

Programme Specific Appendix to the EER 2020-2021

For the Master of Science programme

Environmental and Energy Management (MEEM)

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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 domains. Graduating in one of the three domains will prepare students for working with multidisciplinary teams in business, government, NGO's, 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 2020-2021

Q	Course code	Name	EC	Exam
COURSES 28 EC				
1	201700114	Environmental Management	4	S + PG
1	201900112	Sustainability and Law	3	S
1	201700116	Energy Management	4	S
1	201900111	Water Management	4	S + PG of PS
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
2/3	201700043	Academic Research Skills	4	PRS + PS
SPECIALIZATION 28 EC				
3	201900129/30/31	Case project (Energy, Environmental or Water)	10	PGI/PGR
3	202001451	Research Proposal (Energy, Environmental or Water)	3	PS
4	202001452/53/54	Master Thesis (Energy, Environmental or Water)	15	BAM
PERSONAL DEVELOPMENT 4 EC (to be chosen from the following courses)				
3	202001456	Social network Analysis	2	
2	201900172	Serious Sustainability Gaming	2	VAR
2	202001473	Energy Management and Certification	2	PG
3	201900174	Systematic Literature Reviewing	1	PS
2	202001462	Project Proposal Writing	1	PS
3	201900176	Understanding the European Union	1	PS
2	201900177	Gender and Sustainable Development Goals	1	PR

This structure is foreseen for students who begin the programme in September 2020. 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
- PRS = Presentation
- 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:
 - 2.1 Case project (quartile 3)
 - 2.2 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) and greener industry, to design environmental and socially inclusive management systems that cope with the industrial challenges of delivering sustainable products/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 programme 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. The pre-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 pre-Master programme before being admissible to MEEM.

2. Goals/objectives and final attainment targets

Preliminary remark

The goals/objectives/targets listed below are expected to be updated before the start of MEEM 22, in September 2020. This update is intended to improve the fit of the list with operational changes in the MEEM programme that have already been made during the positive accreditation of the programme in 2019. When settled, and only if before 01 September 2020, the new list of goals/objectives/targets will be made available to all interested parties.

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 for profit and not for profit/NGO of environmental, energy or water management, including in (applied) academic research in those fields.

2b Intended learning outcomes/qualifications

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 analyse (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 analyse an existing situation and design solutions for (a specific issue in) environmental, water or energy management.

Integration / multidisciplinary 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 a multi-disciplinary team to analysing 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 or 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 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 leads to one academic diploma, the Master of science degree in environmental and energy management. The Master degree is obtained only upon successfully completing all the exams of the units of study, including the Master's thesis.

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 Examination Regulations). 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. The, in time, second opportunity to

do an exam is available only in case of: 1. non-participation, with prior notification of the relevant lecturer, to the first exam, and 2. in case of obtaining a fail mark on the first exam opportunity. 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 it is evident that the student has made serious efforts at these earlier exams. A request for a second re-exam must be made with the examination committee, within one month after the last exam result that satisfies the requirement of having passed all other courses 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 Master thesis are outlined in the specific manual 'Guidelines for the Master thesis'. 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, the validity of a result of a unit of study has no time-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 programme 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 or university of applied sciences:

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 programme 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 pre-Master programme (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 programme director takes the final decision.

NB2 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 programme. The admission committee advises on admissibility to this programme; the MEEM programme 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. In special circumstances, such as with double diploma arrangements, native language or language of a completed bachelor or master programme, the admissions committee can, upon request, provide an assessment on whether an at least equivalent level of proficiency is otherwise secured.
- For a positive assessment the relevant diplomas and transcripts as proof of the above have to be certified.

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 programme space

The programme comes with three types of elective options:

- a. the choice of specialization (one of the following three: environmental management, energy management, water management – starting with a case study project in quartile 3)

- b. 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.
- c. the choice of the individual master thesis topic, within the chosen specialization, and within the (broad) competence of the existing MEEM staff.

The choice of above options a. and b. will be presented to the students in the course of the study year, together with a procedure on how and ultimately when to make their choice known. Once the deadline has passed, the choice that was made cannot be undone. Further a choice made includes the obligation to participate in the compulsory activities, assignments and/or exams related units of study (i.e. under a, of the relevant case-study project; under b. of the relevant personal development course). Non-participation will be listed on the diploma as a fail mark.

The choice of the above option b. can only be made in such a way that the total 4 EC is divided equally over quartile 2 (2 EC) and quartile 3 (2 EC).

The choice under the above option c. will be presented in accordance with the procedure outlined in the 'Guidelines for the Master thesis'. Once the deadline for choosing a topic has passed, it cannot be undone within the same year of study.

4e Programme Committee (OLC)

The tasks of the programme committee are:

- To give advice on the Education and Examination Regulations (EER)
- To assess yearly the execution of the Education and Examination Regulations (EER)
- 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 Education and Examination Rules (EER) 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 EER. 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 master thesis 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 master thesis is 9.0 or higher;
- The programme is completed within a period of 15 months.

5b Emergency

In case of a public emergency, as declared by national or regional/local government, or a state of emergency declared by the University of Twente's executive board or the board of the faculty of BMS,

the programme management can, only in as much as necessary and when proportionate, derogate from any other arrangement in this Programme Specific Appendix to the EER, subject to approval by the Examination Board Governance Sciences, insofar as required by the EER and in the areas indicated in the EER.

6. Transitional arrangements

6a Transitional arrangements MEEM

Per September 2019 changes have been implemented in the MEEM study programme. Students from older cohorts 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.

Master thesis

In the 2020-2021 curriculum the master thesis consist of 18 EC (15+3). Before September 2019 this was 20 EC. Students from older cohorts who are yet to finalise the master thesis should still put an extra 2 EC (56 hours) into their master thesis in order to graduate successfully.

Personal Development Electives

Alternatively to the above arrangements, students from older cohorts 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.