme are 'internationals' themselves, are part of international networks and / or participate in international research or educational activities.

4d Elective options

The programme comes with three types of elective options:
- the choice of specialization (one of the following three: environmental management, energy management, water management – starting with a case study project in quartile 3)
- the choice of the individual research project topic, within the chosen specialization, and within the (broad) competence of the existing MEEM staff.
- the choice of one to a maximum of four short courses (workshops etc.) from a list of short courses within the frame of the (4 EC) Personal Development courses.

4e Programme Committee (OLC)

The tasks of the programme committee are:
- To give advice on the Teaching and Examination Regulations (OER)
- To assess yearly the execution of the Teaching and Examination Regulations (OER)
- To give advice - asked or unasked - to the management of the programme and to the Dean on all matters with respect to the concerned education.

The programme committee of MEEM consists of three lecturers and three students. The programme committee is supported by the two MEEM programme coordinators. The programme leader can also participate in the OLC-meetings.

4f Examination Board

The Examination Board is the body that determines in an objective and expert way whether a student meets the conditions under the Teaching and Examination Rules (TER) concerning the knowledge, comprehension and skills required in order to obtain the Master of Science (MSc) degree. The Dean of the Faculty appoints members of the Examination Board.

The Board's tasks are described in paragraph 5.1 of the generic (i.e. non programme-specific) part of the TER. More information, including the most up-to-date composition of the Board can be found on

the webpage of the Examination Board.

5. Additional information

5a Graduation with distinction

If upon sitting the Master's examination, the student has shown evidence of exceptional capability, 'cum laude' will be recorded on the degree certificate.

A student is considered to have exceptional capability if each of the following conditions is met:

- all requirements for completion of the Master programme;
- the non-weighted average grade for the coursework (not including the research project and courses that are assessed using 'Pass' or 'Fail') is 8.0 or higher;
- for the units of study that are assessed using grades, the minimum grade should be a 7,0 or higher.
- the grade for the research project is 9.0 or higher;
- The programme is completed within a period of 15 months.

6. Transitional arrangements

6a Transitional arrangements MEEM

Per September 2019 changes will be implemented in the MEEM study programme. Students from cohort 2017 and 2018 (MEEM18 and MEEM19) should not be negatively affected by these changes when completing their mandatory courses. If students face problems in their approved study planning they should contact the study advisor or programme coordinator. Only the courses that affect students from Cohort 2017 and 2018 are mentioned here.

Thesis Project
In the 2019-2020 curriculum the Thesis project consist of 18 EC. In previous years this was 20 EC. Students from cohort 2017 and 2018 who are yet to finalise the Thesis project should still put an extra 2 EC (56 hours) extra work into their Thesis project in order to graduate successfully.

(Science Backgrounds:) Environment and technology
In the 2019-2020 curriculum this course consists of 3 EC. In previous years this was 4 EC. Students from cohort 2018 who still need to pass this course need to take an extra assignment.

Case Project
In the 2019-2020 curriculum the Case project has 10 EC. In previous years this was 12 EC. Students from cohort 2018 who still need to pass this course need to take an extra assignment.

Personal Development Electives
Alternatively to the above arrangements, students from Cohort 2018 (MEEM19) may also choose subunits of study from the list belonging to the Personal Development Electives course (of 4 EC) to count up to a total of 60 EC.