Programme-specific part of the Education and Examination Regulations 2022-2023

Graduate School of Geosciences: Master's degree programme in Environmental Sciences

The Master's degree programme *Environmental Sciences* offers the programmes *Sustainable Development* and *Water Science and Management*.

Art. 2.1 – Admission requirements

1. The following conditions for admission apply:

Sustainable Development

Admission to the *Sustainable Development* programme is granted to students with a Dutch or a foreign diploma confirming that they have acquired the knowledge, insights and skills at university Bachelor's level.
Furthermore, students need to prove that they have gained the following specific knowledge, insights and skills:

a) knowledge in the field of *Environmental Sciences*, *Natural Sciences* or *Social Sciences* at the advanced level of a major in *Earth Sciences*, *Physics*, *Chemistry*, *Biology*, *Economics*, *Public Administration and Organisational Science* or *Social Sciences* at Utrecht University, or equivalent to this level
b) knowledge in the field of sustainability issues
c) basic knowledge of physical processes in the environment
d) basic knowledge of mathematics at Bachelor's level
e) insight into *Environmental Sciences*, *Natural Sciences* or *Social Sciences* at the advanced level of a major in *Earth Sciences*, *Physics*, *Chemistry*, *Biology*, *Economics*, *Public Administration and Organisational Science* or *Social Sciences* at Utrecht University, or equivalent to this level.
f) academic and research skills of a major in *Earth Sciences*, *Physics*, *Chemistry*, *Biology*, *Economics*, *Public Administration and Organisational Science* or *Social Sciences* at Utrecht University, or equivalent to this level.

Water Science and Management

Admission to the *Water Science and Management* programme is granted to students with a Dutch or a foreign diploma confirming that they have acquired the knowledge, insights and skills at university Bachelor's level.
Furthermore, students need to prove that they have gained the following specific knowledge, insights and skills:

a) knowledge in the field of *Earth Sciences*, *Environmental Sciences* or *Natural Sciences*, at the advanced level of the major *Earth Sciences* or *Environmental Sciences* at Utrecht University, or equivalent to this level
b) insight into *Earth Sciences*, *Environmental Sciences* or *Natural Sciences* at advanced level of the major *Earth Sciences* or *Environmental Sciences* at Utrecht University, or equivalent to this level
c) academic and research skills of the major *Earth Sciences* or *Environmental Sciences* at Utrecht University, or equivalent to this level

2. Students will be selected based on objective standards regarding:
   a) their previous academic performance in a relevant subject area or areas
   b) relevant skills
   c) their command of the language or languages used in the programme
   d) the following additional selection criteria with proven relevance for the opinion on the suitability of the candidate:
      • motivation
      • average grade

This information is used to consider whether the student concerned will be able to complete the Master's Programme successfully within the set time period.
The admission requirements have been formulated clearly and transparently so that candidates know in advance which requirements must be met in order to qualify for selection.

Art. 3.1 – Aim of the degree programmes

Graduates of the *Environmental Sciences* degree programme:

1. have advanced knowledge and understanding of the field of Environmental Sciences in its societal context
2. can apply knowledge and research methods, and have problem-solving abilities in broader contexts related to the field of *Environmental Sciences*
3. can conduct research in the field of *Environmental Sciences* in a creative and independent way
4. have professional and academic skills, in particular related to *Environmental Sciences*

5. can apply knowledge and understanding in such a way that they demonstrate a professional approach to their work
6. can communicate conclusions, as well as the knowledge, reasons and considerations underlying these conclusions, to an audience of specialists and non-specialists
7. can study and work independently and in a self-reflective way while exploring new areas of interest in the field of the programme or related fields

Sustainable Development

The programme aims:

- to enable integration of the knowledge needed to analyse, describe and explain sustainability issues (in terms of cause and effect) and place these issues in their societal context
- to apply knowledge integration in the generation, assessment and implementation of measures that make a transition to that sustainable society possible

Graduates can:

1. analyse the issue of sustainable development from both natural and social science perspectives
2. apply knowledge, research methods and problem-solving abilities in broad contexts related to sustainable development
3. design and carry out scientific research into sustainable development in a creative and independent way
4. draw up a well-founded critique on the scientific work of others and can engage in a scientific debate on the issue of sustainable development, based on specialised and broader academic knowledge as well as ethical considerations
5. apply knowledge and understanding in such a way that they demonstrate a professional approach to their work
6. communicate conclusions, as well as the knowledge, reasons and considerations underlying these conclusions, to an audience of specialists and non-specialists

Water Science and Management

The aim of this Master's programme is to combine knowledge of the physical water system and elements of classical (technical) water management with knowledge of ecological processes, innovation management and governance.

Graduates can:

1. analyse technical and societal issues, and the relationships between them, relevant to contemporary and future water management aimed at sustainable development
2. understand and perform basic calculations on natural and technical processes related to water quantity and water quality issues
3. design, carry out and report on scientific research on the issue of water management in a creative and independent way
4. engage in a scientific, social and administrative debate on the issue of water management
5. communicate on the issue of water management verbally and in writing to a wide audience of water specialists and non-specialists alike

Art. 3.6 – Composition of the programmes

1. Appendices 1 and 2 describe the required courses of the programmes including their course load.
2. Students may choose optional courses. The course load of the optional courses are listed in Appendices 1 and 2. The rules for choosing optional courses are listed in Appendix 4.
3. The requirements for the Annotation Sustainable Entrepreneurship and Innovation (only for SUSD) can be found in Appendix 5.
4. The prospectus gives a detailed description of the content and type of courses in the different programmes, including prior knowledge that is required to participate successfully.

Art. 4.2 – Entry requirements of courses

The Executive Board decides the order in which the required components of a Master's degree programme must be completed. This has been listed in Appendix 6.

Art. 4.7 – Evaluation of quality of the education

1. The Director of Education monitors the quality of education, and ensures that both the courses and the curriculum are evaluated. The Director takes into consideration the advice and suggestions given by the Education Committee regarding improving and ensuring the quality of the programme.
2. Students are informed of the outcomes of the course and curriculum evaluations.

Appendices

Appendix 1: Exam programme Sustainable Development (cohort 2022)

1. Compulsory components (75 EC)

-	Perspectives on Sustainable Development	7.5 EC
-	Systems thinking, Scenarios & Indicators for SD	7.5 EC
-	Research Design SD	7.5 EC
-	Consultancy Project SUSD and WSM	7.5 EC
-	Master's thesis	45 EC

2. Obligatory optional components (30 EC)

Environmental Change & Ecosystems (30 EC)

-	Global Environmental Change	7.5 EC
-	Environmental Systems Analysis	7.5 EC
-	Integrated Assessment of Climate Change	7.5 EC
-	Quantifying Ecosystem Resilience to Global Environmental Change	7.5 EC

Energy & Materials (30 EC)

-	Tools for Energy & Materials Analysis	7.5 EC
-	Energy Supply Technologies	7.5 EC
-	Policies for Energy and Materials Transitions	7.5 EC
-	Squaring the Circular Economy	7.5 EC

Earth System Governance (30 EC)

-	Foundations of ESG Research	7.5 EC
-	Governance Theories	7.5 EC
-	Research Strategies ESG	7.5 EC
-	Analysing Governance Practices	7.5 EC

International Development (30 EC)

-	Development Themes	7.5 EC
-	Natural Resources Management and Society	7.5 EC
-	Advanced Methods & Techniques for SD-ID	7.5 EC
-	Field Research Practical	7.5 EC

3. Other optional components (15 EC)

Students should select additional optional courses for 15 EC.

-	Environmental Change & Ecosystems	15 EC
-	Energy & Materials	15 EC
-	Earth System Governance	15 EC
-	International Development	15 EC

4. Conversion of former courses

Old course	***New course 2022-2023***
Research Project ECE (GEO4-2335)	Tailor-made course 15 EC (GEO4-2318)
Field Research Practical (GEO4-2336)	Tailor-made course 15 EC (GEO4-2318)
Advanced M&T Development Studies (GEO4-3518)	Advanced Methods & Techniques for SD-ID (GEO4-3521)

Appendix 2: Exam programme Water Science and Management (cohort 2022)

1. Compulsory components (67.5 EC)

-	Sustainable Water Resources Management	7.5 EC
-	Principles of Groundwater Flow	7.5 EC
-	Quantitative Water Management	7.5 EC
-	Research in WSM	7.5 EC
-	Water Quality Management	7.5 EC
-	Water, Governance and Law	7.5 EC
-	Drinking Water and Sanitation	7.5 EC
-	Consultancy Project SUSD and WSM	7.5 EC
-	Land Surface Hydrology	7.5 EC

2. Obligatory optional components (52.5 EC)

Choice 1 of 2:

-	Systems thinking, Scenarios & Indicators for SD	7.5 EC
-	Unsaturated Zone Hydrology	7.5 EC

Choice 1 of 2:

-	Master's thesis (30 EC) + other optional courses (15 EC)	45 EC
-	Extended Master's thesis	45 EC

3. Conversion of former courses

Not applicable in 2022-2023

Appendix 3 : Grade conversion tables Joint Programme

FROM GRAZ TO UTRECHT

Definition	GU	UU
Passed	≤4,0 Sehr gut Gut Befriedigend Genügend	Pass
Considerable further work is required, failed	> 4,0 Nicht genügend	Fail
Utrecht University transfers no specific grades but only pass/fail into their own system for credits acquired abroad.		

FROM LEIPZIG TO UTRECHT

Definition	LU	UU
Passed	≤4,0 Sehr gut Gut Befriedigend Ausreichend	Pass
Considerable further work is required, failed	> 4,0 Mangelhaft	Fail
Utrecht University transfers no specific grades but only pass/fail into their own system for credits acquired abroad.		

FROM CA' FOSCARI VENICE TO UTRECHT

Definition	CU	UU
Passed	18-30	Pass
Considerable further work is required, failed	< 18	Fail
Utrecht University transfers no specific grades but only pass/fail into their own system for credits acquired abroad.		

FROM BASEL TO UTRECHT

Definition	BU	UU
Passed	4,0-6,0	Pass
Considerable further work is required, failed	< 4,0	Fail
Utrecht University transfers no specific grades but only pass/fail into their own system for credits acquired abroad.		

FROM HIROSHIMA TO UTRECHT

Definition	HU	UU
Passed	S A B C	Pass
Considerable further work is required, failed	D	Fail
Utrecht University transfers no specific grades but only pass/fail into their own system for credits acquired abroad.		

FROM STELLENBOSCH TO UTRECHT

Definition	SU	UU
Passed	>=50%	Pass
Considerable further work is required, failed	<50%	Fail
Utrecht University transfers no specific grades but only pass/fail into their own system for credits acquired abroad.		

FROM TERI TO UTRECHT

Definition	TERI	UU
Passed	A+ A B+ B C+ C D	Pass
Considerable further work is required, failed	F	Fail
Utrecht University transfers no specific grades but only pass/fail into their own system for credits acquired abroad.		

Appendix 4: Rules for choosing elective courses

1. Students in the Master's programme choose elective courses from another or their own Master's programme. Courses that are obligatory in the exam programme cannot be used as elective courses.
2. Honours programmes for Master's students (e.g. Young Innovators, GHIS, Leadership Programme) do not count towards the electives in the programme.
3. Electives as mentioned in the student's academic progress review in Osiris are pre-approved by the track coordinator and by the Board of Examiners. Students can enrol for those courses via Osiris. It remains the student's responsibility to make sure that the points mentioned under 6 d-f are met. If the course is from another department than the Copernicus Institute, it may be that other students have priority and that they are therefore placed on a waiting list.
4. It is possible to choose other courses than the pre-approved courses mentioned in Osiris. Any non-pre-approved elective courses must be subjected in advance to the track coordinator and the Board of Examiners for approval. The track coordinator will advise the Board in this matter.
5. The application for a non-pre-approved elective is done by a written request (form) to the track coordinator. Written information on the content, the level, and the study load of the course (preferably by means of a copy of the course's description from the course catalogue) must be attached. The 'Application Form Elective courses Copernicus' can be found in the Blackboard communities Sustainable Development and Water Science and Management.
6. The track coordinator tests the proposed elective course(s) on the following criteria:
   a. It must be thematically linked to the Master's programme;
   b. It concerns a course at master level (M);
   c. There is no overlap in content with courses still to be taken or already taken.

   The student is responsible for making sure that:
   d. The course is available to students of the SUSD/WSM programme;
   e. The student fulfills the entrance requirements of the course (if applicable). Actual participation is only possible if students satisfy the course's entrance conditions; in case of doubt they should contact the course coordinator first;
   f. The course is not taught in the same period and timeslot as another course the student has selected.
7. If the track coordinator (SUSD) or programme leader (WSM) has declared that the elective course(s) meet the criteria under 6a-c (by either signing the application form or by email), the student sends the (signed) application form (and track coordinator's/programme leader's email if applicable) and the course information to the Board of Examiners (Boardofexaminers.geo@uu.nl). The Board of Examiners takes the final decision on whether or not the elective is approved.
8. In the programme's course schedule, room has been reserved for taking electives. However, the student is free to deviate from this planning, e.g. because she/he wishes to take an interesting elective course in another period. If this causes delay in the study planning, the responsibility is for account of the student! Students are therefore advised to take their electives in the reserved periods and timeslots, or use a part of the time planned for their internship and/or Master's thesis.

Appendix 5: Requirements for the Annotation Sustainable Entrepreneurship and Innovation (only for SUSD)

In order to qualify for the annotation, the following three requirements must be fulfilled:

1) having passed the examinations of one of these two courses:
- Innovation Management (GEO4-2268; 7,5 EC) with an assignment regarding a sustainability subject;

or:
- Sustainable Entrepreneurship (ECMSE; 7,5 EC).

2) having passed the examinations of one of these (elective) courses, which may not be the same course as the course passed for fulfillment of requirement 1 mentioned above:

- GEO4-2521: Bio-based Economy
- GEO4-2312: Energy Supply Technologies
- GEO4-2604: Governance and Change Management for Sustainability (not available in 2022/23)
- GEO4-2268: Innovation Management
- GEO4-5501: Techniques of Futuring

- ECMSE: Sustainable Entrepreneurship

3) having conducted a research project of at least 15 EC related to the subject of Sustainable Entrepreneurship & Innovation. This can only be achieved with the Master's Thesis (GEO4-2321; 30 EC) on a subject related to Sustainable Entrepreneurship & Innovation.

The requirements for the research component are:

- It is about newly developed or to be developed sustainable production processes, products, and/or services created by firms (within established firms and/or new start-ups);
- These activities need to be new to the current business activities of these firms;
- It needs to include some form of data collection about these new business activities.

Appendix 6: Entrance requirements 2022-23

Sustainable Development:

Course	***Entrance requirement****
Sustainable Food Systems (GEO4-2005)	Letter of acceptance of a Master's programme
Consultancy Project SUSD and WSM (GEO4-2008)	Letter of acceptance MSc Sustainable Development or MSc Water Science & Management. - At least 22,5 EC gained in the master SUSD or WSM, including Perspectives on Sustainable Development (GEO4-2301) or Sustainable Water Resources Management (GEO4-6008). - Only for cohort 2022
Innovation and International Development (GEO4-2009)	Letter of acceptance MSc Sustainable Development or MSc Innovation Sciences or MSc Sustainable Business & Innovation
Perspectives on Sustainable Development (GEO4-2301)	Letter of acceptance MSc Sustainable Development
Transdisciplinary Case Study (GEO4-2302)	- Letter of acceptance MSc Sustainable Development or MSc Water Science & Management. - At least 22,5 EC gained in the master's programme SUSD or WSM, including Perspectives on Sustainable Development (GEO4-2301) or Sustainable Water Resources Management (GEO4-6008). - Only for students cohort 2021 and earlier
Environmental Systems Analysis (GEO4-2303)	Recommended prerequisites: For students from other programmes: mathematics and modelling, level 1; e.g. Wiskunde & Systeemanalyse (GEO1-2202), please contact the coordinator before enrolment in Osiris.
Research Strategies ESG (GEO4-2304)	Letter of acceptance MSc Sustainable Development. Actively participated in Foundations of ESG Research (GEO4-2306) and Governance Theories (GEO4-2332) Recommended prerequisites: Basic research methodology skills. Knowledge of the main literatures on environmental governance.
International Governance for SD (GEO4-2305)	Letter of acceptance MSc Sustainable Development, or others with a policy related social science background. Actively participated in Foundations of ESG Research (GEO4-2306) or Governance Theories (GEO4-2332). Non-SUSD students should contact the course coordinator *before* registering for the course. Recommended prerequisites: Knowledge on policy analysis and governance theories.
Foundations of Earth System Governance Research (GEO4-2306)	Letter of acceptance MSc Sustainable Development or MSc Innovation Sciences or MSc Sustainable Business & Innovation or MSc Energy Science.
Global Environmental Change (GEO4-2310)	None
Policies for Energy & Materials Transitions (GEO4-2311)	Letter of acceptance MSc Sustainable Development or MSc Innovation Sciences or MSc

	Energy Science or MSc Sustainable Business & Innovation or MSc Earth Sciences. Recommended prerequisites: Tools for Energy & Materials Analysis(GEO4-2326)
Energy Supply Technologies (GEO4-2312)	Recommended prerequisites: Applied Thermodynamics (GEO2-2212), Energy Analysis (GEO3-2223) or Tools for Energy & Materials Analysis (GEO4-2326) or equivalent courses. ***This course is not available to Energy Science students.***
Research Design SD (GEO4-2314)	Letter of acceptance MSc Sustainable Development
Tailor-made course SUSD (GEO4-2320)	- Letter of acceptance MSc Sustainable Development, and - At least 45 EC passed within the programme Students in the SUSD-Joint Programme will need to have passed 45 EC, including one of the mobility tracks.
Master's Thesis SD (GEO4-2321)	- Letter of acceptance MSc Sustainable Development, and - At least 60 EC passed within the program, including: • Perspectives on SD (GEO4-2301) • Systems Thinking, Scenarios & Indicators (GEO4-2331) • Research Design SD (GEO4-2314) *And:* - at least two track-specific courses of which 1 methods course (at least 15 EC in total). These are specified per track: <u>For track E&M:</u> - Tools for E&M Analysis (GEO4-2326) And 1 out of 2: - Energy Supply Technologies (GEO4-2312) - Policies for E&M Transitions (GEO4-2311) <u>For track ECE:</u> - Environmental Systems Analysis (GEO4-2303), and - Global Environmental Change (GEO4-2310) <u>For track ESG:</u> - Research Strategies ESG (GEO4-2304) And 1 out of 2: - Foundations of ESG Research (GEO4-2306) - Governance theories (GEO4-2332) <u>For track ID:</u> - Advanced M&T Development Studies (GEO4-3518) And 1 out of 2: - Development Themes (GEO4-3510) - Development Theories (GEO4-3505) Students in the SUSD-Joint Programme will need to have passed 60 EC, including one of the mobility tracks.
Environmental Ethics & Sustainable Development (GEO4-2323)	None
Tools for Energy & Materials Analysis (GEO4-2326)	Recommended prerequisites: Energy Analysis (GEO3-2223) or similar course. ***This course is not available to Energy Science students.***

Analysing Governance Practices (GEO4-2328)	Letter of acceptance to the master programme Sustainable Development. Actively participated in Foundations of ESG Research (GEO4-2306) and Governance Theories (GEO4-2332)
Systems thinking, Scenarios & Indicators for SD (GEO4-2331)	Letter of acceptance MSc Sustainable Development or MSc Water Science and Management or profile Complex Systems. Recommended prerequisites: Perspectives on Sustainable Development (GEO4-2301), or Sustainable Water Resources Management (GEO4-6008)
Governance Theories (GEO4-2332)	Letter of acceptance MSc Sustainable Development or MSc Innovation Sciences or MSc Sustainable Business & Innovation.
Squaring the Circular Economy (GEO4-2338)	Letter of acceptance MSc Sustainable Development or MSc Innovation Sciences or MSc Sustainable Business & Innovation or MSc Energy Science or MSc Water Science and Management. Recommended prerequisites: Basic background in natural sciences.
Natural Resources Management and Society (GEO4-2339)	Letter of acceptance MSc Sustainable Development or MSc Environmental Biology
Integrated Assessment of Climate Change (GEO4-2340)	Letter of acceptance MSc Sustainable Development
Quantifying Ecosystem Resilience to Global Environmental Change (GEO4-2341)	Letter of acceptance MSc Sustainable Development Recommended prerequisite: Passed Global Environmental Change (GEO4-2310)
Field Research Practical (GEO4-2342)	- Letter of acceptance MSc Sustainable Development. - Advanced M&T Development Studies (GEO4-3518) - Development Theories (GEO4-3505), or Development Themes (GEO4-3510)
Development Themes (GEO4-3510)	Letter of acceptance MSc International Development Studies or MSc Sustainable Development. Exclusively for IDS master students & students in the Sustainable Development - ID track.
Advanced Methods & Techniques for SD-ID (GEO4-3521)	Letter of acceptance MSc Sustainable Development
Techniques of Futuring (GEO4-5501)	None

* For students in the Joint International Master in Sustainable Development programme, admission to courses will be judged on an individual basis, based on previous education and interests.

Water Science and Management:

Course	***Entrance requirement***
Principles of Ground Water Flow (GEO4-1434)	- Letter of acceptance MSc Earth Sciences or MSc Water Science and Management. - BSc or equivalent in Earth Sciences, Applied Sciences, or related fields. - basic knowledge of physics, calculus, ordinary and partial differential equations. Recommended prerequisites: - basic knowledge of hydrology, introductory geology and/or environmental sciences.
Sustainable Food Systems (GEO4-2005)	Letter of acceptance of a Master's programme
Consultancy Project SUSD and WSM (GEO4-2008)	Letter of acceptance MSc Sustainable Development or MSc Water Science & Management. - At least 22,5 EC gained in the master SUSD or WSM, including Perspectives on Sustainable Development (GEO4-2301) or Sustainable Water Resources Management (GEO4-6008). - Only for cohort 2022

Transdisciplinary Case Study (GEO4-2302)	- Letter of acceptance MSc Sustainable Development or MSc Water Science & Management. - At least 22,5 EC gained in the master SUSD or WSM, including Perspectives on Sustainable Development (GEO4-2301) or Sustainable Water Resources Management (GEO4-6008). - Only for cohort 2021 and earlier
Systems thinking, Scenarios & Indicators for SD (GEO4-2331)	Letter of acceptance MSc Sustainable Development or MSc Water Science and Management. Recommended prerequisite: Perspectives on Sustainable Development (GEO4-2301), or Sustainable Water Resources Management (GEO4-6008)
Land Surface Hydrology (GEO4-4404)	Letter of acceptance MSc Earth Sciences or MSc Water Science and Management. Recommended prerequisites: Basic knowledge of quantitative analysis, including statistics, mathematics (differentiation, integration) and physics (mechanics).
Unsaturated Zone Hydrology (GEO4-4417)	Letter of acceptance MSc Earth Sciences or MSc Water Science and Management. Recommended prerequisites: - Knowledge of groundwater hydrology: GEO2-4203 Physical hydrology or GEO4-1434 Principles of groundwater flow (or equivalent); - basic physics/mathematics skills.
Quantitative Water Management (GEO4-6001)	Letter of acceptance of a Master's programme. Recommended prerequisites: - A bachelor level natural sciences background. - One or more of the following courses: GEO2-4203 Physical Hydrology; GEO3-4307: Fluid mechanics 1; GEO4-1434 Principles of groundwater flow. Students without a natural science Bachelor's degree should contact the course coordinator *before* registering for the course.
Water, Governance and Law (GEO4-6002)	Letter of acceptance of a Master's programme.
Drinking Water and Sanitation (GEO4-6003)	Letter of acceptance MSc Water Science and Management.
Master's thesis (Internship) (GEO4-6004; GEO4-6006)	Letter of acceptance MSc Water Science and Management. At least 60 EC passed within the programme.
Tailor made course WSM (GEO4-6005)	Letter of acceptance MSc Water Science and Management. At least 45 EC passed within the WSM programme.
Water Quality Management (GEO4-6007)	Letter of acceptance of a Master's programme. Recommended prerequisite: Basic knowledge of chemistry at 1st year bachelor level
Sustainable Water Resources Management (GEO4-6008)	Letter of acceptance MSc Water Science and Management or MSc Sustainable Business and Innovation or MSc Innovation Sciences or MSc Energy Science or MSc Sustainable Development or MSc Earth Sciences or MSc Physical Geography.
Research in WSM (GEO4-6009)	Letter of acceptance MSc Water Science and Management.
Techniques of Futuring (GEO4-5501)	None