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# **Master's Programme in Transdisciplinary Studies of Climate, Environment, and Energy**

**Student Handbook - Study Track 4: Environmental  
Chemistry and Toxicology**

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## Glossary

**Admission to the Programme:** The formal process by which a student is officially accepted into the Programme after meeting the required academic qualifications, submitting necessary documents, and fulfilling any additional criteria set by the institutions involved. Admission is confirmed through an official notification from the university with the issuing of an Acceptance Letter.

**Programme board:** The main decision-making body for the Programme.

**Cohort:** The group of students admitted and enrolled in the Programme in one intake. The cohort 2026 applies to all students admitted and enrolled in the programme starting in 2026.

**Curriculum:** The elements that make up a degree programme, including the structure, the content to be covered, intended learning outcomes, teaching, examination and assessment methods.

**Degree:** The academic qualification awarded by a university upon successful completion of the Programme. The degree certifies that the student has met all academic requirements, including coursework, research, final assessments and is officially recognised as having attained a specific level of expertise in their field of study defined by the intended learning outcomes of the Programme.

**Degree Type:** The type of master's degree (Master of Arts, Master of Science, International Master etc.) and the level of qualification it confers.

**Diploma:** The document/parchment presented to the student after successful completion of the programme according to the practices and regulations of the awarding university/-ies.

**Diploma Supplement:** The document that accompanies the diploma and provides the details of the academic programme and academic achievements.

**European Credit Transfer and Accumulation System (ECTS):** A standardised system used in European higher education to measure and compare students' workload and learning outcomes. One ECTS credit typically corresponds to 25–30 hours of study.

**Issuing partner university:** The university that issues the diploma.

**Joint Degree:** A single degree jointly awarded by universities to a student upon successful completion of a joint programme.

**Multiple Degree:** Separate degrees awarded by higher education institutions offering the joint programme attesting the successful completion of this programme.

**Participation cost:** The financial charges levied on students for their enrolment in the Programme.

**Partner university:** The university that awards a degree, as applicable with reference to the relevant format of awarded degree (joint, double or multiple).

**Transcript of records:** The official record or breakdown of a student's progress and achievements.

## 1 The programme

The master's programme in Transdisciplinary Studies of Climate, Environment, and Energy (TRACEE) is a collaborative initiative designed within the CIVIS Alliance. This innovative master's programme aims to equip students with transdisciplinary expertise to address the complex challenges of our time, focusing on climate, environment, and energy. It features an integrated curriculum co-created by scholars from CIVIS member universities that promote diverse academic perspectives across Europe and Africa. The vision, target group of students and intended learning outcomes are presented hereafter.

### 1.1 Vision

The vision which forms the foundation for this programme is for students with a solid disciplinary background in natural sciences, social sciences, law, or humanities to become transdisciplinary graduates capable of tackling the world's most pressing challenges—climate change, energy transitions, and environmental crises.

### 1.2 Target group of students

This programme is intended for students who are seeking (a) a career working at a local, regional, national, European or even global level on the ongoing societal transformation (e.g., as expressed by the European Green Deal), or (b) a future in transdisciplinary research focusing on climate, environment and/or energy.

### 1.3 Intended learning outcomes of the programme

The intended learning outcomes of the programme are listed below. They are complemented by additional learning goals in each study track, which are presented in the respective annex for each study track.

#### Knowledge and understanding

- Demonstrate knowledge and understanding in Transdisciplinary Environmental Science, including both broad knowledge of the field and a considerable degree of specialised knowledge applied in the field of each study track and its transdisciplinary applications.
- Demonstrate insight into current research and development work within the specialised field of the study track and its transdisciplinary applications.
- Demonstrate methodological knowledge from the humanities, law, social sciences, and natural sciences applied to and relevant for Transdisciplinary Environmental Science.
- Demonstrate knowledge to use systems thinking as a framework for analysing climate, environment, and energy issues from perspectives of natural sciences, social sciences, law, and humanities, and transdisciplinarity.

#### Competence and skills

- Demonstrate the ability to critically and systematically integrate knowledge and to analyse, assess and deal with complex phenomena, issues and situations from perspectives of natural sciences, social sciences, law, and humanities, even with limited information.
- Demonstrate the ability to critically, independently, and creatively identify and formulate questions, to plan and carry out qualified tasks within given time frames using appropriately chosen methods, thereby contributing to the development of knowledge, and to evaluate one's own work.
- Demonstrate the ability to clearly present and discuss, both orally and in writing, conclusions and the knowledge and arguments underlying them in dialogue with various groups, in both national and international contexts.

- Demonstrate the skills required to participate in research and development work, or to work independently in other professional areas.

#### Judgement and approach

- Demonstrate the ability to make assessments in Transdisciplinary Environmental Science informed by relevant interdisciplinary, societal and ethical issues and to demonstrate awareness of ethical aspects of research and development work.
- Demonstrate insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used.
- Demonstrate the ability to identify the personal need for further knowledge and take responsibility for their ongoing learning.

## 2 Programme structure overview

The TRACEE Master is delivered through the collaboration of 11 universities within the CIVIS Alliance where the credits of the master's programme are distributed according to the student's selected study path and integrated mobility.

### 2.1 Partner Universities

The programme results from a collaborative design within the CIVIS Alliance including the partners below and their respective acronym that will be used hereafter in the student handbook:

- Aix-Marseille Université (AMU), France
- National and Kapodistrian University of Athens (NKUA), Greece
- Université libre de Bruxelles (ULB), Belgium
- University of Bucharest (UB), Romania
- University of Glasgow (UofG), Scotland
- Université de Lausanne (UNIL), Switzerland
- Universidad Autónoma de Madrid (UAM), Spain
- Sapienza – Università di Roma (SUR), Italy
- Paris-Lodron-Universität Salzburg (PLUS), Austria
- Stockholm University (SU), Sweden
- Eberhard Karls Universität Tübingen (UT), Germany

The CIVIS Alliance has six associate partners from African countries, these are: Makerere University in Uganda, Eduardo Mondlane University in Mozambique, Université Hassan II de Casablanca in Morocco, University of Sfax in Tunisia, Université Cheikh Anta Diop de Dakar in Senegal, and University of the Witwatersrand in South Africa. The six African partners may be involved in parts of the delivery of certain courses of the TRACEE master.

### 2.2 Distribution of the credits of the programme

The programme spans two academic years, structured into four semesters, each worth 30 credits, for a total of 120 credits in the European Credit Transfer and Accumulation System (ECTS).

The credits (ECTS) are distributed as follows:

- **The First Semester:** A Common Core (30 ECTS): The first semester is common to all students across the programme and takes place at Stockholm University. It consists of one mandatory course, co-created and co-delivered by teachers and scholars from across the CIVIS Alliance in Europe and Africa.
- **The Second and Third Semesters:** The Study Track (60 ECTS): After the first semester, students follow one of nine study tracks. Mobility paths are predefined for each study

track, specifying the partner universities where students will study during these semesters.

- **The Fourth Semester:** The master's thesis project (30 ECTS): The final semester is dedicated to a mandatory independent master's thesis project in transdisciplinary studies of climate, environment and energy. It is carried out at one of the CIVIS universities offering the selected study track.
- **The transdisciplinary stream:** The stream runs through the entire Programme. It is extra-curricular, meaning that credits are not awarded for participating in the stream. The stream aims at enhancing students' understanding of transdisciplinarity, maintains the coherence of the Programme and keeps the cohort of students connected throughout the entire duration of the programme, and provides preparation and support for the master's thesis project.

### 2.3 Mobility paths

Students select a specific study track upon application to the Programme and are required to complete their studies and to complete at least two mobilities to countries other than the student's country of residence at enrolment. Thus, mobility is an integral part of the Programme.

The table below illustrates the structure of the programme, including the specific mobility paths for each of the nine study tracks.

\* For students selecting the study track 3 or 4 (ST3 and ST4), including Stockholm University (SU) in the study track, the country for Semester 4 (registration to the master's thesis project) must represent a second mobility in relation to the country of residence of the student at enrolment stage.

- Students in ST3 or ST4 residing in Sweden at the time of the application should be admitted to the University of Bucharest (UB) in Semester 4.
- Students in ST3 residing in Spain at the time of the application should be admitted to the University of Bucharest (UB) in Semester 4.
- Students in ST4 residing in Germany at the time of the application should be admitted to the University of Bucharest (UB) in Semester 4.
- Students in ST3 residing elsewhere in the world (outside Sweden or Spain) can register either at Stockholm University (SU), the Autonomous University of Madrid (UAM) or the University of Bucharest (UB) in Semester 4.
- Students in ST4 residing elsewhere in the world (outside Sweden or Germany) can register either at Stockholm University (SU), the Eberhard Karls University of Tübingen (UT) or the University of Bucharest (UB) in Semester 4.



| Study tracks                                        | Semester 1               | Semester 2  | Semester 3 | Semester 4              |
|-----------------------------------------------------|--------------------------|-------------|------------|-------------------------|
| ST1: Environmental Humanities and Law               | SU                       | PLUS        | UB         | SU or PLUS or UB        |
| ST2: Environmental Social Sciences                  |                          | UofG        | UB         | SU or UofG or UB        |
| ST3: Energy and Matter                              |                          | UAM         | SU         | SU* or UB               |
| ST4: Environmental Chemistry and Toxicology         |                          | SU          | UT         | SU* or UT* or UB        |
| ST5: Environmental Geoscience                       |                          | UofG        | AMU        | SU or UofG or AMU       |
| ST6: Climate Change Science                         |                          | NKUA        | UT         | SU or NKUA or UT        |
| ST7: Environmental Risk and Mitigation              |                          | UNIL        | SUR        | SU or UNIL or SUR       |
| ST8: Transdisciplinary Approaches to Climate Change |                          | PLUS        | ULB        | ULB                     |
| ST9: Global Change Biology                          |                          | SUR         | AMU        | SU or SUR or AMU        |
|                                                     | Common Core              | Study Track |            | Master's thesis project |
|                                                     | Transdisciplinary stream |             |            |                         |

\* For ST3, students residing in Sweden or Spain at enrolment should be admitted to UB for Semester 4. Other students may be allocated to SU or UB, subject to the thesis allocation procedure and final approval.

### 3 Programme content overview

The programme content overview provides a description for each semester and the transdisciplinary stream that runs through the entire programme. Complementary information for each study track is available in the respective annexes.

#### 3.1 The first semester – The common core

The programme begins with a common semester for the programme. It consists of one single mandatory 30 ECTS course, Climate, Environment, and Energy – a Transdisciplinary Perspective. The course will be hosted by the Department of Environmental Science at Stockholm University. It is co-created and co-taught by educators from across the CIVIS Alliance in Europe and Africa. This course consists of five modules. The first module (Systems Thinking) uses the concept of systems to set the stage for interdisciplinary learning. The second, third and fourth modules examine climate, environment and energy from natural science, social science and humanities perspectives. The fifth module (Creating Knowledge Through Transdisciplinary Methods) introduces transdisciplinary learning. The learning goals for each of these parts are as follows:

##### Part 1. Systems Thinking, 3 ECTS

- Discuss systems thinking and its history, central system concepts, as well as types of systems and their properties.

##### Part 2. Climate, Environment, and Energy - A Natural Science Perspective, 9 ECTS

- Describe energy and matter and their transfer within the Earth's system, as well as solutions for future energy supply.
- Describe global biogeochemical cycles, ecosystem services, and biodiversity, as well as the risks they face due to global environmental changes.
- Explain the climate system, drivers and feedback mechanisms, as well as Earth's past, present, and future climate.

### Part 3. Climate, Environment, and Energy - A Social Science Perspective, 9 ECTS

- Describe past, present, and future economics, politics, and policies on energy systems, environment, and climate change.
- Discuss the international, European, and national legal framework for climate, environmental, and energy policies and the transition.
- Discuss knowledge, behaviour and action in relation to climate change, as well as the role of communication and education in addressing environmental and climate challenges.

### Part 4. Climate, Environment, and Energy - A Humanities Perspective, 6 ECTS

- Discuss historical, literary, aesthetic, and philosophical aspects of environmental thinking and address concerns about climate and the environment.
- Analyse sociocultural paradigms and rhetorical strategies in climate and environmental communication.

### Part 5. Creating Knowledge Through Transdisciplinary Methods, 3 ECTS

- Describe methods for involving society in different cultural contexts for knowledge generation and case studies of transdisciplinary research.

## 3.2 The second and third semester – The Study Track

The second and third semester are the disciplinary or transdisciplinary study tracks selected by the students, reflecting their different backgrounds.

| Study track                                                 | Semester 2 | Semester 3 |
|-------------------------------------------------------------|------------|------------|
| ST1: Environmental Humanities and Law                       | PLUS       | UB         |
| ST2: Environmental Social Sciences                          | UofG       | UB         |
| ST3: Energy and Matter                                      | UAM        | SU         |
| ST4: Environmental Chemistry and Toxicology                 | SU         | UT         |
| ST5: Environmental Geoscience                               | UofG       | AMU        |
| ST6: Climate Change Science                                 | NKUA       | UT         |
| ST7: Environmental Risk and Mitigation                      | UNIL       | SUR        |
| ST8: Transdisciplinary Approaches to Climate Change Studies | PLUS       | ULB        |
| ST9: Global Change Biology                                  | SUR        | AMU        |

### 3.2.1 Study Track 1: Environmental Humanities and Law

The study track Environmental Humanities and Law provides students with in-depth knowledge of the disciplines involved in the development of profound, lasting, and sustainable solutions to climate change, energy transition and environmental problems. Students will study various disciplines that inform the development, adoption, and implementation of mitigation and adaptation measures to climate change, energy transition, and environmental issues that meet the political, economic, legal, societal, ethical and communication challenges and must be taken into account for developing lasting and sustainable solutions. At the end of the study track, students will have obtained knowledge on the perspectives from different disciplines that facilitate dialogue with and understanding of the positions of the different stakeholders. Students will have acquired skills to develop and implement solutions to the problems that climate change, energy transition, and environmental degradation pose to societies.

The intended learning outcomes and the details of the curriculum are available in the annexe dedicated to the study track 1.

### **3.2.2 Study Track 2: Environmental Social Sciences**

The study track Environmental Social Sciences provide an in-depth understanding of the intricacies of the socio-ecological transformations, many of which are related to climate change, in a globalised world. Students will acquire the theoretical approach to socio and physical science research, together with a series of specific skills to tackle the environmental and societal challenges of sustainable development in the Anthropocene. The students will have the great opportunity to develop practical experiences in the compulsory placement course, working in governmental bodies, activist and community sectors. The research-led teaching that both Universities offer will prepare the students to confidently use the sociological lens to understand and investigate climate change and socio-ecological transformations and to envision sustainable and effective solutions for local, regional and global communities.

The intended learning outcomes and the details of the curriculum are available in the annexe dedicated to the study track 2.

### **3.2.3 Study Track 3: Energy and Matter**

The study track Energy and Matter equips students with advanced expertise in sustainable energy storage, conversion, and chemistry applications essential for renewable energy systems. Through modules energy conversion, storage and sustainable chemistry, students develop the technical and theoretical skills needed to innovate within the fields of energy storage, clean energy production, and environmentally focused chemistry. This track aims to prepare students for innovative roles in renewable energy systems by equipping them with both the technical skills and practical experience necessary to address energy challenges across various sectors.

The intended learning outcomes and the details of the curriculum are available in the annexe dedicated to the study track 3.

### **3.2.4 Study Track 4: Environmental Chemistry and Toxicology**

The study track Environmental Chemistry and Toxicology is focusing on the evaluation and solution of problems in the environment related to chemicals. Apart from theoretical studies, this study track also involves laboratory training in both chemistry and toxicology as well as field work where students will be trained in relevant sampling techniques. The Study Track aims for a comprehensive understanding of the linkages between physical, chemical, and biological process mechanisms. Students from various science backgrounds will learn to qualitatively and quantitatively address complex processes in soils, water and air as well as in organisms. In addition, students will address the ethical, legal, and regulatory frameworks governing environmental protection, chemical safety, and toxicology and to evaluate environmental risks based on multi-disciplinary approaches.

The intended learning outcomes and the details of the curriculum are available in the annexe dedicated to the study track 4.

### **3.2.5 Study Track 5: Environmental Geoscience**

The study track Environmental Geoscience combines the study of the fundamentals and applied aspects of geoscience to develop skills required to implement sustainable environmental solutions to global challenges. Using a variety of pedagogical approaches, all driven by the most up-to-date research in the field of environmental sustainability, the programme will provide students with a command of the relevant scientific knowledge, digital tools and innovative technologies to empower them to develop solutions to environmental

challenges. The students will have the opportunity to tailor their studies to their specific needs and aspiration, including an in-depth knowledge of techniques used to investigate, monitor and predict, using numerical modelling, environmental hazards and risks. This programme is particularly suitable for students that are interested the most up-to-date science and technology to solve geo-environmental problems for their future career and/or for further studies. It aims to develop the ability to understand and address environmental changes through a solid scientific foundation, adaptive strategies, transdisciplinary research, and technological skills, fostering a just transition and societal resilience.

The intended learning outcomes and the details of the curriculum are available in the annexe dedicated to the study track 5.

### **3.2.6 Study Track 6: Climate Change Science**

The study track Climate Change Science lets the student acquire a comprehensive understanding of the climate system, including past and present climate variability as well as ongoing climate change. They will gain focussed knowledge about how climate is studied using remote sensing atmospheric and climate science and geophysics, ecosystem responses and feedback, as well as vegetation and soils in the climate system. Extending beyond the natural sciences, students will learn about sustainability in its broader sense (including renewable energies), and about climate policies. Students will apply the multi-disciplinary skills they have learned about in the study track by conducting a research internship project in climate science.

The intended learning outcomes and the details of the curriculum are available in the annexe dedicated to the study track 6.

### **3.2.7 Study Track 7: Environmental Risk and Mitigation**

The study track in Environmental Risk and Mitigation provides a deep understanding of processes involved in Mountain and oceanic environments which are related to environmental hazard. Students will acquire advanced experience in field and laboratory methods and practice as well as theoretical approach to assess natural hazards, from the study of physical and chemical processes through to their management, via the quantification of their probability of occurrence in different conditions. The students will have the opportunity to develop theoretical understanding and practical experience in data acquisition, mapping analysis, modelling, monitoring methods, estimation of natural hazard and risk, its management warning systems development and evaluation of strategies for risk reduction.

The intended learning outcomes and the details of the curriculum are available in the annexe dedicated to the study track 7.

### **3.2.8 Study Track 8: Transdisciplinary Approaches to Climate Change**

The study track Transdisciplinary Approaches to Climate Change provides students with in-depth understanding of underlying scientific issues as well as societal needs to develop climate warming solutions. Students will be introduced to various disciplines that inform the development, adoption and implementation of solutions to the problems posed by climate change, energy transition and environmental issues, based on the transdisciplinary knowledge on climate, energy and environment obtained in the first semester.

The intended learning outcomes and the details of the curriculum are available in the annexe dedicated to the study track 8.

### **3.2.9 Study Track 9: Global Change Biology**

The study track in Global Change Biology equips students with a deep understanding of biodiversity, ecological interactions, and the impacts of global change on ecosystems. This

track combines scientific theory with practical, field-based skills, preparing students to address complex environmental challenges using cutting-edge methods in biodiversity conservation and ecological analysis. The study track provides students with a well-rounded skill set in ecological research, statistical modelling, and project management, blending rigorous scientific training with hands-on experience.

The intended learning outcomes and the details of the curriculum are available in the annexe dedicated to the study track 9.

### 3.3 The fourth semester: The Master's thesis project

Each study track includes an obligatory 30 ECTS independent thesis in transdisciplinary studies of climate, environment and energy at a university within the CIVIS Alliance. This is offered as a single course or a combination of courses in accordance with university-specific regulations. Depending on the study track, the master's thesis project must be registered at a specific university within the Alliance, as described in the table below.

Students in each study track will be asked to indicate their preferred university for completing the fourth semester; however, placement at the preferred university cannot be guaranteed. The final decision will be made by the Programme Board.

| Study track                                                | Semester 4        |
|------------------------------------------------------------|-------------------|
| ST1: Environmental Humanities and Law                      | SU or PLUS or UB  |
| ST2: Environmental Social Sciences                         | SU or UofG or UB  |
| ST3: Energy and Matter                                     | SU* or UAM* or UB |
| <b>ST4: Environmental Chemistry and Toxicology</b>         | SU or UT or UB    |
| <b>ST5: Environmental Geoscience</b>                       | SU or UofG or AMU |
| <b>ST6: Climate Change Science</b>                         | SU or NKUA or UT  |
| <b>ST7: Environmental Risk and Mitigation</b>              | SU or UNIL or SUR |
| <b>ST8: Transdisciplinary Approaches to Climate Change</b> | ULB               |
| <b>ST9: Global Change Biology</b>                          | SU or SUR or AMU  |

\* see mobility paths

The student must have received all credits from the first semester (30 ECTS) and a total of 30 ECTS from semester two and three as a balanced requirement to be registered for a master's thesis project.

The learning goals for the thesis are as follows:

- Plan a transdisciplinary project
- Carry out, document, and complete a transdisciplinary project within the allotted time
- Demonstrate experimental, field-based, or theoretical skills
- Evaluate, analyse, and draw conclusions from obtained results
- Read and comprehend primary literature in natural, social, and human sciences related to climate, environment, and/or energy, and apply necessary theories to the project
- Conduct goal-related, transdisciplinary literature reviews
- Compile and write a scientific report corresponding to the project's scope
- Communicate the project's results in a popular scientific format

### 3.4 The transdisciplinary stream

The stream will engage students in learning about transdisciplinarity, including its definitions and methods, while also providing support and checkpoints for developing independent projects. It will be offered on site during the first semester in Stockholm, and thereafter online.

The main purpose will be to provide students with the knowledge, understanding and skills required to undertake a transdisciplinary thesis in semester 4. Secondary aims include maintaining connection and support networks within the student cohort and providing an overall coherence to the master's programme.

The stream will consist of remote monthly meetings, each lasting 1.5 hours. These sessions will include a combination of guest lectures, discussion panels, networking sessions and student presentations. Guest speakers will be invited from a range of fields and sectors, with the aim being to demonstrate the importance of transdisciplinary thinking in different environments.

The sessions will evolve throughout the programme, with a slightly different focus in each semester. In the first semester, concepts will be introduced and students exposed to a range of ideas from guest speakers. During the second and third semesters, students will begin to select topics for their thesis projects, and the sessions will focus more strongly on helping them to develop their own ideas, forge connections with useful contacts, and establish how they can demonstrate transdisciplinarity in their own project. In the final semester, sessions will be almost entirely student-led, allowing them the opportunity to support one another while carrying out their projects.

## 4 Application and Admission

Stockholm University is coordinating the application to the TRACEE programme including the platform used for admission and the transfers related to participation cost and financial aid. The selection of the students receiving financial aid and admitted to the programme is made within the consortium via the Application and Scholarship Selection Committee (ASSC).

### 4.1 Admission Requirements and selection

The programme is open to students with a bachelor's degree in any discipline. This sets the entry requirements for the programme itself and for obligatory courses within the programme. The entry requirements for some elective semesters are discipline specific.

#### 4.1.1 General Eligibility Criteria

##### Bachelor's degree

Academic qualifications from an internationally recognised university equivalent to a bachelor's degree.

Students in their final year of bachelor's studies can meet the requirement if they follow the instructions from University Admissions.

Find out what you need to submit here:

<https://www.universityadmissions.se/en/apply-to-masters/provide-application-documents-masters/find-out-what-you-need-to-submit/>

##### English proficiency

English proficiency equivalent to level B2 on the CEFR scale (Common European Framework of Reference for Languages).



Requirements can be met with an English test, for example an overall IELTS score of 6.5 or a TOEFL score of 90. Depending on the country of previous studies, the requirement can be completed during upper secondary or university studies.

University Admissions have specific information for each country and the test score requirements: <https://www.universityadmissions.se/en/entry-requirements/english-language-requirements/>

#### 4.1.2 Specific Eligibility Criteria

Admission requirements for each study track are as follows:

| Study track                                                | Entry requirement                                                                                                                                                          |
|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ST1: Environmental Humanities and Law</b>               | A Bachelor's degree or equivalent in any discipline (general requirement).                                                                                                 |
| <b>ST2: Environmental Social Sciences</b>                  | A Bachelor's degree within Social Sciences or equivalent                                                                                                                   |
| <b>ST3: Energy and Matter</b>                              | A Bachelor's degree within Natural Science, Engineering or equivalent including at least 30 ECTS in Chemistry and Spanish B2                                               |
| <b>ST4: Environmental Chemistry and Toxicology</b>         | A Bachelor's degree within Natural Science, Engineering or equivalent including at least 15 ECTS in Chemistry, 6 ECTS in Geology, and 15 ECTS in Mathematics or Statistics |
| <b>ST5: Environmental Geoscience</b>                       | A Bachelor's degree within Earth Sciences, Geography or Environmental Sciences or equivalent                                                                               |
| <b>ST6: Climate Change Science</b>                         | A Bachelor's degree within Natural Science, Engineering or equivalent including at least 6 ECTS in Physics, 6 ECTS in Geology, 6 ECTS Mathematics or Statistics            |
| <b>ST7: Environmental Risk and Mitigation</b>              | A Bachelor's degree within Natural Science or equivalent                                                                                                                   |
| <b>ST8: Transdisciplinary Approaches to Climate Change</b> | A Bachelor's degree or equivalent within any discipline (general requirement)                                                                                              |
| <b>ST9: Global Change Biology</b>                          | A Bachelor's degree within Natural Science or equivalent                                                                                                                   |

## 4.2 Application fee

An application fee must be paid for individuals who are not citizens of countries of EU/EEA or Switzerland. The application fee is 900 SEK (Swedish kronor) and is paid directly to University Admissions in Sweden to have the application processed. Students pay one application fee for each intake semester they submit an application for in this system. Meaning that it doesn't matter how many courses, study tracks or programmes the student applied for that intake. If an eligible student was not admitted and decide to apply once again for another intake, the application fee should be paid again.

More information on the application fee criteria is available on the [universityadmissions.se](https://www.universityadmissions.se) webpage.

<https://www.universityadmissions.se/en/fees-scholarships-residence-permit/who-is-required-to-pay-fees/>

## 4.3 Participation Cost, mobility grant and other funding

TRACEE has a single participation cost, paid per semester, which is independent of the chosen study track. The full programme participation cost is €9,000 for students from the EU/EEA/Switzerland and €18,000 for students from outside the EU/EEA/Switzerland. This corresponds to €2,250 per semester for EU/EEA/Switzerland students and €4,500 per semester for non-EU/EEA/Switzerland students.

The participation cost covers compulsory academic activities, tuition/registration at the partner universities, student services related to the programme, and insurance arranged for the programme. It does not cover living expenses, accommodation, travel, visa or residence-permit costs, food, or other personal expenses. However, some additional costs may apply, depending on the study track, host university, country, or planned activities. Students should therefore check the study-track-specific information and follow the instructions provided by the relevant partner university.

Stockholm University collects the participation cost on behalf of the TRACEE consortium and transfers the relevant parts to the partner universities. Questions about payment of the participation cost should be addressed to the TRACEE coordination at Stockholm University.

Students are responsible for covering the costs connected to programme mobility, including travel and living costs in each host country. Eligible students can apply for an Erasmus+ student mobility grant during the first semester. The Erasmus+ mobility grant is intended to contribute to additional costs during mobility abroad and does not cover the full cost of participation, housing, travel, or living expenses.

The TRACEE programme currently does not offer tuition waivers or fully funded scholarships. Students may be eligible to apply for Erasmus+ mobility support for mobility periods outside Sweden, normally during semesters 2 and 3, but this grant does not cover the full participation cost, housing, travel, or living expenses. Students should therefore plan their finances carefully and are encouraged to explore external scholarships and funding opportunities.

<https://www.su.se/english/education/how-to-apply/costs-fees-and-scholarships/scholarships>

#### **4.4 Application period**

Cohort-specific application dates are published on the official Stockholm University programme page. Applicants should check the current application period, document deadlines, and any payment deadlines that apply to their cohort.

#### **4.5 Documents required for the application**

The documents required for the application are:

- Transcript of records (in English)
- Diplomas or certificates of completed degrees.
- Curriculum Vitae
- Proof of English proficiency
- Scanned copy of ID or Passport
- Online application supplement (motivation letter)

#### **4.6 Admission procedure**

The admission procedure is managed by Stockholm University as the coordinating university for the master's programme in Transdisciplinary Studies in Climate, Energy and Environment.

Universityadmissions.se is the system that is used for admissions to higher education in Sweden and selected for the admission procedure of this programme. It is managed by the Swedish Council for Higher Education (UHR).

UHR manages the admissions process together with Stockholm University and is responsible for:



- The website Universityadmissions.se provided for the application
- Registering admissions documents submitted by students as part of their admissions application, such as transcripts and English test scores
- Reviewing applications to see that students meet general entry requirements
- Answering questions that students have about the admissions process
- Notifying students of their selection results in the courses and programmes they've applied for here at Universityadmissions.se

Students will be provided with the information and procedure to appeal decisions made regarding eligibility. The Higher Education Appeals Board (Överklagandenämnden) is the Swedish government agency that reviews appeals of specific types of decisions made by universities during the admissions process.

The evaluation criteria to rank the students is based on grades from the bachelor studies and the letter of motivation in the application with a proportion of 50:50.

The admission procedure is as follows:

| Step                                   | Step description                                                                                                                      | Responsibility                       |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| <b>1: Regulation</b>                   | Activate admission system/platform set evaluation criteria                                                                            | Programme board                      |
| <b>2: Application</b>                  | Application through Universityadmissions.se                                                                                           | SU                                   |
| <b>3: General eligibility control</b>  | Document verification and validation, followed by first screening of general eligibility                                              | SU                                   |
| <b>4: Specific eligibility control</b> | Students passing the first step can be evaluated for specific eligibility                                                             | PU within a track                    |
| <b>5: Ranking</b>                      | Ranking of students according to evaluation criteria                                                                                  | PU within a track                    |
| <b>6: Selection</b>                    | Number of students per study track set and communicated to SU                                                                         | The board after suggestion from ASSC |
| <b>7: Payment</b>                      | The selected students must proceed with participation cost payment followed by transfer to course crediting platform for registration | SU                                   |
| <b>8: Admission</b>                    | Info to partners in each Study track and admission                                                                                    | SU                                   |

## 4.7 Student agreement

Before starting the programme, each student and the TRACEE consortium will need to sign a two-party Student Agreement. The Student Agreement is a contract between the student and the programme. It aims to regulate the terms and conditions of the participation of the student in the Programme.

## 4.8 Enrolment

Students shall be admitted and registered as programme students at all universities within a study track, from day one of the programme, when possible.

# 5 Residence permit and Insurance

## 5.1 Residence permit

Students are responsible for ensuring that they have the correct residence permit, visa, registration certificate, or other immigration documentation required for each country in which they study during the programme. The partner universities provide information and support, but all decisions are made by the relevant national authorities. Visa and residence-permit costs are not included in the participation cost.

Students from outside the EU/EEA who will study in Sweden for more than three months normally need a residence permit for studies in Sweden. The application should generally be submitted before travelling to Sweden and must be granted before entry, unless other rules apply. Students who are required to pay the participation cost must have paid the first instalment before applying for the residence permit.

To be granted a Swedish residence permit for studies, students must meet the Swedish Migration Agency's requirements, including final admission to full-time studies, a valid passport, sufficient financial maintenance, and relevant insurance documentation. Students should always check the current requirements directly with the Swedish Migration Agency before applying.

As TRACEE is a two-year programme starting at Stockholm University, non-EU/EEA students are encouraged to apply for a Swedish residence permit covering the full study period, where this is possible. The Swedish Migration Agency may grant a permit for up to two years for studies at Stockholm University, but the permit period is always decided by the Swedish Migration Agency and cannot be longer than the study period or the validity of the student's passport.

EU/EEA citizens who are registered students at a Swedish university do not need to apply for a Swedish residence permit. Swiss citizens follow separate rules and must apply for a residence permit if they plan to stay in Sweden for longer than three months, but they may begin studying after arrival while the application is being processed.

For mobility semesters outside Sweden, students must follow the instructions from the host university and the competent national authorities in the relevant country. Requirements may differ depending on citizenship, residence-permit status, destination country, length of stay, and the type of study activity. Students should therefore check the official information well in advance of each mobility period. For mobility semesters at partner universities outside Sweden, students must follow the instructions from the host university and the competent national authorities. Requirements may differ depending on the student's citizenship, residence-permit status, destination country, length of stay, and type of study activity, for example if the mobility includes an internship or work placement. Students should check the official information well in advance of each mobility period, as regulations, procedures, and costs may change.

<https://www.migrationsverket.se/en/you-want-to-apply/study/higher-education.html>

## 5.2 Insurance

You are insured throughout the Programme as described below:

Students from the EU/EEA/Switzerland are covered by the general student insurance that applies at Stockholm University during school hours and travel to and from the place of study. These students should also bring a valid European Health Insurance Card (EHIC), which gives access to medical care in Sweden at the same cost as Swedish residents. More information:

<https://www.su.se/english/education/student-health/insurance/insurance-for-eu-eea-swiss-nordic-citizens>

Fee-paying students from outside the EU/EEA/Switzerland are covered by FAS+ – The Swedish State's Insurance for Fee-Paying Students, provided by Kammarkollegiet. FAS+ is accepted by the Swedish Migration Agency as comprehensive health insurance and applies according to its terms and conditions. More information:

<https://www.kammarkollegiet.se/engelska/start/all-services/insurance/insurance-for-students-and-foreign-visitors/insurance-for-students-who-pay-tuition-fees-fas-and-fasplus/terms-and-conditions-fee-paying-students-fas-2021>

Semesters at PUs other than SU

All students are covered by Student OUT, provided by Kammarkollegiet and ordered by Stockholm University, during mobility periods at partner universities outside Sweden. Student OUT applies during studies or internships abroad, including travel between Sweden and the host country and the study period at the host university, according to its terms and conditions. More information:

<https://www.kammarkollegiet.se/engelska/start/all-services/insurance/insurance-for-students-and-foreign-visitors/insurance-during-education-abroad-student-out>

In addition to the insurance schemes described above, students may be required to obtain additional insurance coverage to meet host-university requirements or national regulations. The partner universities will inform students accordingly. Students should read the applicable terms and conditions before travelling, especially regarding coverage, restrictions and exclusions.

## **6 Examination**

### **6.1 Examination and assessment**

The students' academic performance is assessed according to the examination and assessment methods, criteria, and regulations of the university responsible for the course or part of the programme that is being assessed. More details can be found in each course syllabus of the respective university.

### **6.2 Grades**

The grades received during the programme follow the local regulations at the university where the course is given. A comparison table is used for degree honours at some universities.

| ECTS<br>Grading<br>Scale | AMU | NKUA  | ULB   | UB  | UofG    | UNIL     | UAM      | SUR   | PLUS | SU    | UT      |   |  |
|--------------------------|-----|-------|-------|-----|---------|----------|----------|-------|------|-------|---------|---|--|
| A                        | 20  | 9-10  | 20    | 10  | 22 (A1) | 6.00     | 9.5      | 30+   | 1    | A     | 1.0-1.3 |   |  |
|                          | 19  |       | 19    |     | 21 (A2) | 5.75     |          | 30    |      |       |         |   |  |
|                          | 18  |       | 18    |     | 20 (A3) | 5.50     |          | 29    |      |       |         |   |  |
|                          | 17  |       | 17    |     | 19 (A4) |          |          |       |      |       |         |   |  |
|                          | 16  |       | 16    |     | 18 (A5) | 5.25     |          |       |      |       |         |   |  |
| B                        | 15  | 8-8.9 | 15    | 9   | 17 (B1) | 5.00     | 8        | 28    | 2    | B     | 1.4-2.1 |   |  |
|                          | 14  |       | 14    |     | 16 (B2) | 4.75     |          | 27    |      |       |         |   |  |
| C                        | 13  | 7-7.9 | 13    | 8   | 15 (B3) | 4.50     | 7        | 26    | 3    | C     | 2.2-2.8 |   |  |
|                          | 12  |       | 12    | 7   | 14 (C1) |          |          | 25    |      |       |         |   |  |
| D                        | 11  | 6-6.9 | 11    | 6   | 13 (C2) | 4.25     | 6        | 24    | 4    | D     | 2.9-3.6 |   |  |
|                          |     |       |       |     | 12 (C3) |          |          | 23    |      |       |         |   |  |
| E                        | 10  | 5-5.9 | 10    | 5   | 11 (D1) | 4.00     | 5        | 20-21 | 4    | E     | 3.7-4.0 |   |  |
|                          |     |       |       |     | 10 (D2) |          |          | 19-20 |      |       |         |   |  |
|                          |     |       |       |     | 9 (D3)  |          |          | 18    |      |       |         |   |  |
| FX                       | 9   | 0-4.9 | 9     | 4   | 8 (E1)  | 3 - 3.75 | 4        | 16-17 | 5    | FX    | 4.1-5   |   |  |
|                          | 8   |       | 8     |     | 7 (E2)  |          |          | 14-15 |      |       |         |   |  |
|                          | 7   |       | 7     |     | 6 (E3)  |          |          | 12-13 |      |       |         |   |  |
| F                        | 6   |       | 0-4.9 | 6   | 3       | 5 (F1)   | 1 - 2.75 | 3     |      | 10-11 |         | F |  |
|                          | 5   |       |       | 5   |         | 4 (F2)   |          |       |      | 8-9   |         |   |  |
|                          | 4   |       |       | 4   | 2       | 3 (F3)   |          | 2     |      | 6-7   |         |   |  |
|                          | 3   |       |       | 3   |         | 2 (G1)   |          |       |      | 3-5   |         |   |  |
|                          | 0-2 |       |       | 0-2 | 1       | 1 (G2)   |          | 0-1   |      | 0-2   |         |   |  |

\* UNIL only assigns a grade zero when a student does not attend or in case of fraud, plagiarism, cheating or attempt to cheat. Zero cannot be counted in an average mark.

\* SU does not assign a grade when a student either fails to show up or hands in a blank exam.

The definitions and honours of the ECTS standard grading table are:

**ECTS standard grading scale Definitions and Honours**

|           |                                                                    |
|-----------|--------------------------------------------------------------------|
| <b>A</b>  | <b>Excellent:</b> Outstanding performance without errors           |
| <b>B</b>  | <b>Very Good:</b> Above the average standard but with minor errors |
| <b>C</b>  | <b>Good:</b> Generally sound work with some errors                 |
| <b>D</b>  | <b>Satisfactory:</b> Fair but with significant shortcomings        |
| <b>E</b>  | <b>Adequate:</b> Performance meets the minimum criteria            |
| <b>FX</b> | <b>Fail:</b> some additional work required                         |
| <b>F</b>  | <b>Fail:</b> much more work required                               |

The course's grading criteria are handed out at the start of the courses in the official documentation of each involved university in the study track.

A passing final grade requires passing grades on all included parts of the course. The final grade of the course is determined by weighing the grades from all course parts, where each grade is weighed in relation to the scope of the course parts.

### 6.3 Retake an examination

Retake of examination follows the regulations of the university responsible for the course or part of the programme that is being assessed.

## 7 Academic Degree

Students will receive a degree from Stockholm University and from the universities involved in the respective study track. The process of issuing the diploma varies from university to university. Some universities will deliver a single degree certificate whereas others will deliver a joint degree certificate in the study track.

The details of the academic degree are detailed in the annex for each study track.

### 7.1 Transfer of credits

Before each university can issue a diploma, it needs to be ensured that all the credits of the curriculum are recorded at each university meaning that both the necessary courses and the transfer of credits are completed at each corresponding university.

The system of credits used in most of the CIVIS universities is the European Credit Transfer and Accumulation System (ECTS).

The University of Glasgow uses the Scottish Credit and Qualifications Framework (SCQF). The equivalence of credit points for the University of Glasgow with ECTS is done by multiplying the number of ECTS credits by two to convert to SCQF and by dividing the number of SCQF Credit Points by two to convert to ECTS.

| Partner University               | AMU  | NKUA | ULB  | UB   | UofG | UNIL | UAM  | SUR  | PLUS | SU   | UT   |
|----------------------------------|------|------|------|------|------|------|------|------|------|------|------|
| System                           | ECTS | ECTS | ECTS | ECTS | SCQF | ECTS | ECTS | ECTS | ECTS | ECTS | ECTS |
| Necessary credits for the degree | 120  | 120  | 120  | 120  | 240  | 120  | 120  | 120  | 120  | 120  | 120  |

## 7.2 Academic degree

Students will receive a degree from Stockholm University and from the universities hosting a student within a study track. The process of issuing the diploma varies from university to university. Depending on the study track, universities will deliver multiple degrees, a joint degree, or a combination of both:

| Study track name                                           | Awarding universities | Degree type | Degree Title                                                                      |
|------------------------------------------------------------|-----------------------|-------------|-----------------------------------------------------------------------------------|
| <b>ST1: Environmental Humanities and Law</b>               | <b>SU</b>             | Multiple    | Master of Science in Transdisciplinary Environmental Science                      |
|                                                            | <b>PLUS</b>           | Joint       | Master in Transdisciplinary Studies of Climate, Environment and Energy            |
|                                                            | <b>UB</b>             |             |                                                                                   |
| <b>ST2: Environmental Social Sciences</b>                  | <b>SU</b>             | Multiple    | Master of Science in Transdisciplinary Environmental Science                      |
|                                                            | <b>UofG</b>           | Multiple    | International Masters in Environmental Social Science                             |
|                                                            | <b>UB</b>             | Multiple    | Master in Cross-Disciplinary Perspectives on Socio-ecological Transformations     |
| <b>ST3: Energy and matter</b>                              | <b>SU</b>             | Multiple    | Master of Science in Transdisciplinary Environmental Science                      |
|                                                            | <b>UAM</b>            | Multiple    | Master in Energy and Fuels for the Future (Local 60 ECTS)                         |
|                                                            | <b>UB</b>             | Multiple    | Master in Nature-centered Approach to Sustainability                              |
| <b>ST4: Environmental Chemistry and Toxicology</b>         | <b>SU</b>             | Joint       | Master of Science in Transdisciplinary Environmental Science                      |
|                                                            | <b>UT</b>             |             | Master of Science in Transdisciplinary Studies of Climate, Environment and Energy |
|                                                            | <b>UB</b>             |             |                                                                                   |
| <b>ST5: Environmental Geoscience</b>                       | <b>SU</b>             | Multiple    | Master of Science in Transdisciplinary Environmental Science                      |
|                                                            | <b>UofG</b>           | Multiple    | International Masters in Environmental GeoScience                                 |
|                                                            | <b>AMU</b>            | Multiple    | Master Sciences de la Terre et des planètes, environnement                        |
| <b>ST6: Climate Change Science</b>                         | <b>SU</b>             | Joint       | Master of Science in Transdisciplinary Environmental Science                      |
|                                                            | <b>NKUA</b>           |             | Master of Science in Transdisciplinary Studies of Climate, Environment and Energy |
|                                                            | <b>UT</b>             |             |                                                                                   |
| <b>ST7: Environmental Risk and Mitigation</b>              | <b>SU</b>             | multiple    | Master of Science in Transdisciplinary Environmental Science                      |
|                                                            | <b>UNIL</b>           | multiple    | Master of Science (MSc) in Environmental Science                                  |
|                                                            | <b>SUR</b>            | multiple    | Master of Science in Sciences and Teaching of Natural Systems                     |
| <b>ST8: Transdisciplinary Approaches to Climate Change</b> | <b>SU</b>             | Multiple    | Master of Science in Transdisciplinary Environmental Science                      |
|                                                            | <b>PLUS</b>           | Joint       | Master in Transdisciplinary Studies of Climate, Environment and Energy            |
|                                                            | <b>ULB</b>            |             |                                                                                   |
| <b>ST9: Global Change Biology</b>                          | <b>SU</b>             | Multiple    | Master of Science in Transdisciplinary Environmental Science                      |
|                                                            | <b>SUR</b>            | Multiple    | Master of Science in Sciences and Teaching of Natural Systems                     |
|                                                            | <b>AMU</b>            | Multiple    | Master Biodiversité, Écologie et Évolutionin                                      |

## 7.3 Degree certificate application

More information will be provided during the course of the programme.

## 7.4 End of programme conference

More information will be provided during the course of the programme.

## 8 Academic calendar

The first semester corresponds to the autumn semester at Stockholm university. It starts in late August/early September and continues until mid-January.

The second and third semester dates vary depending on the mobility path in each study track and are available in the corresponding annex of the student handbook.

The fourth and last semester is dedicated to the degree project and dates may vary depending on the selected path and place of registration.

## 9 Support and guidance during the programme

### 9.1 Pre arrival information

For you to be well prepared for your journey in the TRACEE master, you will receive information to support you and ensure everything is in order before the start of the programme. Additionally, before each semester begins within your study track, the host university will organise information sessions.

Stockholm University hosts a series of live webinars for newly admitted students. These webinars cover everything you need to know after receiving your admission results and before arriving in Sweden and starting the TRACEE master.

<https://www.su.se/english/education/a-smooth-start/pre-departure-information>

### 9.2 Arrival and welcome activities

The programme starts at Stockholm University where a series of welcome activities, including an arrival service, are organised at the beginning of the first semester. The activities are designed to assist you as a new student and introduce you to university life in Stockholm and also within the CIVIS Alliance. Attendance to these events is optional, but we highly recommend attending in order for you to familiarise yourself with the campus and the support available for students, as well as to make friends!

<https://www.su.se/english/education/a-smooth-start/welcome-activities>

Each programme cohort will be welcomed to TRACEE in form of a programme kick-off at Stockholm University. During the kick-off both academic and/or administrative staff from all partner universities will participate on site and/or online. The programme content, cohort-specific details, student services, study track details and the path through the programme as well as expected outcomes from the programme will be introduced and discussed. Importantly, we see the kick-off as a first opportunity to start welding all different academic and cultural backgrounds of the cohort, also introducing expertise within the consortium academic staff to the students. At the programme kick-off each student and the consortium will sign the individual student contracts.

Each mobility path will then include welcome activities for each of the receiving universities for the second and third semester detailed in the corresponding annex of the student handbook.

### 9.3 Study and career counselling

Starting the programme at Stockholm University, you will be introduced to the study and career counselling services that can provide help during the whole programme. Additionally, each host university within your study track will provide local support related to your studies.

You can connect with our study counsellors in several ways: in person, by telephone, or online. They offer individual guidance and support to help you make a well-informed decision about your studies and career.



<https://www.su.se/english/education/student-support/study-and-career-counselling>

## 9.4 Alumni

Information about all partner universities' alumni's careers will be published on the programme website in line with relevant data protection regulations.

Programme alumni will be encouraged and supported to establish a TRACEE Alumni Association, to build a stronger TRACEE identity. A first step is the creation of a LinkedIn group open to all students, alumni, teaching staff, visiting educators and associated partners. The objective of this new networking tool is to increase visibility of the programme and broaden alumni's career opportunities.

A strong sense of belonging to the programme, and a common programme identity are of great importance for the consortium – not only within each cohort, but also between cohorts, and between active students and alumni. The aim is to have each academic year's kick-off become a meeting place for all said groups, together with the academic and administrative staff working with the programme. The same adjoined meeting place will be the end-of-programme conference, concluding each cohort. External stakeholders, linked to the programme's educational activities, will also be invited to participate at such events, on site or online.

## 9.5 Language

As TRACEE student, you will find it easy to navigate daily life in English, as Europe has a high level of non-native English proficiency. However, immersing yourself in the local language of the partner university will deepen your understanding of different cultures, help you build social connections, and strengthen your CV if you plan to work internationally in the future.

As TRACEE student you are encouraged to develop your language skills and take the opportunity to learn and practice the languages that you will encounter during your mobilities within the programme. Therefore, you are welcome to the Language Learning Resource Centre (Språkstudion) at SU during your first semester, where Language Cafés are organised, as well as tandem language exchange programme, where you are matched with a language buddy to mutually practice each other's languages.

<https://www.su.se/english/divisions/sprakstudion-language-learning-resource-centre/about-sprakstudion/language-cafes>

<https://www.su.se/english/divisions/sprakstudion-language-learning-resource-centre/about-sprakstudion/find-a-language-buddy>

## 9.6 Writing

The Academic Writing Service provides free English-language support for writing and study skills. Services include talks, seminars, and individual guidance to help you improve your academic performance.

<https://www.su.se/english/education/student-support/academic-writing-service>

## 9.7 Bank

Depending on the study path, information on bank account might be specified in the corresponding annex of the study track. It is not required to open a bank account in each of the visited country during the mobility in your studies.

## **10 Support and guidance during the first semester**

### **10.1 Housing**

While there is no guaranteed housing, each host university typically provides guidance to help you find accommodation. Since the programme involves multiple mobilities, you will need to arrange housing in multiple locations.

### **10.2 Living expenses**

Like in most cities, the cost of living in Stockholm largely depends on your individual lifestyle and habits. Students in Stockholm should budget at least 11,214 SEK per month to cover their living expenses. Accommodation will likely account for the largest portion of your monthly budget. The cost of rent varies depending on the location, size, and type of housing. For a detailed breakdown of what a typical monthly budget might look like, you can visit SU's page on living costs.

<https://www.su.se/english/education/new-in-sweden/living-costs>

### **10.3 Public transport**

Navigating Stockholm with public transport is easy and convenient, thanks to its comprehensive and well-integrated system.

You can travel from Arlanda Airport to Stockholm city centre by Arlanda Express, commuter train (SL Pendeltåg), or Flygbussarna airport bus. Taxis are also available.

To reach Frescati campus by metro (Tunnelbana) from the central station, take the red line towards Mörby Centrum and get off at Universitetet (The University). You can also explore other routes and plan your journey using Stockholm Public Transport (SL) online resources.

### **10.4 Finding your way on campus**

Stockholm University is home to multiple campuses, each offering a unique environment for study and exploration. The main campus, Frescati, is known for its beautiful natural surroundings, is just 20 minutes from the city centre. Nearby, the sustainable Albano campus, inaugurated in 2023, provides state-of-the-art facilities and fosters collaboration.

At Stockholm University's various campuses, there are designated resting rooms, known as "vilorum," available for students and staff. These rooms provide a quiet space for rest and are located in different buildings. In the Student House, there are also nursing rooms.

Additionally, contemplation rooms, known as "andrum", are open to all students and staff, regardless of religious affiliation or belief. These spaces offer a peaceful environment for reflection, meditation, or prayer.

The university's website provides detailed information on the locations, opening hours, usage guidelines, and contact details for these rooms.

<https://www.su.se/english/about-the-university/about-our-campus>

### **10.5 Stockholm University library**

Located in Frescati, the University Library offers full access to books, journals, articles and databases, in printed and digital formats. The University Library's staff are experts in searching for information and managing references, and will gladly show you how to search, select and critically examine scientific resources. <https://www.su.se/stockholm-university-library/>

## 10.6 Student health

The student health webpage provides essential information about your health and study environment at Stockholm University. A supportive and well-functioning study environment is a priority at the university, encompassing everything from study spaces and teaching modes to unwritten rules of behaviour.

You can also explore resources to support your well-being, including student health services, which offer individual counselling, group sessions, workshops, and other activities to help you achieve your full academic and personal potential.

Additionally, you will find details about student insurance. Students are covered by different insurance policies depending on their status, so it is important to understand which category you belong to. Lastly, the page provides guidance on what to do if you become ill or face an emergency during your time at Stockholm University.

<https://www.su.se/english/education/student-health>

## 10.7 Special needs /Disability support

Stockholm University provides various types of study support for students with long-term disabilities, aiming to ensure that all students have the opportunity to study on equal terms.

The support is designed to facilitate your studies in a way that is reasonable, taking into account your specific disability, course requirements, and intended learning outcomes. Applications for disability study support are managed by the staff at Disability Services.

Students with a medically documented long-term disability—defined as a condition that has lasted or is expected to last at least six months—are eligible to apply for support.

You can find more information about the different types of disabilities and the application process on this page.

<https://www.su.se/english/education/student-support/studying-with-a-disability>

## 10.8 Student Union/Organisation

Stockholm University has three student unions—one large and two departmental—alongside Faculty Clubs and Student Union Associations.

The student unions represent students' interests, ensuring their voice is heard in education and university decisions. They also play a key role in social life, influencing areas like course planning, housing, and even coffee prices.

Faculty Clubs bring together students from the same or similar disciplines and organise activities such as student pubs, seminars, and career fairs. Student Union Associations are open to all students and cater to diverse interests, offering a wide range of extracurricular activities.

The Student Union membership gives you access to a wide variety of benefits and discounts on everything from course literature and lunch to public transportation and training.

You will find a full list of these organisations and details about memberships on the webpage of the student union.

<https://www.su.se/english/education/student-life/student-unions>

## **10.9 IT Services**

Stockholm University provides a range of IT tools and services to assist students throughout their academic journey. On these pages, you'll find information on how to access wireless networks, IT support, printers, software licences, and other essential digital tools that you may need during your studies.

<https://www.su.se/english/education/it-for-students>

## **10.10 Swedish courses**

The Department of Swedish Language and Multilingualism offers a range of Swedish courses specifically designed for international students.

<https://www.su.se/english/divisions/department-of-swedish-language-and-multilingualism/education/courses-and-programmes/swedish-for-international-students?eventopenforinternationalstudents>

## 11 The study track 4: Environmental Chemistry and Toxicology

**The study track Environmental Chemistry and Toxicology (ST4)** is an international research-oriented study track focusing on the evaluation and solution of environmental problems. The study track aims for a comprehensive understanding of the physical, chemical, and biological process mechanisms. The focus is on environmental chemistry and toxicology. Students from various science backgrounds learn to qualitatively and quantitatively address complex processes in soils, water and air and to evaluate environmental risks based on multi-disciplinary approaches.

The first semester will be offered at Stockholm University. The second semester will take place at Stockholm University with the focus on »Environmental toxicology«. The third semester is offered by the University of Tübingen with the focus on »Environmental chemistry«. The master's thesis can be completed at Stockholm University, the University of Tübingen or the University of Bucharest. Students can only choose SU or UT for the fourth semester if they are not resident in Germany or Sweden at the time of enrolment.

| Study track                                 | Semester 1               | Semester 2  | Semester 3 | Semester 4      |
|---------------------------------------------|--------------------------|-------------|------------|-----------------|
| ST4: Environmental Chemistry and Toxicology | SU                       | SU          | UT         | SU or UT or UB* |
|                                             | Common Core              | Study Track |            | Master's thesis |
|                                             | Transdisciplinary stream |             |            |                 |

\* Students can only choose SU or UT for the fourth semester if they are not resident in Germany or Sweden at the time of enrolment.

The **study and examination language** of Study Track 4 is **English**.

**SU** is a renowned educational institution in Sweden, known for its excellent research and teaching. The Department of Earth Sciences plays a central role in the study of earth processes and environmental issues. Here, various disciplines such as geology, geophysics, meteorology and oceanography are combined to promote a comprehensive understanding of the earth and its systems. Students and researchers have access to modern laboratories and innovative technologies that enable them to address current challenges in the field of geosciences. The university places great emphasis on interdisciplinary collaboration and sustainable development, which makes it an attractive place for students from all over the world.

**UT** is a full university covering virtually all areas in natural and social sciences giving the individual students much space for inter/transdisciplinary projects. The University is one of eleven Universities of Excellence and has the largest Department for terrestrial geosciences in Germany providing state-of-the art laboratory and field facilities in a new building from 2020. Tübingen is located in hilly south-western Germany, the bike gets you everywhere you need to go and it is one of the most sought after student locations in Germany.

**UB**, founded in 1864, is one of Romania's leading higher education institutions. Located in the capital city, it offers a diverse range of programmes across various fields, including humanities, sciences, social sciences, and law. The university is known for its strong emphasis on research and academic excellence, attracting both local and international students. With a vibrant campus life, numerous student organisations, and cultural events, the University of Bucharest

provides a dynamic environment for learning and personal growth. Its commitment to fostering critical thinking and innovation makes it a significant contributor to Romania's educational and cultural landscape.

### 11.1 The vision of the study track

Students will gain a comprehensive understanding of the linkages between physical, chemical, and biological process mechanisms. Students from various science backgrounds will learn to qualitatively and quantitatively address complex processes in soils, water and air as well as in organisms. In addition, students will address the ethical, legal, and regulatory frameworks governing environmental protection, chemical safety, and toxicology and to evaluate environmental risks based on multi-disciplinary approaches.

### 11.2 Target group of students: Entry requirements

Prerequisite for the Study Track 4 is a bachelor's degree in natural sciences or engineering. In addition, performance must also have been achieved in the following subjects of the bachelor's programme in particular:

- 15 CP in mathematics or statistics or equivalent,
- 15 CP chemistry,
- 6 CP in geology\*.

To take part in the Study Track, applicants must also document knowledge of English at least at the level of B2 of the Common European Framework of Reference for Languages (CEFR). Requirements can be met with an English test, for example an overall IELTS score of 6.5 with no subtests under 6.0 or a TOEFL score of 90 overall with Reading 20; Listening 19; Speaking 19; Writing 21.

*\* These competences may also be acquired in the second semester.*

### 11.3 Intended learning outcomes of the study track

The intended learning outcomes of this Study Track, in addition to the overarching learning outcomes of the programme, are listed below.

#### **Knowledge and understanding**

- demonstrate advanced understanding of the fundamental principles of environmental chemistry and toxicology, including the fate and effects of pollutants.
- demonstrate an understanding of the ethical, legal, and regulatory frameworks governing environmental protection, chemical safety, and toxicology.

#### **Competence and skills**

- define and analyse environmental problems related to chemical pollution
- plan and undertake appropriate field and advanced laboratory techniques to identify and quantify environmental contaminants, quantify their fate processes and their toxicity, including methods for environmental sampling, chemical analysis, and bioassays.
- develop and implement models to assess the fate and toxicity of chemicals in different environmental media and various organisms.
- present and interpret chemical and toxicological data and analysis results

#### **Judgement and approach**

- develop strategies to mitigate the environmental and toxicological impacts of chemical pollutants, integrating both scientific and regulatory perspectives.
- promote sustainability and the responsible use of chemicals, considering environmental health and societal implications.

## 12 Structure overview of Study Track 4

### 12.1 Semester periods of the study track

The study track takes place at Stockholm University (SU), the University of Tübingen (UT) and the University of Bucharest (UB). Below you will find an overview of the semester times of the participating universities:

| Semester                 | University | Period                                                                                                            |
|--------------------------|------------|-------------------------------------------------------------------------------------------------------------------|
| 1 <sup>st</sup> Semester | SU         | Winter semester runs from <b>Beginning of September to Mid-January (including exams)</b> of the following year.   |
| 2 <sup>nd</sup> Semester | SU         | Summer semester runs from <b>Mid-January to Beginning of June (including exams)</b> of the following year.        |
| 3 <sup>rd</sup> Semester | UT         | Winter semester runs from <b>1 October to 31 March (including exams)</b> of the following year.                   |
| 4 <sup>th</sup> Semester | SU         | <b>Summer semester</b> runs from <b>Mid-January to Beginning of June (including exams)</b> of the following year. |
|                          | UT         | <b>Summer semester</b> runs from <b>1 April to 30 September (including exams)</b> of the following year.          |
|                          | UB         | <b>Summer semester</b> runs from <b>End of February to End of May (including exams)</b> of the following year.    |

### 12.2 Academic degree and grades of the study track

The study track is divided into four semesters of 30 ECTS each, for a total of 120 ECTS.

The cooperating universities award a joint degree "Master of Science" (abbreviated to "M. Sc.") with the title "Transdisciplinary Studies of Climate, Environment and Energy" on the basis of the successfully completed programme. The joint certificate, ToR and Diploma Supplement is issued by the coordinating partner university: Stockholm University.

The overall Master's degree grade (in the German and Romanian grading system) for the programme is calculated from the average of all graded courses, as weighted by credit points. For the overall Master's degree grade on the Diploma Supplement, the grades are converted according to the following comparison table:

| ECTS Grading Scale | UB   | SU | UT      |
|--------------------|------|----|---------|
| A                  | 10   | A  | 1,0-1,3 |
| B                  | 9    | B  | 1,4-2,1 |
| C                  | 7, 8 | C  | 2,2-2,8 |
| D                  | 6    | D  | 2,9-3,6 |
| E                  | 5    | E  | 3,7-4,0 |
| FX                 | < 5  | FX | 4,1-5,0 |
| F                  |      | F  |         |

### 12.3 Examination regulations of the study track

Examinations taken at the cooperating partner universities are carried out and assessed in accordance with the regulations that apply at the partner universities.



### 13 Study track content overview

The study track overview by study progress is presented below:

| University                                                                             | Type                   | Module Title                                                                                                                                                                                                                            | ECTS per Semester |           |           |           | Total ECTS |
|----------------------------------------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------|-----------|-----------|------------|
|                                                                                        |                        |                                                                                                                                                                                                                                         | S1                | S2        | S3        | S4        |            |
| <b>SU</b><br><i>Climate, Environment, and Energy – a Transdisciplinary Perspective</i> | Mandatory              | Systems Thinking                                                                                                                                                                                                                        | 3                 |           |           |           | <b>30</b>  |
|                                                                                        | Mandatory              | Climate, Environment and Energy – A Natural Science Perspective                                                                                                                                                                         | 9                 |           |           |           |            |
|                                                                                        | Mandatory              | Climate, Environment and Energy – A Social Science Perspective                                                                                                                                                                          | 9                 |           |           |           |            |
|                                                                                        | Mandatory              | Climate, Environment and Energy – A Humanities Perspective                                                                                                                                                                              | 6                 |           |           |           |            |
|                                                                                        | Mandatory              | Creating Knowledge Through Transdisciplinary Methods                                                                                                                                                                                    | 3                 |           |           |           |            |
| <b>SU</b><br><i>Environmental Toxicology</i>                                           | Mandatory              | Toxicology for Environmental Scientists                                                                                                                                                                                                 |                   | 7.5       |           |           | <b>30</b>  |
|                                                                                        | Mandatory              | Risk Assessment and Regulation of Chemicals                                                                                                                                                                                             |                   | 7.5       |           |           |            |
|                                                                                        | Mandatory              | Environmental Field Studies                                                                                                                                                                                                             |                   | 7.5       |           |           |            |
|                                                                                        | Mandatory              | Environmental Biogeochemistry                                                                                                                                                                                                           |                   | 7.5       |           |           |            |
| <b>UT</b><br><i>Environmental Chemistry</i>                                            | Mandatory              | Environmental Chemistry                                                                                                                                                                                                                 |                   |           | 6         |           | <b>30</b>  |
|                                                                                        | Mandatory              | Environmental Analytical Chemistry                                                                                                                                                                                                      |                   |           | 6         |           |            |
|                                                                                        | Mandatory              | Modelling for Sustainable River Management                                                                                                                                                                                              |                   |           | 6         |           |            |
|                                                                                        | Conditionally elective | 2 courses from the list provided:<br>Global Change (6 ECTS)<br>Biotransformation of Pollutants (6 ECTS)<br>Isotopes in Ecosystem Sciences (6 ECTS)<br>Inter- and Transdisciplinary Perspectives on Climate and the Environment (6 ECTS) |                   |           | 12        |           |            |
| <b>SU / UT / UB*</b><br><i>Master's thesis</i>                                         | Mandatory              | Master's thesis                                                                                                                                                                                                                         |                   |           |           | 30        | <b>30</b>  |
|                                                                                        |                        |                                                                                                                                                                                                                                         | <b>30</b>         | <b>30</b> | <b>30</b> | <b>30</b> | <b>120</b> |

\* Students can choose SU or UT for the fourth semester only if they are not resident in Germany or Sweden at the time of enrolment.

## 14 Your semester at Stockholm University (SU)

The services provided at Stockholm University for the semester within the Study Track Environmental Chemistry and Toxicology are the same as those provided during the first semester (Common Core) listed in this student handbook.

## 15 Your semester at Eberhard Karls University of Tübingen (UT)

### 15.1 Arrival and welcome activities

Starting out can be difficult. In the first few weeks, you will experience many new things. We aim to help you find your way around the University.

As an international student, you are invited to our Welcome Programme, which includes a Help Desk, an academic writing workshop, a mini-workshop on study planning with the digital "Alma" system, and various peer-to-peer activities from students for students, for instance an advisory course on "How to study at a German university".

[welcoming and introductory sessions](#) Link The University of Tübingen also offers specific welcome and introductory sessions where you can ask your questions directly. Further information: Link The [Department of Geosciences](#) at the University of Tübingen includes almost 40 professorships from the general fields of geology, mineralogy, environmental sciences, geography, and archaeological sciences. It is thus one of the largest departments of its kind at German universities.

### 15.2 Housing

It is difficult to find a room or an apartment in Tübingen at the beginning of your studies. The university has responded to the particularly tight situation on the housing market. The most common types of accommodation are the following:

- *Student residences:* A room in a student residence hall / dormitory is good value for money. Note that in Germany, all student residences are self-catering – you usually share a kitchen as well as sanitary facilities and have a single room on your own. Still, life in dormitories differs widely: In some dorms, residents do a lot together in their free time and form a close community; in others, they tend to keep to themselves. Accommodation in Tübingen can be found in halls of residence run by the [Studierendenwerk](#).
- *Shared apartments:* A popular form of housing among students is sharing an apartment (Wohngemeinschaft, or WG for short). Similar to dormitories, life in WGs is various: Some apartments are shared by friends; in others, the flatmates aren't that close, but get together for joint activities from time to time. For some students, sharing a flat is an inexpensive way to live, but they are not that interested in forming a community. It's up to you what you make of a shared apartment. Most-used websites for sharing/finding shared apartments are: [www.wg-gesucht.de](http://www.wg-gesucht.de), [www.kleinanzeigen.de](http://www.kleinanzeigen.de).

Further information: [Link](#)

[register Wohnungsgeberbescheinigung confirmed by your landlord electronically](#) All residents in Germany must register their place of residence with the local Residents' Registration Office (called "Bürgerbüro" in Tübingen) within two weeks of moving into their new accommodation. Book an appointment in advance or complete the online registration using your online ID function. Both forms of registration require a confirmation from your housing provider ("Wohnungsgeberbescheinigung"), which can either be signed by your landlord and uploaded by you/handed in on site, or confirmed by your landlord electronically.

### 15.3 Living expenses

The necessary allowance of a university student at the University of Tübingen per month would be:

|                                             |                  |
|---------------------------------------------|------------------|
| Cost of living (incl. transport)            | 467 Euro         |
| Rent                                        | 500 Euro         |
| Other expenditures (incl. health insurance) | 134 Euro         |
| <b>Total expenses</b>                       | <b>1101 Euro</b> |

More Information for students at the University of Tübingen about student housing, canteens and cafeterias, studying abroad, student finances, studying with children, clubs and societies (music, the arts, theater, sport), mobility, insurances, and getting involved: [Link](#).

### 15.4 Transport

Students at the University of Tübingen are entitled to a discounted semester ticket for local public transport. The semester ticket is valid on all buses and trains in the NALDO public transport network, which includes the greater districts of Tübingen, Reutlingen, Zollernalbkreis and Sigmaringen. No-one else is allowed to use your semester ticket. If you lose it, you must buy another one. Further Information: [Link](#).

[Here](#) you can find more information on how to get to Tübingen.

### 15.5 Navigating campus

[mapAltstadtMorgenstellethe Klinikenthe Sand"Geo- und Umweltforschungszentrum"](#)The following map provides an overview of the campus. The campus is spread over the Altstadt, the Morgenstelle, the Kliniken and the Sand. The "Geo- und Umweltforschungszentrum" (Geo- and Environmental Centre) hosts all groups active in environmental geosciences. It is located in close vicinity to the university's other science departments.

In this [interactive virtual guided tour of Tübingen](#) (in German, produced in 2020, but still good for a first impression of the city), you can get to know some of the most relevant places in the city of Tübingen from the perspective of the students Amelie and Tony.

The University regularly hosts events that give interested members of the public, students and employees insights into topics being dealt with at the University. From concerts, exhibitions and conferences to public lectures - there is something for everyone. Further information: [Link](#).

### 15.6 Student health

[Link](#). Studying can pose many challenges, whether content-related, organisational or emotional. Psychologically difficult situations can arise at any stage of your studies. No matter whether you are dealing with study-related stress (e.g. coursework overload), with problems in your family or social life, or with economic or medical issues that may affect your mental health – the university offers you support through preventative services, counselling options, and competent contact points that you can turn to in situations of crisis. Further information: [Link](#).

### 15.7 Special needs and disability support

Services for students with a disability or (chronic) illness: It is estimated that there are more than 4,000 students at the University of Tübingen whose ability to study is affected by illness and/or disability. In order to support such students, the University of Tübingen offers special counselling services that can be used at any stage of studies, or even before the start of studies.

We can support you in deciding on the appropriate type of study and university, in planning and organising your studies, and in answering questions about possible alternatives. There is

also the option of counselling in personally difficult situations. Important topics may also include financing your studies, getting access to necessary tools and resources, finding suitable housing, and assistance in everyday study routines. If you need an individual adjustment of study conditions, you can apply for disadvantage compensation ("Nachteilsausgleich"). Counselling is voluntary, confidential and open-ended. Further information: [Link](#).

### 15.8 Resting and contemplation rooms

Whether you are preparing a group presentation, working individually or conducting research - the University Library offers you a variety of different work spaces. Further information: [Link](#).  
[Link](#) Since 2013, the university library has housed a "Room of Silence" in the transition between the Bonatzbau and the main building. It was set up by the University of Tübingen to be open to members of all religions for individual prayer and meditation. However, it can also serve as a retreat for people without religious convictions for a moment of silence and pause. Further information: [Link](#).

In the Ammerbau on level 3 (A321), a resting and work room is available for students with disabilities or a (chronic) illness. The room is accessible without barriers and equipped with a height-adjustable desk, an armchair with stool and a yoga mat. Further information: [Link](#).

### 15.9 Student organisations

For students of all academic fields and study programmes: [Here](#) you can find all our counselling services, events and workshops, as well as a range of useful information for studying at the University of Tübingen. The Student Counselling Service is there for you throughout your studies. We support you at the beginning and during all stages of your study programme. We offer you a wide range of events, guidance materials, and of course individual counselling. We are a neutral service and will always treat your situation as confidential; i.e. the counselling is subject to professional discretion.

When do lectures start? Which courses can I take? And how do I take leave of absence? From planning your timetable, to expenses and paperwork, to getting assistance with your studies - the information below can help you get organised. For further information: [Link](#).

[Link](#) The University of Tübingen offers a number of different services which give helpful advice if you are planning to study in Tübingen or if you are already enrolled here - whether you are just beginning, are well into your studies, or are finishing your studies and planning a career. Directly below, you will find a list of these services, sorted according to topic as well as according to the different phases of studying. For further information: [Link](#).

Students at the University of Tübingen have various opportunities to become involved in University policymaking. The University of Tübingen is home to many student groups and initiatives which are active in the fields of politics, the environment, or in social policy. For further information: [Link](#)

The [University sports](#) programme opens for registration about a week before the semester begins and offers a wide range of options — from high-intensity fitness classes and team sports to stress-relief activities such as mindfulness training, nutrition seminars, and meditation workshops.

### 15.10 Language courses

Learning German at the University of Tübingen

- Are you interested in taking a summer course or an intensive course at a famous German university during your semester break?
- Would you like to take the German proficiency exam (DSH) and get ready to study at a German university? Or would you like to improve your German while studying in Germany?

- The common language in your lab, your working group or in your classes is English, but would you like to be proficient enough to successfully handle everyday situations in German?
- Would you like to learn more about Germany and its people?
- The department "German as a Foreign Language and Intercultural Programmes" offers German language classes, courses relating to the geography, history and institutions of Germany and language proficiency exams.

#### Learning foreign languages at the University of Tübingen

- Would you like to improve your languages skills while studying and acquire important additional qualifications for your future working life?
- Do you need a UNIcert certificate or a country specific certificate in order to be able to account for your language level?
- Are you studying at the University of Tübingen and are interested in voluntary additional language Training?

Language courses for students of the University of Tübingen are offered by the Foreign Language Centre (FSZ). You can find more information about the courses [here](#).

## 16 Your semester at the University of Bucharest (UB)

### 16.1 Arrival and welcome activities

The University of Bucharest offers a range of arrival and welcome activities to help new students integrate smoothly into university life. These initiatives are designed to familiarise students with the campus, academic procedures, and the vibrant community. Key activities include:

- **Welcome Sessions:** At the beginning of each semester, the university organises welcome sessions for incoming students. These sessions provide essential information about academic programmes, campus facilities, and student services. They also offer an opportunity to meet faculty members and fellow students.
- **Romanian Language Courses:** For international students, the University of Bucharest offers Romanian language courses during the academic year. These courses cater to different proficiency levels, including beginners and intermediate learners. Each module lasts for one semester and includes both oral and written assessments, awarding 6 ECTS upon completion. The courses are free of charge and include a Romanian language manual.
- **Buddy Network:** The University's Erasmus Student Network (ESN, <https://unibucharest.esn.ro/>) runs a Buddy Network programme, pairing incoming students with current students. This initiative helps newcomers acclimate to the university environment, providing guidance on academic and social aspects of student life. The Buddy Network also organises various events, trips, and cultural activities to enhance the student experience.
- **Orientation Events:** Throughout the academic year, the university hosts various orientation events, including campus tours, informational workshops, and social gatherings. These events aim to introduce students to the university's resources, support services, and extracurricular opportunities.

For more detailed information, please refer to the [International Students Guide](#) provided by the University of Bucharest.

### 16.2 Housing

The University of Bucharest offers approximately 5,300 accommodation places across 15 dormitories, covering nearly 80% of the student housing demand. Priority for on-campus housing is typically given to students with higher entrance examination scores. For detailed

information on the available dormitories, including their facilities and contact details, you can visit the [Student Dormitories page](#). In the case of dormitories offered by the University of Bucharest, prices can vary from year to year.

The accommodation process, including eligibility criteria and application procedures, is outlined on the [Accommodation Process page](#). It's important to note that the university can accommodate students within the limits of available places. For those who do not receive on-campus housing, renting a private apartment is a common alternative. The university advises contacting a real estate agency for assistance, with typical rents for a two-room flat ranging between €300–€400 per month, excluding utilities. Signing a rental contract is necessary, as it will be required by the Immigration Office when applying for a residence permit.

Additionally, private student residences in Bucharest, such as Arcca (Arcca Vitan Dormitory - information, Arcca Pajura Dormitory - information), Campus Est (Campus Est - information), and West Gate Studios (West Gate Studios - information), offer modern amenities and can be viable alternatives for accommodation. For more information on these options, you can refer to the Accommodation section on the Study in Bucharest website.

For further assistance, you can contact the International Relations and Foreign Students Office at the University of Bucharest:

- **Telephone:** +4021-305.46.41 / +4021-305.46.42
- **Email:** [contact@externe.unibuc.ro](mailto:contact@externe.unibuc.ro)
- **Address:** 90 Panduri Road, 4th floor, room 404, Bucharest, 050663, Romania

Office hours are Monday to Thursday, 13:00 – 15:00.

### 16.3 Living expenses

The following table should give you an idea of the average cost of living. The figures may vary according to your personal lifestyle. Information on living expenses in Bucharest can be found here: <https://studyinbucharest.com/life-in-bucharest/cost-of-living>

The following table provides an overview of the average monthly cost of living in Bucharest. Please note that the figures are approximate and may vary depending on personal lifestyle, accommodation choices, and spending habits.

| Category                                                  | Estimated Cost (EUR / month)                                                                                                  | Notes                                                               |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| Meals                                                     | 300-350                                                                                                                       | Average monthly food expenses                                       |
| Local transportation                                      | 20                                                                                                                            | Student discounts may be available                                  |
| Pocket money / personal expenses                          | 150-200                                                                                                                       | Leisure, coffee, social activities, small purchases                 |
| Rent (Accommodation in case of private rented apartments) | 300-400                                                                                                                       | Depending on the area and apartment type                            |
| Utilities / facilities                                    | 100-200                                                                                                                       | Electricity, heating, water, internet                               |
| Medical insurance                                         | It is highly recommended to have a private health insurance and for European citizens to have European Health Insurance Card. | Medical insurance is to be paid in each applicant's native country. |

### 16.4 Transport

Information on public transport in Bucharest can be found here: <https://studyinbucharest.com/life-in-bucharest/transport>

Bucharest has one of the largest public transport systems in Eastern Europe, made up of:



### **Metro (underground) – operated by Metrorex**

The metro system, operated by Metrorex, is the fastest and most reliable way to travel in Bucharest, especially during peak hours. There are currently five metro lines:

M1 (yellow) – Dristor 2 ↔ Pantelimon

M2 (blue) – Pipera ↔ Tudor Arghezi

M3 (red) – Preciziei ↔ Anghel Saligny

M4 (green) – Gara de Nord 2 ↔ Străulești

M5 (orange) – Eroilor ↔ Râul Doamnei / Valea Ialomiței

Metro services usually operate from 05:00 to 23:00.

For the most accurate and up-to-date information on metro tickets, passes and prices, please consult the official Metrorex Travel Tickets page: [Metrorex travel tickets](#).

### **Surface transport – buses, trams, trolleybuses operated by STB**

Surface public transport is operated by STB and covers the entire city, including areas not served by the metro. Services run from early morning until approximately 23:00 and night buses operate on major routes. Coverage is extensive, but travel times may be affected by traffic.

For the most accurate and up-to-date information on STB tickets, passes and prices, please consult the official STB pages: [Prices](#), [How to pay](#), [Recommendations](#), [Cards and passes](#).

Students are encouraged to use mobile applications by STB for easier navigation and ticket management in Bucharest:

#### **Info TB (Public Transport Bucharest)**

This is the official STB application, providing real-time information on routes, vehicle locations on the map, and estimated arrival times in stations. It is a useful tool for planning daily travel and checking delays or service updates.

#### **Bilet TB**

The official app for purchasing tickets and transport subscriptions directly from your phone. Payments can be made by registering a bank card, allowing quick and convenient access to public transport without the need for a physical ticket.

### **c) Transport to and from the Airport**

Bucharest is served by two airports: **Henri Coandă International Airport (Otopeni, OTP)**, the main international airport, and **Aurel Vlaicu Airport (Băneasa, BBU)**, used mainly for regional and private flights.

Henri Coandă Airport is located approximately 16 km north of the city centre and is well connected by public transport. Students can reach the city using the **direct train service** (approximately 25 minutes to Gara de Nord), **express buses** (such as line 100), or **ride-sharing services and taxis**. The train is generally the fastest and most reliable option, while buses operate frequently but may be affected by traffic.

Băneasa Airport is much closer to the city centre (around 8 km) and can be accessed easily by bus (line 100), taxi, or ride-sharing services.



#### d) Taxis

Taxis are usually picked up on street corners where the cabbies hang out, rather than hailed on the street. Try to use only licensed metered taxis that have a lighted sign on top, and their name, number and rate on the car door.

Students can use Uber or Bolt as well in Romania.

### 16.5 Navigating campus

Navigating the University of Bucharest campus is essential for students to efficiently locate faculties, administrative offices, and other key facilities. Below is a guide to help you find your way around.

#### Campus Overview

- The University of Bucharest comprises multiple buildings and faculties spread across the city.
- The **main administrative building (Rector's Office)** is located at **90 Panduri Street, Sector 5, Bucharest**. This campus also hosts faculties such as Psychology and Educational Sciences, Sociology and Social Work, and Chemistry.
- More information about campus locations can be found [here](#).

#### Campus Map

- For a detailed layout of the university's facilities, including **student dormitories, dining halls, and IT&C services**, visit the official [campus page](#).

#### Student Guide

- The university provides a comprehensive **Student's Guide**, covering accommodation, transportation, and student services.
- Access the guide [here](#).

#### Resources for International Students

- If you're an **international student**, the university offers tailored resources to help you adjust to campus life and the city.
- More details are available on the [international students' page](#).

#### Contact Information

For specific inquiries or further assistance, you can contact the university:

- **Address:** 90 Panduri Street, Sector 5, 050663, Bucharest, Romania
- **Email:** [office@g.unibuc.ro](mailto:office@g.unibuc.ro)
- **Phone:** +40 21 305 97 30
- Faculty-specific contact details are available [here](#).

### 16.6 Student health

Through psychological counselling we get involved in finding solutions to overcome problematic situations which can affect a student's experience as a whole, starting from the entrance examination to graduation, by taking into account:

- getting through emotional difficulties
- support for self-knowledge
- the evaluation of values, interests and professional abilities
- stress management during exam sessions

You can register for a counselling session [here](#).

The students of the University of Bucharest benefit from free medical services, offered by the [Medical Consulting Room](#) found in the Mihail Kogălniceanu Dormitory.

The Medical Consulting Room belongs to the Bucharest Hospital Administration and has 12 employees (8 medics and 4 nurses), covering General Medicine and Stomatology specialisations.

At the University of Bucharest, students have access to free medical services through the Medical Consulting Room located in the Mihail Kogălniceanu Dormitory. This facility is staffed by a team of 12 professionals, including 8 doctors and 4 nurses, specializing in General Medicine and Stomatology. The consulting room operates Monday to Friday, from 08:00 to 19:00. All University of Bucharest students, regardless of their faculty or department, are eligible to use these services. <https://unibuc.ro/student-ub/campus/asistenta-medicala-gratuita/?lang=en>

#### Contact Information:

- **Phone:** +4021.315.71.87 ext. 138
- **Address:** 36-46 Mihail Kogălniceanu Blvd, Mihail Kogălniceanu Complex, Sector 5, Bucharest

### 16.7 Special needs and disability support

The University of Bucharest declared its institutional commitment to the social mission of ensuring an accessible, inclusive and open-minded educational environment and meeting the needs of students with disabilities in an attempt to remove barriers to access to higher education for vulnerable groups.

Thus, a series of measures were adopted aimed at supporting young people with special needs in fully accessing the opportunities and the administrative and educational services offered by the University of Bucharest.

At the same time, the University of Bucharest proposes and undertakes to strengthen the administrative capacity by diversifying the means of communication and support services and also to integrate accessibility standards in future projects aimed at adapting the physical and digital infrastructure to the needs of people with disabilities.

Here you can find the support services offered by the [University of Bucharest](#).

### 16.8 Resting and contemplation rooms

The students of the University of Bucharest have access to the Central University Library, one of the most modern in Europe ([www.bcub.ro](http://www.bcub.ro)). It has 12 specialized reading rooms, a reference section, a lending division and department for textbooks and other facilities fully computerized, with full permanent Internet access and access to Search -OCLC (Online Computer Library Centre). The Central University Library is located in Piata Revolutiei.

Each faculty of the University has also its own library where you can find books in the domain you study.

### 16.9 Student organisations

The University of Bucharest offers a diverse range of student organisations that enhance academic, cultural, and social experiences. Here are some key associations:

- **Association of Students at the University of Bucharest (ASUB)** – Represents students across all faculties, advocating for their rights and organising events to support personal and professional development.
- **Erasmus Student Network (ESN) UniBucharest** – Supports international students in integrating into university life through cultural events and social activities.

For more details on these and other student organisations, visit the [University of Bucharest's official website](#).

A free weekly guide named Sapte seri (Seven Evenings) will tell you everything: you want to know about cinemas, theatres, nightclubs, restaurants, pubs, sports rooms, art events, music, concerts, exhibitions and many other things. The guide is available in all public places, from the university buildings to cinemas and restaurants ([www.sapteseri.ro](http://www.sapteseri.ro)). Also a good guide of all restaurants, pubs and clubs in Bucharest is [www.afterhours.ro](http://www.afterhours.ro).

Besides that, all newspapers in Bucharest offer in their cultural pages information on cinema and theatre performances.

### 16.10 Language courses

The **University of Bucharest** offers various **language courses** for students, including:

- **Foreign Language Centre** – Courses in English, French, German, Spanish, Chinese, Arabic, and more. [Details here](#)
- **Preparatory Year for Romanian** – For international students studying in Romanian. [More info](#)
- **Summer Courses** – Intensive Romanian language & culture programmes. [Check here](#)

The Foreign Language Centre of the University of Bucharest awards certificates for the following languages: Romanian, English, French, German, Italian, Spanish, Hungarian, Russian, Czech, Slovakian, Polish, Bulgarian, Turkish, Arabic, Chinese etc.

Here you can find further information: [Link](#).

## 17 Description of the curriculum

| Legend                                       |                                                                                                                                                                                                                                                  |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Grading System:</b>                       | g = graded<br>ng = not graded (pass/fail)<br>nE = no exam                                                                                                                                                                                        |
| <b>Type of Exams/<br/>Study Requirement:</b> | WE = written assessment<br>OE = oral assessment<br>A = assignment / term paper, written report<br>R = report, presentation<br>LP = lab protocol / journal<br>SP = successful participation<br>PF = portfolio examination<br>MT = Master's thesis |
| <b>Duration of Assessment:</b>               | Duration of the assessment in <i>min</i>                                                                                                                                                                                                         |
| <b>Weighting:</b>                            | Weighting of grade for the module                                                                                                                                                                                                                |
| <b>CH:</b>                                   | Credit Hours                                                                                                                                                                                                                                     |
| <b>Status:</b>                               | c = compulsory<br>op = optional                                                                                                                                                                                                                  |
| <b>Type of Lecture:</b>                      | L = lecture<br>S = seminar<br>E = exercise/tutorial<br>FC = field course<br>LC = laboratory course<br>PR = project                                                                                                                               |
| <b>CR:</b>                                   | Credits (ECTS)                                                                                                                                                                                                                                   |

## 17.1 First semester at SU

| Module Number:<br>TRACEE_ST                                                   | Module Title:<br>System Thinking                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                  |        |    |                      | Type of Module:<br>Mandatory                      |                  |                |           |
|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--------|----|----------------------|---------------------------------------------------|------------------|----------------|-----------|
| Credits (ECTS)*                                                               | 3 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                  |        |    |                      |                                                   |                  |                |           |
| Workload*<br>- Contact Time<br>- Private Study                                | Workload:<br>90 h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Contact Time:<br>Depends on the selected courses |        |    |                      | Private Study:<br>Depends on the selected courses |                  |                |           |
| Duration of Module*<br>Module Coordinator                                     | 1 semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                  |        |    | Stockholm University |                                                   |                  |                |           |
| Regular Cycle*                                                                | Every academic year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                  |        |    |                      |                                                   |                  |                |           |
| Language                                                                      | English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                  |        |    |                      |                                                   |                  |                |           |
| Learning- / Teaching Forms*                                                   | Seminar, group work, collaborative learning, case studies, presentation<br>(Will be informed at the beginning of the selected course)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                  |        |    |                      |                                                   |                  |                |           |
| Module Content*                                                               | <ul style="list-style-type: none"><li>• Definition and core concepts of systems thinking</li><li>• Understanding complexity in environmental, social, and technological systems</li><li>• Characteristics of complex systems: emergence, nonlinearity, self-organization, and adaptation</li><li>• The role of uncertainty in systems analysis</li><li>• Introduction to complexity science and its relevance to climate, environment, and energy studies</li><li>• Integrating knowledge across disciplines: natural sciences, social sciences, engineering, and policy</li><li>• Transdisciplinary research: involving stakeholders in system design and problem-solving</li><li>• Designing sustainable systems using a systems thinking approach</li><li>• Ethical considerations and ensuring equity in system design</li></ul> |                                                  |        |    |                      |                                                   |                  |                |           |
| Qualification Goals*                                                          | Students will be able to discuss systems thinking and its history, central system concepts, as well as types of systems and their properties.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                  |        |    |                      |                                                   |                  |                |           |
|                                                                               | Students will develop a comprehensive understanding of system thinking principles. They will gain the ability to identify and analyse complex systems in the context of climate, environment, and energy.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                  |        |    |                      |                                                   |                  |                |           |
|                                                                               | Students will be able to apply system thinking frameworks to address interdisciplinary challenges related to climate change, environmental sustainability, and energy transitions. This includes recognizing the interdependencies between social, ecological, and technological systems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                  |        |    |                      |                                                   |                  |                |           |
|                                                                               | Students will learn how to engage in transdisciplinary collaboration, integrating knowledge from diverse fields such as science, policy, engineering, and social sciences. They will enhance their ability to communicate complex system dynamics to both experts and non-experts.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                  |        |    |                      |                                                   |                  |                |           |
| Prerequisites for the allocation of credits /grades (if necessary weighting)* | Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Type of Lecture                                  | Status | CH | CR                   | Type of Exam                                      | Duration of Exam | Grading System | Weighting |
|                                                                               | Selected Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | various                                          | c      | -  | 3                    | Written or oral                                   | -                | g              | -         |
| Applicability*                                                                | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                  |        |    |                      |                                                   |                  |                |           |
| Participation Prerequisites*                                                  | No prerequisites                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                  |        |    |                      |                                                   |                  |                |           |

|                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                  |        |    |                              |                                                   |                  |                |           |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--------|----|------------------------------|---------------------------------------------------|------------------|----------------|-----------|
| Module Number:<br>TRACEE_NSP                                                  | Module Title:<br>Climate, Environment and Energy – A Natural Science Perspective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                  |        |    | Type of Module:<br>Mandatory |                                                   |                  |                |           |
| Credits (ECTS)*                                                               | 9 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                  |        |    |                              |                                                   |                  |                |           |
| Workload*<br>- Contact Time<br>- Private Study                                | Workload:<br>270 h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Contact Time:<br>Depends on the selected courses |        |    |                              | Private Study:<br>Depends on the selected courses |                  |                |           |
| Duration of Module*<br>Module Coordinator                                     | 1 semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                  |        |    | Stockholm University         |                                                   |                  |                |           |
| Regular Cycle*                                                                | Every academic year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                  |        |    |                              |                                                   |                  |                |           |
| Language                                                                      | English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                  |        |    |                              |                                                   |                  |                |           |
| Learning- / Teaching Forms*                                                   | Seminar, group work, collaborative learning, case studies, presentation<br>(Will be informed at the beginning of the selected course)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                  |        |    |                              |                                                   |                  |                |           |
| Module Content*                                                               | <ul style="list-style-type: none"><li>• Introduction to Natural Science Perspectives on Climate, Environment, and Energy</li><li>• Climate Science and its Drivers</li><li>• The Earth System and Interactions</li><li>• Biodiversity and Ecosystem Dynamics</li><li>• Energy Systems and Natural Resource Use</li><li>• Climate-Environment-Energy Interactions</li><li>• Environmental Pollution and Contaminants</li><li>• Climate Change Impacts on the Earth System</li><li>• Climate Change Mitigation and Adaptation from a Natural Science Perspective</li><li>• The Role of Natural Science in Environmental Policy and Global Governance</li><li>• Emerging Topics in Natural Sciences and Environmental Change</li></ul> |                                                  |        |    |                              |                                                   |                  |                |           |
| Qualification Goals*                                                          | Students will be able to describe energy and matter and their transfer within the Earth's system, as well as solutions for future energy supply. They can describe global biogeochemical cycles, ecosystem services, and biodiversity, as well as the risks they face due to global environmental changes.                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                  |        |    |                              |                                                   |                  |                |           |
|                                                                               | Students will be able to explain the climate system, drivers and feedback mechanisms, as well as Earth's past, present, and future climate. They will develop the ability to explain key concepts such as the greenhouse effect, energy flow, carbon cycles, ecosystem dynamics, and the interactions between natural and human systems.                                                                                                                                                                                                                                                                                                                                                                                            |                                                  |        |    |                              |                                                   |                  |                |           |
|                                                                               | Students will be able to apply systems thinking to complex environmental and energy challenges, recognizing the interconnectedness of climate, ecosystems, and energy systems. They will be proficient in analysing the interactions and feedbacks between natural systems, human activities, and technological interventions.                                                                                                                                                                                                                                                                                                                                                                                                      |                                                  |        |    |                              |                                                   |                  |                |           |
|                                                                               | Students will develop the ability to effectively communicate complex scientific concepts related to climate, environment, and energy to both specialist and non-specialist audiences. They will be able to convey the significance of scientific data and findings to policymakers, stakeholders, and the general public in an accessible and compelling manner.                                                                                                                                                                                                                                                                                                                                                                    |                                                  |        |    |                              |                                                   |                  |                |           |
|                                                                               | Students will be equipped to integrate scientific knowledge into environmental and climate policy development. They will learn how to use natural science data to inform decision-making processes, especially in the context of global climate negotiations, energy transitions, and sustainable development.                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                  |        |    |                              |                                                   |                  |                |           |
|                                                                               | Students will develop interdisciplinary skills, collaborating with experts from various fields (e.g., social sciences, engineering, policy) to address complex climate and environmental issues. They will also refine their critical thinking skills to assess and challenge existing scientific theories and assumptions, contributing to more effective, evidence-based solutions.                                                                                                                                                                                                                                                                                                                                               |                                                  |        |    |                              |                                                   |                  |                |           |
| Prerequisites for the allocation of credits /grades (if necessary weighting)* | Students will understand the ethical implications of environmental and climate science. They will develop a strong commitment to sustainability and social responsibility, considering the long-term impacts of scientific solutions on global ecosystems, human communities, and future generations.                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                  |        |    |                              |                                                   |                  |                |           |
|                                                                               | Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Type of Lecture                                  | Status | CH | CR                           | Type of Exam                                      | Duration of Exam | Grading System | Weighting |
|                                                                               | Selected Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | various                                          | c      | -  | 9                            | Written or oral                                   | -                | g              | -         |

|                              |                  |  |  |  |  |  |  |  |  |
|------------------------------|------------------|--|--|--|--|--|--|--|--|
|                              |                  |  |  |  |  |  |  |  |  |
| Applicability*               | -                |  |  |  |  |  |  |  |  |
| Participation Prerequisites* | No prerequisites |  |  |  |  |  |  |  |  |

|                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                  |        |    |                              |                                                   |                  |                |           |
|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--------|----|------------------------------|---------------------------------------------------|------------------|----------------|-----------|
| Module Number:<br>TRACEE_SSP                                                  | Module Title:<br>Climate, Environment and Energy – A Social Science Perspective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                  |        |    | Type of Module:<br>Mandatory |                                                   |                  |                |           |
| Credits (ECTS)*                                                               | 9 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                  |        |    |                              |                                                   |                  |                |           |
| Workload*<br>- Contact Time<br>- Private Study                                | Workload:<br>270 h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Contact Time:<br>Depends on the selected courses |        |    |                              | Private Study:<br>Depends on the selected courses |                  |                |           |
| Duration of Module*<br>Module Coordinator                                     | 1 semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                  |        |    | Stockholm University         |                                                   |                  |                |           |
| Regular Cycle*                                                                | Every academic year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                  |        |    |                              |                                                   |                  |                |           |
| Language                                                                      | English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                  |        |    |                              |                                                   |                  |                |           |
| Learning- / Teaching Forms*                                                   | Seminar, group work, collaborative learning, case studies, presentation<br>(Will be informed at the beginning of the selected course)                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                  |        |    |                              |                                                   |                  |                |           |
| Module Content*                                                               | <ul style="list-style-type: none"><li>• Introduction to Social Science Perspectives on Climate, Environment, and Energy</li><li>• The Political Economy of Climate Change and Environmental Issues</li><li>• Environmental Policy and Governance</li><li>• Social Movements, Public Opinion, and Climate Activism</li><li>• Energy Systems and Social Equity</li><li>• Ethics, Responsibility, and Climate Justice</li><li>• Social Science Methods for Climate and Environmental Research</li><li>• Future of Climate, Environment, and Energy Governance</li></ul> |                                                  |        |    |                              |                                                   |                  |                |           |
| Qualification Goals*                                                          | Students will gain a deep understanding of the key concepts and theoretical frameworks from social sciences (e.g., sociology, economics, political science, anthropology) used to analyse climate change, environmental issues, and energy transitions.                                                                                                                                                                                                                                                                                                              |                                                  |        |    |                              |                                                   |                  |                |           |
|                                                                               | Students can describe past, present, and future economics, politics, and policies on energy systems, environment, and climate change. They are able to discuss the international, European, and national legal framework for climate, environmental, and energy policies and the transition.                                                                                                                                                                                                                                                                         |                                                  |        |    |                              |                                                   |                  |                |           |
|                                                                               | Students are able to discuss knowledge, behaviour and action in relation to climate change, as well as the role of communication and education in addressing environmental and climate challenges.                                                                                                                                                                                                                                                                                                                                                                   |                                                  |        |    |                              |                                                   |                  |                |           |
|                                                                               | Students will develop the ability to assess the social implications of climate change, such as environmental justice, vulnerability, inequality, and power relations. They will analyse how social factors including gender, race, class, and access to resources, intersect with climate impacts and energy systems.                                                                                                                                                                                                                                                |                                                  |        |    |                              |                                                   |                  |                |           |
|                                                                               | Students will acquire the skills to analyse environmental and climate policies, governance structures, and institutions at local, national, and international levels. They will evaluate the effectiveness of different policy responses, such as carbon pricing, climate adaptation strategies, and renewable energy transitions, through a social science lens.                                                                                                                                                                                                    |                                                  |        |    |                              |                                                   |                  |                |           |
| Prerequisites for the allocation of credits /grades (if necessary weighting)* | Students will understand the global-local dynamics of environmental and energy systems, analysing how global climate change and energy policies interact with local contexts, cultures, and practices.                                                                                                                                                                                                                                                                                                                                                               |                                                  |        |    |                              |                                                   |                  |                |           |
|                                                                               | Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Type of Lecture                                  | Status | CH | CR                           | Type of Exam                                      | Duration of Exam | Grading System | Weighting |
|                                                                               | Selected Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | various                                          | c      | -  | 9                            | Written or oral                                   | -                | g              | -         |
| Applicability*                                                                | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                  |        |    |                              |                                                   |                  |                |           |
| Participation Prerequisites*                                                  | No prerequisites                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                  |        |    |                              |                                                   |                  |                |           |

|                       |                      |                        |
|-----------------------|----------------------|------------------------|
| <b>Module Number:</b> | <b>Module Title:</b> | <b>Type of Module:</b> |
|-----------------------|----------------------|------------------------|



|                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                 |                                                  |    |    |                      |                                                   |                |           |  |
|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------------------------------------------|----|----|----------------------|---------------------------------------------------|----------------|-----------|--|
| TRACEE_HP                                                                     | Climate, Environment and Energy – A Humanities Perspective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                                                  |    |    | Mandatory            |                                                   |                |           |  |
| Credits (ECTS)*                                                               | 6 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 |                                                  |    |    |                      |                                                   |                |           |  |
| Workload*<br>- Contact Time<br>- Private Study                                | Workload:<br>180 h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                 | Contact Time:<br>Depends on the selected courses |    |    |                      | Private Study:<br>Depends on the selected courses |                |           |  |
| Duration of Module*<br>Module Coordinator                                     | 1 semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                                                  |    |    | Stockholm University |                                                   |                |           |  |
| Regular Cycle*                                                                | Every academic year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |                                                  |    |    |                      |                                                   |                |           |  |
| Language                                                                      | English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |                                                  |    |    |                      |                                                   |                |           |  |
| Learning- / Teaching Forms*                                                   | Seminar, group work, collaborative learning, case studies, presentation<br>(Will be informed at the beginning of the selected course)                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |                                                  |    |    |                      |                                                   |                |           |  |
| Module Content*                                                               | <ul style="list-style-type: none"><li>• Introduction to Humanities Perspectives on Climate, Environment, and Energy</li><li>• Environmental Ethics and Justice</li><li>• Cultural Narratives and Climate Change</li><li>• History of Environmental Thought and Action</li><li>• Philosophy of Nature and Human-Nature Relationship</li><li>• The Role of Art and Literature in Shaping Environmental Consciousness</li><li>• Technology, Innovation, and Cultural Responses to Climate and Energy Challenges</li><li>• Future Visions: Imagining Sustainable Futures</li></ul> |                 |                                                  |    |    |                      |                                                   |                |           |  |
| Qualification Goals*                                                          | Students will develop a deep understanding of how the humanities (e.g., philosophy, history, literature, ethics, cultural studies) contribute to the analysis of climate change, environmental issues, and energy systems.                                                                                                                                                                                                                                                                                                                                                     |                 |                                                  |    |    |                      |                                                   |                |           |  |
|                                                                               | Students can discuss historical, literary, aesthetic, and philosophical aspects of environmental thinking and addressing concerns about climate and the environment. Students will understand the historical roots of current environmental and energy crises, exploring past environmental transformations, colonialism, industrialization, and their lasting impacts on contemporary climate and energy systems.                                                                                                                                                             |                 |                                                  |    |    |                      |                                                   |                |           |  |
|                                                                               | Students will explore how literature, art, and media have represented and influenced public perceptions of climate change, energy, and the environment. They will develop the ability to analyse environmental storytelling, symbolism, and cultural expressions of sustainability, environmental degradation, and the Anthropocene.                                                                                                                                                                                                                                           |                 |                                                  |    |    |                      |                                                   |                |           |  |
|                                                                               | Students will explore how climate change and environmental issues are framed through political, social, and economic discourse, and how these narratives shape public policy, scientific understanding, and collective action. They will analyse how different narratives (e.g., crisis, opportunity, denial) influence the public's perception of climate change and environmental issues, and how these narratives can be leveraged to promote climate action.                                                                                                               |                 |                                                  |    |    |                      |                                                   |                |           |  |
|                                                                               | Students will develop the skills to collaborate across disciplines, integrating humanistic perspectives with natural and social science research to address climate, environmental, and energy challenges. They will learn how to bridge the gap between scientific knowledge and societal values, ensuring that policy and solutions reflect not only technical feasibility but also cultural and ethical considerations.                                                                                                                                                     |                 |                                                  |    |    |                      |                                                   |                |           |  |
| Prerequisites for the allocation of credits /grades (if necessary weighting)* | Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Type of Lecture | Status                                           | CH | CR | Type of Exam         | Duration of Exam                                  | Grading System | Weighting |  |
|                                                                               | Selected Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | various         | c                                                | -  | 6  | Written or oral      | -                                                 | g              | -         |  |
| Applicability*                                                                | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |                                                  |    |    |                      |                                                   |                |           |  |
| Participation Prerequisites*                                                  | No prerequisites                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                                                  |    |    |                      |                                                   |                |           |  |

|                                                                               |                                                                                                                                                                                                                                                                                                                                                                                           |                                                  |        |    |                      |                                                   |                  |                |           |
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| Module Number:<br>TRACEE_CK                                                   | Module Title:<br>Creating Knowledge Through Transdisciplinary Methods                                                                                                                                                                                                                                                                                                                     |                                                  |        |    |                      | Type of Module:<br>Mandatory                      |                  |                |           |
| Credits (ECTS)*                                                               | 3 CP                                                                                                                                                                                                                                                                                                                                                                                      |                                                  |        |    |                      |                                                   |                  |                |           |
| Workload*<br>- Contact Time<br>- Private Study                                | Workload:<br>90 h                                                                                                                                                                                                                                                                                                                                                                         | Contact Time:<br>Depends on the selected courses |        |    |                      | Private Study:<br>Depends on the selected courses |                  |                |           |
| Duration of Module*<br>Module Coordinator                                     | 1 semester                                                                                                                                                                                                                                                                                                                                                                                |                                                  |        |    | Stockholm University |                                                   |                  |                |           |
| Regular Cycle*                                                                | Every academic year                                                                                                                                                                                                                                                                                                                                                                       |                                                  |        |    |                      |                                                   |                  |                |           |
| Language                                                                      | English                                                                                                                                                                                                                                                                                                                                                                                   |                                                  |        |    |                      |                                                   |                  |                |           |
| Learning- / Teaching Forms*                                                   | Seminar, group work, collaborative learning, case studies, presentation<br>(Will be informed at the beginning of the selected course)                                                                                                                                                                                                                                                     |                                                  |        |    |                      |                                                   |                  |                |           |
| Module Content*                                                               | Introduction to Transdisciplinary Knowledge Creation<br>Methods and Tools for Creating Knowledge through Transdisciplinary Methods<br>Collaborative Knowledge<br>Creation in Transdisciplinary research: Case Studies                                                                                                                                                                     |                                                  |        |    |                      |                                                   |                  |                |           |
| Qualification Goals*                                                          | Students can describe methods for involving society in different cultural contexts for knowledge generation and case studies of transdisciplinary research.                                                                                                                                                                                                                               |                                                  |        |    |                      |                                                   |                  |                |           |
|                                                                               | Students will acquire a comprehensive understanding of the principles and practices of transdisciplinary research, particularly the role of community collaboration in generating knowledge. They will understand how integrating local and community-based knowledge with scientific expertise can lead to more effective solutions for climate, environment, and energy challenges.     |                                                  |        |    |                      |                                                   |                  |                |           |
|                                                                               | Students will acquire skills to effectively translate and disseminate research findings in accessible formats for diverse community audiences, ensuring that research benefits are shared and understood by those directly affected. They will develop strategies for knowledge translation that respect community preferences and enhance local capacity for decision-making and action. |                                                  |        |    |                      |                                                   |                  |                |           |
| Prerequisites for the allocation of credits /grades (if necessary weighting)* | Courses                                                                                                                                                                                                                                                                                                                                                                                   | Type of Lecture                                  | Status | CH | CR                   | Type of Exam                                      | Duration of Exam | Grading System | Weighting |
|                                                                               | Selected Courses                                                                                                                                                                                                                                                                                                                                                                          | various                                          | c      | -  | 3                    | Written or oral                                   | -                | g              | -         |
| Applicability*                                                                | -                                                                                                                                                                                                                                                                                                                                                                                         |                                                  |        |    |                      |                                                   |                  |                |           |
| Participation Prerequisites*                                                  | No prerequisites                                                                                                                                                                                                                                                                                                                                                                          |                                                  |        |    |                      |                                                   |                  |                |           |

## 17.2 Second semester at SU

|                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                  |        |    |          |                                                   |                  |                |           |  |
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| Module Number:<br>MI7015                                                      | Module Title:<br>Toxicology for Environmental Scientists                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                  |        |    |          | Type of Module:<br>Mandatory                      |                  |                |           |  |
| Credits (ECTS)*                                                               | 7.5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                  |        |    |          |                                                   |                  |                |           |  |
| Workload*<br>- Contact Time<br>- Private Study                                | Workload:<br>225 h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Contact Time:<br>Depends on the selected courses |        |    |          | Private Study:<br>Depends on the selected courses |                  |                |           |  |
| Duration of Module*<br>Module Coordinator                                     | 1 semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                  |        |    | J.Martin |                                                   |                  |                |           |  |
| Regular Cycle*                                                                | Every academic year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                  |        |    |          |                                                   |                  |                |           |  |
| Language                                                                      | English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                  |        |    |          |                                                   |                  |                |           |  |
| Learning- / Teaching Forms*                                                   | Lectures, seminars, exercises, laboratory experiments and a project work                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                  |        |    |          |                                                   |                  |                |           |  |
| Module Content*                                                               | <p>This course addresses toxicological fundamental principles with the aim of understanding the hazards that chemical pollutants pose to living organisms. The course provides knowledge about standard methods for toxicity testing, technical terminology, dose-response relationships, and the estimation of chemical and biological factors affecting the toxicity of pollutants under different exposure scenarios. The course covers:</p> <ul style="list-style-type: none"><li>• Experimental methods and basic statistics used in toxicological testing</li><li>• Key toxicological concepts, such as dose-response relationships, target receptors, and mechanisms of action</li><li>• Toxicological effects at the molecular, individual, and population levels</li><li>• Absorption, distribution, metabolism, and excretion (ADME), taking into account the unique anatomy and biochemistry of exposed organisms, as well as the physicochemical properties of different chemical pollutants</li></ul> |                                                  |        |    |          |                                                   |                  |                |           |  |
| Qualification Goals*                                                          | <p>The students can</p> <ul style="list-style-type: none"><li>– explain how environmental pollutants can be absorbed in living organisms, distributed to different tissues, metabolized, and excreted</li><li>– explain, at the molecular level, how various properties of environmental pollutants can cause different toxic effects</li><li>– discuss the possibilities and limitations of various testing methods used to study the toxic effects of environmental pollutants.</li><li>– apply relevant statistical methods to analyse toxicological datasets</li><li>– communicate in writing and orally about ADME (absorption, distribution, metabolism, and excretion) and the toxicity of an environmental pollutant</li></ul>                                                                                                                                                                                                                                                                             |                                                  |        |    |          |                                                   |                  |                |           |  |
| Prerequisites for the allocation of credits /grades (if necessary weighting)* | Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Type of Lecture                                  | Status | CH | CR       | Type of Exam                                      | Duration of Exam | Grading System | Weighting |  |
|                                                                               | Selected Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | various                                          | c      | -  | 7.5      | Written or oral                                   | -                | g              | -         |  |
| Applicability*                                                                | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                  |        |    |          |                                                   |                  |                |           |  |
| Participation Prerequisites*                                                  | <p>Requires knowledge equivalent to</p> <ul style="list-style-type: none"><li>– Bachelor of Science, or its equivalent, including at least 30 ECTS in chemistry</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                  |        |    |          |                                                   |                  |                |           |  |

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| Module Number:<br>MI8022                                                      | Module Title:<br>Risk assessment and regulation of chemicals                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                                                  |    |     | Type of Module:<br>Mandatory |                                                   |                |           |  |
| Credits (ECTS)*                                                               | 7.5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                                                  |    |     |                              |                                                   |                |           |  |
| Workload*<br>- Contact Time<br>- Private Study                                | Workload:<br>225 h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                 | Contact Time:<br>Depends on the selected courses |    |     |                              | Private Study:<br>Depends on the selected courses |                |           |  |
| Duration of Module*<br>Module Coordinator                                     | 1 semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                                                  |    |     | M. Ågerstrand                |                                                   |                |           |  |
| Regular Cycle*                                                                | Every academic year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |                                                  |    |     |                              |                                                   |                |           |  |
| Language                                                                      | English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 |                                                  |    |     |                              |                                                   |                |           |  |
| Learning- / Teaching Forms*                                                   | Lectures, seminars and individual project work                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                 |                                                  |    |     |                              |                                                   |                |           |  |
| Module Content*                                                               | <ul style="list-style-type: none"><li>• The course explores the general principles of regulatory risk assessment of chemicals</li><li>• Concepts that will be covered include: Hazard assessment, dose-response, exposure assessment, and risk characterization</li><li>• An overarching theme will be the use of different types of scientific data in risk assessment and how data are evaluated and weighed in the process</li><li>• In addition, the course will introduce the system for regulating chemicals within the European Union and internationally</li></ul> |                 |                                                  |    |     |                              |                                                   |                |           |  |
| Qualification Goals*                                                          | <p>The students can</p> <ul style="list-style-type: none"><li>• demonstrate understanding of the methodology and principles of hazard and risk assessments of chemicals</li><li>• demonstrate understanding of how scientific data is assessed, valued and used for hazard and risk assessment of chemicals</li><li>• demonstrate understanding of the chemicals regulation in Europe and international agreements and treaties</li><li>• critically examine a risk assessment</li></ul>                                                                                   |                 |                                                  |    |     |                              |                                                   |                |           |  |
| Prerequisites for the allocation of credits /grades (if necessary weighting)* | Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Type of Lecture | Status                                           | CH | CR  | Type of Exam                 | Duration of Exam                                  | Grading System | Weighting |  |
|                                                                               | Selected Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | various         | c                                                | -  | 7.5 | Written or oral              | -                                                 | g              | -         |  |
| Applicability*                                                                | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |                                                  |    |     |                              |                                                   |                |           |  |
| Participation Prerequisites*                                                  | <p>Requires knowledge equivalent to</p> <ul style="list-style-type: none"><li>– Large Scale Challenges to Climate and Environment, 15 credits (MI7014)</li><li>– Toxicology for Environmental Scientists, 7.5 credits, (MI7015)</li></ul>                                                                                                                                                                                                                                                                                                                                  |                 |                                                  |    |     |                              |                                                   |                |           |  |

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| Module Number:<br>MI8021                                                      | Module Title:<br>Environmental Field Studies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 |                                                  |    |            | Type of Module:<br>Mandatory                      |                  |                |           |
| Credits (ECTS)*                                                               | 7.5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                                                  |    |            |                                                   |                  |                |           |
| Workload*<br>- Contact Time<br>- Private Study                                | Workload:<br>225 h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 | Contact Time:<br>Depends on the selected courses |    |            | Private Study:<br>Depends on the selected courses |                  |                |           |
| Duration of Module*<br>Module Coordinator                                     | 1 semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                 |                                                  |    | S. Jonsson |                                                   |                  |                |           |
| Regular Cycle*                                                                | Every academic year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 |                                                  |    |            |                                                   |                  |                |           |
| Language                                                                      | English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                 |                                                  |    |            |                                                   |                  |                |           |
| Learning- / Teaching Forms*                                                   | Lectures, seminars and excursions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |                                                  |    |            |                                                   |                  |                |           |
| Module Content*                                                               | <ul style="list-style-type: none"><li>• The course discusses the principles of planning and conducting field investigations in environmental science</li><li>• Field excursions provide knowledge of the composition and structure of different environmental compartments: Soil systems, inland water systems, coastal systems and the lower atmosphere</li><li>• Hands-on experience with sampling and measurement of core environmental properties as well as demonstration of state-of-the-art techniques</li><li>• Each field excursion is followed by seminars and exercises where biogeochemical concepts and processes are evaluated</li></ul> |                 |                                                  |    |            |                                                   |                  |                |           |
| Qualification Goals*                                                          | <p>The students can</p> <ul style="list-style-type: none"><li>• describe the composition and function of environmental compartments using biogeochemical concepts and core parameters</li><li>• design and plan field investigations</li><li>• give examples of state-of-the-art field techniques</li><li>• describe basic principles behind the field sampling and measurement methods</li><li>• interpret and draw quantitative and qualitative conclusion from environmental data and be aware of sources of uncertainties</li><li>• reflect on advantages and limitations of model-, experimental- and field-based studies</li></ul>               |                 |                                                  |    |            |                                                   |                  |                |           |
| Prerequisites for the allocation of credits /grades (if necessary weighting)* | Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Type of Lecture | Status                                           | CH | CR         | Type of Exam                                      | Duration of Exam | Grading System | Weighting |
|                                                                               | Selected Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | various         | c                                                | -  | 7.5        | Written or oral                                   | -                | g              | -         |
| Applicability*                                                                | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |                                                  |    |            |                                                   |                  |                |           |
| Participation Prerequisites*                                                  | <p>Knowledge equivalent to 30 credits on</p> <ul style="list-style-type: none"><li>• the Master's programme in Environmental Science with a focus on Environmental Chemistry and Toxicology</li><li>• Or the Master's programme in Environmental Science with a focus on Atmosphere, Biogeochemistry, Climate including the course Large Scale Challenges to the Climate and the Environment, 15 credits, (MI7014)</li></ul>                                                                                                                                                                                                                           |                 |                                                  |    |            |                                                   |                  |                |           |

| Module Number:<br>MI8017                                                      | Module Title:<br>Environmental Biogeochemistry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 |                                                  |    |                                   | Type of Module:<br>Mandatory                      |                  |                |           |
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| Credits (ECTS)*                                                               | 7,5 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 |                                                  |    |                                   |                                                   |                  |                |           |
| Workload*<br>- Contact Time<br>- Private Study                                | Workload:<br>225 h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 | Contact Time:<br>Depends on the selected courses |    |                                   | Private Study:<br>Depends on the selected courses |                  |                |           |
| Duration of Module*<br>Module Coordinator                                     | 1 semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 |                                                  |    | S. Jonsson (2024), B. Wild (2025) |                                                   |                  |                |           |
| Regular Cycle*                                                                | Every academic year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |                                                  |    |                                   |                                                   |                  |                |           |
| Language                                                                      | English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |                                                  |    |                                   |                                                   |                  |                |           |
| Learning- / Teaching Forms*                                                   | Lectures, exercises and seminar workshops                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |                                                  |    |                                   |                                                   |                  |                |           |
| Module Content*                                                               | <ul style="list-style-type: none"><li>• The course explores interactions between natural systems, biogeochemical cycles and anthropogenic (human-induced) perturbations with focus on the local-regional scale</li><li>• The course will provide knowledge about:</li><li>• Biogeochemical processes in soil, inland waters, coastal ocean, sediments and lower atmosphere</li><li>• Interactions between biogeochemical cycles of several elements, and their seasonal and regional variations</li><li>• Key anthropogenic perturbations and their interactions with regional biogeochemical cycles</li><li>• Effects of natural processes and perturbations on the fate and bioavailability of contaminants</li><li>• The role of biogeochemistry in environmental management concepts and tools, such as in ecosystem services and the EU Water Framework Directive</li></ul> |                 |                                                  |    |                                   |                                                   |                  |                |           |
| Qualification Goals*                                                          | <p>The students can</p> <ul style="list-style-type: none"><li>• describe coupled biogeochemical cycling of carbon, nutrients and other elements in local-regional terrestrial and aquatic systems</li><li>• explain how anthropogenic perturbations, such as eutrophication and acidification, interact with biogeochemical cycles</li><li>• outline environmental cycling of contaminants and their coupling to cycling of other elements and anthropogenic perturbations</li><li>• discuss consequences of anthropogenic perturbation on biogeochemical cycles for e.g. ecosystem services</li></ul>                                                                                                                                                                                                                                                                           |                 |                                                  |    |                                   |                                                   |                  |                |           |
| Prerequisites for the allocation of credits /grades (if necessary weighting)* | Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Type of Lecture | Status                                           | CH | CR                                | Type of Exam                                      | Duration of Exam | Grading System | Weighting |
|                                                                               | Selected Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | various         | c                                                | -  | 7,5                               | Written or oral                                   | -                | g              | -         |
| Applicability*                                                                | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                 |                                                  |    |                                   |                                                   |                  |                |           |
| Participation Prerequisites*                                                  | Requires knowledge equivalent to <ul style="list-style-type: none"><li>– Large Scale Challenges to Climate and Environment, 15 credits (MI7014)</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |                                                  |    |                                   |                                                   |                  |                |           |

### 17.3 Third semester at UT

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| Module Number:<br>M 207                                                       | Module Title:<br>Environmental Chemistry                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                 |                               |    |       | Type of Module:<br>Mandatory |                  |                |           |
| Credits (ECTS)*                                                               | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                 |                               |    |       |                              |                  |                |           |
| Workload*<br>- Contact Time<br>- Private Study                                | Workload:<br>180 h                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 | Contact Time:<br>90 h / 6 SWS |    |       | Private Study:<br>90 h       |                  |                |           |
| Duration of Module*<br>Module coordinator                                     | 1 semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 |                               |    | Zarfl |                              |                  |                |           |
| Regular Cycle*                                                                | Every winter semester, recommended for 1 <sup>st</sup> semester                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |                               |    |       |                              |                  |                |           |
| Language                                                                      | English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |                               |    |       |                              |                  |                |           |
| Learning- / Teaching Forms*                                                   | Lectures, Exercises, Tutorial, Teamwork                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |                               |    |       |                              |                  |                |           |
| Module Content*                                                               | <ul style="list-style-type: none"><li>• Chemical thermodynamics in aqueous systems</li><li>• Sorption and partitioning processes of organic and inorganic compounds</li><li>• Sorption kinetics</li><li>• Practical applications and case studies</li></ul>                                                                                                                                                                                                                                      |                 |                               |    |       |                              |                  |                |           |
| Qualification Goals*                                                          | <ul style="list-style-type: none"><li>• Role of particles as sorbents, vectors and reactants for contaminants</li><li>• Quantitative understanding of partitioning and sorption mechanisms of organic and inorganic compounds in the hydrosphere</li><li>• Knowledge of sorption QSARs for various classes of contaminants</li><li>• Sorption kinetics and retarded diffusion in porous media</li><li>• Assessment of contaminant release and cleanup strategies at contaminated sites</li></ul> |                 |                               |    |       |                              |                  |                |           |
| Prerequisites for the allocation of credits /grades (if necessary weighting)* | Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Type of Lecture | Status                        | CH | CR    | Type of Exam                 | Duration of Exam | Grading System | Weighting |
|                                                                               | Environmental Chemistry Lecture                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | L               | c                             | 2  | 6     | WE                           | 120              | g              | 1         |
|                                                                               | Environmental Chemistry Exercises                                                                                                                                                                                                                                                                                                                                                                                                                                                                | E               | c                             | 2  |       |                              |                  |                |           |
|                                                                               | Environmental Chemistry Tutorials                                                                                                                                                                                                                                                                                                                                                                                                                                                                | E               | c                             | 2  |       |                              |                  |                |           |
| Applicability*                                                                | MSc Applied & Environmental Geoscience (c), MSc Geoökologie (e), MSc Geowissenschaften (e)                                                                                                                                                                                                                                                                                                                                                                                                       |                 |                               |    |       |                              |                  |                |           |
| Participation Prerequisites*                                                  | Basic knowledge in Chemistry, Physics, Hydrogeology                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |                               |    |       |                              |                  |                |           |



| Module Number:<br>M 218                                                       | Module Title:<br>Environmental Analytical Chemistry                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 |                               |    |         | Type of Module:<br>Mandatory |                  |                |           |
|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------------------|----|---------|------------------------------|------------------|----------------|-----------|
| Credits (ECTS)*                                                               | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |                               |    |         |                              |                  |                |           |
| Workload*<br>- Contact Time<br>- Private Study                                | Workload:<br>180 h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 | Contact Time:<br>90 h / 6 SWS |    |         | Private Study:<br>90 h       |                  |                |           |
| Duration of Module*<br>Module Coordinator                                     | 1 semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                 |                               |    | Zwiener |                              |                  |                |           |
| Regular Cycle*                                                                | Every winter semester (recommended for the 1 <sup>st</sup> semester)                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 |                               |    |         |                              |                  |                |           |
| Language                                                                      | English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                 |                               |    |         |                              |                  |                |           |
| Learning- / Teaching Forms*                                                   | The module combines classroom lectures and exercises with a one week laboratory practical course, which allows students to apply their theoretical classroom knowledge and gain practical laboratory skills. Regular homework and lab presentations give feedback on individual study progress.                                                                                                                                                                                                                        |                 |                               |    |         |                              |                  |                |           |
| Module Content*                                                               | The module focuses on: <ul style="list-style-type: none"><li>• Analysis of new emerging and polar compounds in environmental media</li><li>• Basic principles of atmospheric pressure ionization techniques and mass spectrometry</li><li>• Advanced applications of instrumental analytical techniques with liquid chromatography-mass spectrometry</li><li>• Special approaches for ultratrace analysis</li></ul>                                                                                                    |                 |                               |    |         |                              |                  |                |           |
| Qualification Goals*                                                          | Students understand the properties of polar compounds. They acquire the theoretical competence to select appropriate problem-oriented analytical methods for environmental pollutants.<br>At the same time the acquired practical skills allow them to handle sophisticated analytical instruments and to develop suitable analytical methods for variable contamination scenarios on demand.<br>Both, the theoretical knowledge and the practical laboratory skills are key competences for environmental scientists. |                 |                               |    |         |                              |                  |                |           |
| Prerequisites for the allocation of credits /grades (if necessary weighting)* | Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Type of Lecture | Status                        | CH | CR      | Type of Exam                 | Duration of Exam | Grading System | Weighting |
|                                                                               | Environmental Analytical Chemistry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | L               | c                             | 3  | 3       | WE                           | 120              | g              | 0,5       |
|                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | LC              | c                             | 3  | 3       | LP                           | -                | g              | 0,5       |
| Applicability*                                                                | The module is an elective module in the MSc Applied & Environmental Geoscience, MSc Geoökologie, MSc Geowissenschaften                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                               |    |         |                              |                  |                |           |
| Participation Prerequisites*                                                  | Basic knowledge in chemistry, environmental analytics and statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |                               |    |         |                              |                  |                |           |

| Module Number:<br>M 236                                                       | Module Title:<br>Modelling for Sustainable River Management                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 |                               |    | Type of Module:<br>Mandatory |                         |                  |                |           |
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| Credits (ECTS)*                                                               | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                               |    |                              |                         |                  |                |           |
| Workload*<br>- Contact Time<br>- Private Study                                | Workload:<br>180 h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                 | Contact Time:<br>60 h / 4 SWS |    |                              | Private Study:<br>120 h |                  |                |           |
| Duration of Module*<br>Module Coordinator                                     | 1 semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |                               |    |                              | Zarfl                   |                  |                |           |
| Regular Cycle*                                                                | Every wintersemester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |                               |    |                              |                         |                  |                |           |
| Language                                                                      | English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 |                               |    |                              |                         |                  |                |           |
| Learning- / Teaching Forms*                                                   | Lecture and accompanying seminar (exercises, presentations, discussions)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |                               |    |                              |                         |                  |                |           |
| Module Content*                                                               | <ul style="list-style-type: none"><li>• Introduction into different mathematical modelling approaches to describe environmental processes with a specific focus on freshwater ecosystems (including differential systems but beyond), parameter estimation techniques and uncertainty analysis</li><li>• Understanding interdependent environmental system dynamics within the (socio-)hydrological cycle across scales and system boundaries</li><li>• Application of models to environmental challenges</li><li>• Models as tools for decision/discussion support/ sustainable water management</li></ul>                                                                                                       |                 |                               |    |                              |                         |                  |                |           |
| Qualification Goals*                                                          | The students are familiar with a variety of modelling approaches and their suitability for specific research questions related to environmental processes. They can deal with uncertainty in parameter values and model structure; evaluate model results and simulated system dynamics. They are aware of current developments in environmental systems analysis and can discuss strengths and weaknesses of applied model approaches. Drawing from a solid understanding of mathematical modeling and socio-hydrological interdependencies, they can critically analyse the role of conceptual and mathematical models in decision support and sustainable water management across spatial and temporal scales. |                 |                               |    |                              |                         |                  |                |           |
| Prerequisites for the allocation of credits /grades (if necessary weighting)* | Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Type of Lecture | Status                        | CH | CR                           | Type of Exam            | Duration of Exam | Grading System | Weighting |
|                                                                               | Modelling and Simulation for Environmental Process Understanding                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | L               | c                             | 2  | 6                            | A                       | -                | g              | 0.5       |
|                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | S               | c                             | 2  |                              | R                       | -                | g              | 0.5       |
| Applicability*                                                                | M.Sc. Geoökologie/Geoecologie, M.Sc. Applied & Environmental Geoscience                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 |                               |    |                              |                         |                  |                |           |
| Participation Prerequisites*                                                  | recommended: BSc course "Modellierung in den Geo- und Umweltwissenschaften"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 |                               |    |                              |                         |                  |                |           |

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| Module Number:<br>M 229                                                                    | Module Title:<br>Global Change                                                                                                                                                                                                                                                                                                                                                                           |                               |        |         | Type of Module:<br>Elective |                         |                     |                   |           |
| Credits (ECTS)*                                                                            | 6                                                                                                                                                                                                                                                                                                                                                                                                        |                               |        |         |                             |                         |                     |                   |           |
| Workload*<br>- Contact Time<br>- Private Study                                             | Workload:<br>180 h                                                                                                                                                                                                                                                                                                                                                                                       | Contact Time:<br>75 h / 5 SWS |        |         |                             | Private Study:<br>105 h |                     |                   |           |
| Duration of<br>Module* Module<br>Coordinator                                               | 1 Semester                                                                                                                                                                                                                                                                                                                                                                                               |                               |        | Rehfeld |                             |                         |                     |                   |           |
| Regular Cycle*                                                                             | every Winter Semester                                                                                                                                                                                                                                                                                                                                                                                    |                               |        |         |                             |                         |                     |                   |           |
| Language                                                                                   | English                                                                                                                                                                                                                                                                                                                                                                                                  |                               |        |         |                             |                         |                     |                   |           |
| Learning- /<br>Teaching Forms*                                                             | Per week: 3 h lecture (2 h + 1 h), 2 h seminar (2 student talks of 15 minutes plus discussion with two opposing hypotheses and groups, 2 students per talk)                                                                                                                                                                                                                                              |                               |        |         |                             |                         |                     |                   |           |
| Module Content*                                                                            | <ul style="list-style-type: none"><li>– Analytical Climate System</li><li>– Climate of Today (modern climate change including observation and models)</li><li>– Climate System of the Past</li><li>– Future Global Change including climate and resources<ul style="list-style-type: none"><li>• Impacted Systems (regions, species, pollution, land use)</li><li>• Counter Measures</li></ul></li></ul> |                               |        |         |                             |                         |                     |                   |           |
| Qualification<br>Goals*                                                                    | Quantitative scientific understanding of global change (especially climate, resources, pollution), how to measure and model global-change variables in time and in sub-systems, technological options for countermeasures The students know the current state of research and are able to present and communicate the underlying concepts in presentations and discussions.                              |                               |        |         |                             |                         |                     |                   |           |
| Prerequisites for<br>the allocation of<br>credits / grades (if<br>necessary<br>weighting)* | Courses                                                                                                                                                                                                                                                                                                                                                                                                  | Type of<br>Lecture            | Status | CH      | CR                          | Type<br>of<br>Exam      | Duration<br>of Exam | Grading<br>System | Weighting |
|                                                                                            | Global Change                                                                                                                                                                                                                                                                                                                                                                                            | L                             | C      | 39      | 4                           | WE                      | 2                   | g                 | 66,6      |
|                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                          | S                             | C      | 26      | 2                           | R                       | 1                   | g                 | 33,3      |
| Applicability*                                                                             | Compulsory: M.Sc. Applied & Environmental Geoscience; Elective: M.Sc. Geoökologie/Geoecology                                                                                                                                                                                                                                                                                                             |                               |        |         |                             |                         |                     |                   |           |
| Participation Pre-<br>requisites*                                                          | -                                                                                                                                                                                                                                                                                                                                                                                                        |                               |        |         |                             |                         |                     |                   |           |

| Module Number:<br>M 233                                                                    | Module Title:<br>Biotransformation of Pollutants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                               |    |       | Type of Module:<br>Elective |                         |                       |           |
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| Credits (ECTS)*                                                                            | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                               |    |       |                             |                         |                       |           |
| Workload*<br>- Contact Time<br>- Private Study                                             | Workload:<br>180 h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    | Contact Time:<br>45 h / 3 SWS |    |       | Private Study:<br>135 h     |                         |                       |           |
| Duration of Module*<br>Module<br>Coordinator                                               | 1 Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                               |    | Joshi |                             |                         |                       |           |
| Regular Cycle*                                                                             | Every winter semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |                               |    |       |                             |                         |                       |           |
| Language                                                                                   | English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                               |    |       |                             |                         |                       |           |
| Learning- /<br>Teaching Forms*                                                             | Lectures, presentation by students, group projects                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                               |    |       |                             |                         |                       |           |
| Module Content*                                                                            | a) Environmental significance of different pollutant classes<br>b) Geochemical principles controlling the abiotic transformation of pollutants<br>c) Physiological and biochemical basis for biotransformation of pollutants<br>d) Differences between environmental systems and compartments within systems determining pollutant turnover<br>e) Transformation reactions and pathways for various organic (e.g. BTEX, chlorinated hydrocarbons) and inorganic pollutants (e.g. radionuclides, nitrate)<br>f) Advances in applied remediation techniques and methods to assess pollutant turnover |                    |                               |    |       |                             |                         |                       |           |
| Qualification Goals*                                                                       | g) Gain knowledge about prominent pollutant compound classes present in the environment as well as their abiotic and biotic transformation reactions<br>h) Learn how environmental conditions affect abiotic and biotic pollutant turnover<br>i) Apply knowledge gained over the semester to design remediation schemes at contaminated sites and monitor remediation progress                                                                                                                                                                                                                     |                    |                               |    |       |                             |                         |                       |           |
| Prerequisites for the<br>allocation of credits<br>/ grades (if<br>necessary<br>weighting)* | Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Type of<br>Lecture | Status                        | CH | CR    | Type<br>of<br>Exam          | Duratio<br>n of<br>Exam | Gradin<br>g<br>System | Weighting |
|                                                                                            | Biotransformation of<br>pollutants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | L                  | c                             | 1  | 2     | R                           | -                       | g                     | 1         |
|                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | S                  | c                             | 2  | 4     |                             |                         |                       |           |
| Applicability*                                                                             | MSc Applied & Environmental Geoscience, MSc Geoökologie                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                               |    |       |                             |                         |                       |           |
| Participation Pre-<br>requisites*                                                          | Content from MSc module Environmental Chemistry,<br>Basic knowledge about environmental microbiology (recommended)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                               |    |       |                             |                         |                       |           |

|                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |        |                |                             |                 |                     |                   |           |
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| Module Number:<br>M 240                                                                   | Module Title:<br>Isotopes in Ecosystem Sciences                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |        |                | Type of Module:<br>Elective |                 |                     |                   |           |
| Credits (ECTS)*                                                                           | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                              |        |                |                             |                 |                     |                   |           |
| Workload*<br>- Contact Time<br>- Private Study                                            | Workload:<br>180 h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Contact Time:<br>90 h/ 6 SWS |        |                | Private Study:<br>90 h      |                 |                     |                   |           |
| Duration of<br>Module* Module<br>Coordinator                                              | 1 Semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                              |        | Dippold, Stock |                             |                 |                     |                   |           |
| Regular Cycle*                                                                            | every winter semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                              |        |                |                             |                 |                     |                   |           |
| Language                                                                                  | English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                              |        |                |                             |                 |                     |                   |           |
| Learning- /<br>Teaching Forms*                                                            | A diverse spectrum of teaching methods is to be used comprising lectures with interactive video section on practical steps in the work with isotopes and individual exercises. Besides introducing into a wide field of possible isotope applications, the course aims to teach the skills in defending project concepts of isotope-based study designs. For this, an interactive seminar simulating a reviewer panel project defense situation will be organised.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |        |                |                             |                 |                     |                   |           |
| Module Content*                                                                           | The module starts with an introduction into isotope biogeochemistry and tracerbased approaches, the understanding of stabile and radioactive isotopes + methods to analyse them (incl. radiation protection). Thereafter, the focus will be on the isotope application in process based research, i.e. identifying processes and rates in C cycle and organic matter transformation in the terrestrial environment. What specifics occur at the interface plant-soil/biosphere-geosphere? How can incubation studies with isotopes contribute to our understanding on mineralization, soil-atmosphere interactions, contaminant degradation and microbial ecology? Comparable topics will be targeted in the nitrogen and phosphorus cycle always considering bulk or compound-specific isotope analysis. Additionally, water isotopes and their application in ecohydrology but also microbial growth dynamics will be targeted. Radiocarbon dating, erosion quantification, radionuclide-based imaging, and further methods, their advantages and shortcomings will be discussed. |                              |        |                |                             |                 |                     |                   |           |
| Qualification<br>Goals*                                                                   | The course addresses M.Sc. students, who intend to use a set of isotope-based natural abundance or tracer methods. Students will learn to apply complex and potentially coupled isotope methods in scientific studies. They will learn to conceptualize an isotope-based study and to present its design and outcome in front of a theoretical reviewer panel simulating a proposal defense.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                              |        |                |                             |                 |                     |                   |           |
| Prerequisites for<br>the allocation of<br>credits /grades (if<br>necessary<br>weighting)* | Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Type of<br>Lecture           | Status | CH             | CR                          | Type of<br>Exam | Duration<br>of Exam | Grading<br>System | Weighting |
|                                                                                           | Isotopes in<br>Ecosystem<br>Sciences                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | L                            | c      | 3              | 6                           | R&A             | 15                  | g                 | 1:1       |
|                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | S/E                          | c      | 3              |                             |                 |                     |                   |           |
| Applicability*                                                                            | M.Sc. Geoökologie/Geoecology, M.Sc. Applied & Environmental Geoscience                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                              |        |                |                             |                 |                     |                   |           |
| Participation<br>Prerequisites*                                                           | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                              |        |                |                             |                 |                     |                   |           |

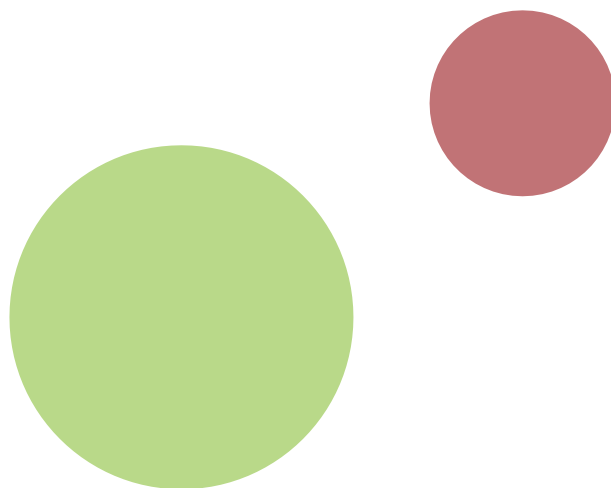
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| Module Number:<br>ITP                                                                  | Module Title:<br>Inter- and Transdisciplinary Perspectives on<br>Climate and the Environment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                               |        |    |     | Type of Module:<br>Elective |                     |                   |           |
| Credits (ECTS)*                                                                        | 6 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                               |        |    |     |                             |                     |                   |           |
| Workload*<br>- Contact Time<br>- Private Study                                         | Workload:<br>180 h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Contact Time:<br>60 h / 4 SWS |        |    |     | Private Study:<br>120 h     |                     |                   |           |
| Duration of Module*<br>Module Coordinator                                              | 1 semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                               |        |    | GUZ |                             |                     |                   |           |
| Regular Cycle*                                                                         | Every winter semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                               |        |    |     |                             |                     |                   |           |
| Language                                                                               | English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |        |    |     |                             |                     |                   |           |
| Learning- / Teaching<br>Forms*                                                         | Lectures, collaborative projects, serious games, active learning exercises, discussion and interaction with international guest experts, civic engagement and service learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                               |        |    |     |                             |                     |                   |           |
| Module Content*                                                                        | <p>The module covers pressing global issues such as climate change, the water crisis and ecosystem degradation through an inter- and transdisciplinary approach that will equip students with skills needed to explore and address interconnected environmental and social challenges. At the intersection of Earth System Sciences and transdisciplinary real-world engagement, global planetary challenges are approached in a collaborative and solution-oriented way. Innovative teaching methods focus on bringing in diverse student perspectives from different study fields in an engaging way. By combining interdisciplinary insights with a global perspective, the module empowers participants to contribute meaningfully to solutions that respect planetary boundaries and contribute to a sustainable and just future. The module consists of at least two seminars addressing topics such as:</p> <ul style="list-style-type: none"><li>≠ Nature-based solutions for carbon drawdown</li><li>≠ Global policies on climate adaptation and mitigation measures</li><li>≠ Environmental communication</li><li>≠ Disaster risk and resiliency</li></ul> |                               |        |    |     |                             |                     |                   |           |
| Qualification Goals*                                                                   | <ol style="list-style-type: none"><li>Analyse Earth surface and environmental processes and their societal impacts in different regions of the world</li><li>Discuss and explain climate action including mitigation and adaptation strategies</li><li>Communicate effectively about climate and environment to understand, motivate and empower public audiences, and inspire action in all sectors of society</li></ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                               |        |    |     |                             |                     |                   |           |
| Prerequisites for the<br>allocation of credits<br>/grades (if necessary<br>weighting)* | Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Type of<br>Lecture            | Status | CH | CR  | Type<br>of<br>Exam          | Duration<br>of Exam | Grading<br>System | Weighting |
|                                                                                        | Elective<br>Courses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | S                             | c      | 4  | 6   | -                           | -                   | g                 | -         |
| Applicability*                                                                         | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                               |        |    |     |                             |                     |                   |           |
| Participation<br>Prerequisites*                                                        | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                               |        |    |     |                             |                     |                   |           |

## 17.4 Fourth semester (Master's thesis) at SU or UT or UB

|                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                              |                              |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Module Number:<br>TRACEE_MT                     | Module Title:<br>Master's thesis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                              | Type of Module:<br>Mandatory |
| Credits (ECTS)*                                 | 30 CP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                              |                              |
| Workload*<br>- Contact Time<br>- Private Study  | Workload:<br>900 h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Contact Time:<br>30 h / 2 SWS                                                                                                                                                                                                                                                                                | Private Study:<br>870 h      |
| Duration of<br>Module*<br>Module<br>Coordinator | 1 semester                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | The Master's thesis can be completed at Stockholm University or University of Tübingen or University of Bucharest. Students can choose SU or UT only if they are not resident in Germany or Sweden at the time of enrolment. (according to the examination regulations by the respective partner university) |                              |
| Regular Cycle*                                  | During the third semester, students will be asked to submit a proposal for a thesis project. The TSTC (Transdisciplinary Stream and Thesis Committee) will communicate on the procedure for the submission of proposals and decide on students' project proposals for thesis and degree projects, with particular consideration to the transdisciplinary aspects and in accordance with specific regulations at SU or UT or UB where the student will carry out the thesis project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                              |                              |
| Language                                        | English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                              |                              |
| Learning- /<br>Teaching Forms*                  | Master's thesis, Transdisciplinary Research Project, Colloquium, Presentation (according to the regulations of the respective partner university)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                              |                              |
| Module Content*                                 | <b>Stockholm University:</b> <ul style="list-style-type: none"><li>Students at Stockholm University would register to the course: "Transdisciplinary Studies of Climate, Environment and Energy, Independent Project".</li><li>The independent project is 30 ECTS and aims to provide experience and advanced knowledge in scientific and transdisciplinary work within the fields of climate, environment, and/or energy. Key elements include planning, execution, and reporting. Additionally, students will practice literature review, writing a scientific report, and presenting research results orally in seminars.</li><li>The course is divided into two parts (More information is available in the syllabus of the course):<ul style="list-style-type: none"><li>Part 1: Planning (5 ECTS). Assessment is based on a written report</li><li>Part 2: Implementation (25 ECTS). Assessment is based on an oral and written presentation of the independent project.</li></ul></li></ul>                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                              |                              |
|                                                 | <b>University of Tübingen</b> <p>The independent research project is 30 ECTS and aims to provide experience and advanced knowledge in scientific and transdisciplinary work within the fields of climate, environment, and/or energy. Key elements include planning, execution, and reporting. Additionally, students will practice literature review, writing a scientific report, and presenting research results orally.</p> <p>Students have to complete the following:</p> <ul style="list-style-type: none"><li>Contacting a supervisor for the Master's thesis topic</li><li>Compilation of a research proposal of the agreed topic</li><li>Preparation of the Master's thesis</li><li>Poster presentation of the thesis' results on the Master's Day</li><li>Presentation of the thesis' results in the research group</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                              |                              |
|                                                 | <b>University of Bucharest</b> <p>At the University of Bucharest, students are required to enrol in the course <b>"Independent Project in Transdisciplinary Studies of Climate, Environment, and Energy – Research Activities, Master's Thesis Preparation."</b></p> <p>This independent project, worth <b>30 ECTS</b>, is designed to provide students with hands-on experience and advanced knowledge in scientific and transdisciplinary research within the fields of <b>climate, environment, and energy</b>. Key components of the course include <b>planning, execution, and reporting</b>, along with opportunities to develop essential research skills such as:</p> <p>Conducting a <b>literature review</b><br/>Writing a <b>scientific report</b><br/><b>Presenting research findings</b> in seminars</p> <p>For additional details, students are encouraged to refer to the <b>course syllabus</b>.</p> <p>Throughout the semester, under the guidance of their coordinators, students will focus on collecting, analysing and interpreting data, conducting in-depth analyses of academic literature related to their thesis topic, writing reports, presenting intermediary research results, and understanding the ethics of transdisciplinary research. This process is designed to ensure a transdisciplinary approach to their final thesis.</p> |                                                                                                                                                                                                                                                                                                              |                              |



|                                                                               |                                                                                                                                                                                                                                                                                                                                                                 |                                    |        |    |    |              |                  |                |           |
|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|--------|----|----|--------------|------------------|----------------|-----------|
|                                                                               | Additionally, students will receive support in engaging with relevant external stakeholders, including representatives from environmental agencies, research institutes, chemical and pharmaceutical companies, public health organisations, NGOs etc.                                                                                                          |                                    |        |    |    |              |                  |                |           |
| Qualification Goals*                                                          | Students will be able to design, execute, and critically assess a transdisciplinary research project that integrates knowledge, methods, and perspectives from multiple disciplines to address relevant topics in the field of climate, environment, and energy challenges.                                                                                     |                                    |        |    |    |              |                  |                |           |
|                                                                               | Students will be able to critically review existing literature, and develop innovative, transdisciplinary frameworks. Students will be able to present their research findings in a clear, structured, and accessible manner, tailored to both academic and non-academic audiences, including policymakers, local communities, and other relevant stakeholders. |                                    |        |    |    |              |                  |                |           |
|                                                                               | They may demonstrate the ability to communicate complex transdisciplinary concepts in diverse formats, including written reports, presentations, and policy briefs.                                                                                                                                                                                             |                                    |        |    |    |              |                  |                |           |
| Prerequisites for the allocation of credits /grades (if necessary weighting)* | Courses                                                                                                                                                                                                                                                                                                                                                         | Type of Lecture                    | Status | CH | CR | Type of Exam | Duration of Exam | Grading System | Weighting |
|                                                                               | Master Thesis                                                                                                                                                                                                                                                                                                                                                   | See regulation by the universities | -      | -  | 30 | MT           | -                | g              | 100       |
| Applicability*                                                                | -                                                                                                                                                                                                                                                                                                                                                               |                                    |        |    |    |              |                  |                |           |
| Participation Prerequisites*                                                  | 30 CP Modules of semesters 1<br>30 CP Modules of semester 2+3                                                                                                                                                                                                                                                                                                   |                                    |        |    |    |              |                  |                |           |



## Contact us

Do you have any questions?  
Please do not hesitate to contact us!

**Responsible office:**

Department of Environmental Science,  
Stockholm University

**Email address:** [tracee@aces.su.se](mailto:tracee@aces.su.se)

**Telephone number:** +46 8 08-16 20 00

<https://www.su.se/english/education/course-catalogue/nc/nceeo>