Master's programme in Environmental Change and Global Sustainability

Curriculum 2023-26

Accepted in ECGS-board 16.8.2022, decided in the Faculty Council (Biological and Environmental Sciences) 25.10.2022

Contents

ECGS DEGREE PROGRAMME DETAILS 2023-2026

Name

Ympäristömuutoksen ja globaalin kestävyyden maisteriohjelma (ECGS)
Magisterprogrammet i miljöförändringar och global hållbarhet
Master's Programme in Environmental Change and Global Sustainability

Degree titles

Master of Science (FM)
Master of Social Sciences (VTM)
Master of Science (Agriculture and Forestry) (MMM)

When entering the programme in Master's admission, the degree is determined by the choice of the study track and the modules within the chosen track.

Degree level

Master's programme: second-cycle degree/EQF level 7

Language of the degree

English, Finnish, Swedish

Responsible persons

Degree Programme Director David Thomas

Profile

Global socio-ecological problems, such as climate change and biodiversity loss, call for multidisciplinary solutions that transcend the usual boundaries of science and policy decision-making. The Environmental Change and Global Sustainability (ECGS) Master's programme will train you in wide-ranging interdisciplinary thinking skills and provide you with the ability to:

- Study environmental and sustainability issues in your respective fields of expertise and
- Solve problems of socio-ecological sustainability in cooperation with various social actors.

Further information about the studies on the Master's programme website.(Link)

Key learning outcomes and objectives of education

The key Learning Outcomes are:

- critical thinking and reasoning between conflicting views
- dialogue, communication and argumentation skills
- solution seeking and problem solving abilities
- co-operational capacities, group working skills
- abilities to work in multidisciplinary contexts

Professional qualifications and competencies provided by the degree

- *Biology teacher's study line provides Biology teacher's competence (teacher's study rights granted during previous bachelor's degree)*
- Candidates can apply for one of the two study tracks in the ECGS Master's programme: the Environmental Change (EC) study line or the Global Sustainability (GS) study line. EC students graduate with a Master's degree in Science (M.Sc.) and GS students with a Master's degree in Social Sciences (M.Soc.Sc.).

Job descriptions and labour market sectors

Upon graduating, students can embark on a wide range of careers. Examples of these include:

- Academic research and teaching
- Other research tasks in the universities, research institutes and centres
- Work as expert in administration both internationally (e.g., UN, EU) and nationally (ministries, research administration), and in provincial and local administration.
- Work as expert in private sector and in the media.
- Work as expert in international and national organizations.
- Teaching in secondary school and gymnasium, and other institutes of higher education

In addition, a MSc degree makes the student eligible to apply for postgraduate studies in different areas of environmental sciences at the University of Helsinki or other universities in Finland and abroad.

Student admissions to degree programme

Information of Student admission to ECGS is available in Studyinfo
Students can move on via registration procedure to ECGS master's programme to Environmental change (EC) study line and Global sustainability (GS) study line from Bachelor's programmes in

- Biology, (EC,) Faculty of Biological end Environmental Sciences
- Environmental Sciences, (EC, GS), Faculty of Biological end Environmental Sciences
- Agricultural Sciences, (EC, GS), Faculty of Agriculture and Forestry
- Environmental and Food Economics, (GS), Faculty of Agriculture and Forestry
- Forest Sciences, (EC, GS,) Faculty of Agriculture and Forestry
- Geography, (EC, GS), Faculty of Sciences
- Geosciences, (EC), Faculty of Sciences
- Physics, (EC), Faculty of Sciences
- Economics, (GS), Faculty of Social Sciences
- Politics, media and communication, (GS), Faculty of Social Sciences
- Social Research, (GS,) Faculty of Social Sciences
- Society and Change, (GS), Faculty of Social Sciences
- Education (General and adult education study line), (GS), Faculty of Educational Sciences

Postgraduate study options and opportunities

Upon completion of Master's degree in ECGS students are eligible to apply for doctoral studies in the University of Helsinki and other leading international research institutions. Examples of suitable doctoral programmes in the University of Helsinki include:

- The Doctoral Programme in Interdisciplinary Environmental Sciences (DENVI)
- The Doctoral Programme in Sustainable Use of Renewable Natural Resources (AGFOREE)
- The Doctoral Programme in Social Sciences
- The Doctoral Programme in Political, Societal and Regional Change (PSRC)
- The Doctoral Programme in Wildlife Biology Research (LUOVA)
- The Doctoral Programme in Atmospheric Sciences (ATM-DP)

Skills relevant to employment

In ECGS the following courses include career orientation, expert identity studies and career planning::

- VIIKB-005 Demanding participation in administrative bodies and student organizations, 2-5 ects
- VIIKB-002 Tutoring BY, 5 ects
- ECGS-153 Internship period, 5-10 ects
- ECGS-154 Research group training, 5 ects
- ECGS-028 Portfolio for the future, 1-5 ects

International skills

The ECGS Master's program is taught in English and will train you to tackle environmental challenges which transcend national borders. All teachers have international research activities and several are recruited from outside of Finland. The Faculties encourage international interaction and the programme promotes a vibrant multicultural atmosphere. You can also include a student exchange as part of your Master's level studies.

Continuous learning

This programme may include some courses that could be adapted to continuous learning schedules.

Sustainability expertise

Sustainability is at the center of the ECGS Programme. Global socio-ecological problems, such as climate change and biodiversity loss, call for multidisciplinary solutions that transcend the usual boundaries of science and policy decision-making. The Environmental Change and Global Sustainability (ECGS) Master's programme will train candidates in wide-ranging interdisciplinary thinking skills and provide the ability to:

- Study environmental and sustainability issues in your respective fields of expertise and
- Solve problems of socio-ecological sustainability in cooperation with various social actors.

Assessment practices

A diverse range of assessment procedures are used on throughout the programme. These range from formal examinations through to continuous assessment exercises. In some instances this may include working within groups and submitting group work.

Procedures for the recognition and validation of prior learning

General University of Helsinki guidelines on the recognition of prior learning

Graduation practices and criteria

Information of Graduation practices and criteria are found in The Instructions for Students website: Graduation

Criteria for full-time and part-time studies, opportunities for distance learning

Many of the courses demand in person attendance for activities and so full distance learning is not possible (e.g. field courses, seminars). Some "lecture only" courses may be possible to complete fully online.
Part time study may be possible on discussion with the Programme Director and University Administration.

Unless otherwise stated it is expected that all students attend all course activities as listed on the relevant course Moodle pages.

Practices for collecting and processing student feedback

Course feedback from students is collected via the University Norppa system and reviewed by the Steering Board of the Programme.
HowULearn surveys are conducted once a year and the feedback reviewed by the programme steering Board and Faculty Teaching committees.
There are student Representatives on the Programme Steering Board and they collect and convey this valuable feedback. Student representatives also lead the compilation of feedback on specific issues.

Student supervision

- Each student on the programme is allocated a PSP-teacher. They are meant to work together on the study plan and continue to work together once the plan has started.
- A thesis project is conducted under the supervision of one or more supervisors. The plan and results of the thesis work are both presented to a group of peers and guiding teachers as part of the master's seminar series. There is also a formal agreement document agreed between the masters thesis student and their supervisor(s).
- As part of courses and modules there are course guiding teachers and module organisers who are available to supervise the progress of students

Studies comprising the degree structure

Applicants can apply for one of the three study tracks in the ECGS Master's programme:

- the Environmental Change (EC) study track
- the Global Sustainability (GS) study track.
- the Biology subject teacher's study track with the study rights to pedagogic studies

Transfer from one study track to another in ECGS is possible through an utterly well-argued application to the board. However, the original degree title cannot be changed.

The ECGS Master's degree (120 credits, ECTS) will consist of the following studies in EC and GS study tracks:

- Study-track specific studies, 75 credits, including the Master's thesis (30 credits)
- Other studies, 45 credits, including 30 credits of Core module studies and 15 credits of elective science specific studies from either ECGS modules or other relevant Master's programs.

Studies in Biology subject teacher track in the ECGS Master's degree (120 cr) will consist of the following:

- 60 cr of EC-study track specific studies and 60 cr of pedagogic studies.

Order and schedule of completion for studies

It is anticipated that as much of the taught Programme material is completed in the first year of the study. This provides a significant period to dedicate to conducting and writing of the Master's thesis in the second year.

ECGS STRUCTURE 2023-2026

ECGS programme structure, EC and GS study tracks, 2023-2026

ECGS-450 Core studies EC and GS study tracks, 30 cr

- ECGS-4000 Sustainability Science, 15 cr (compulsory ECGS-001, ECGS-002, optional ECGS-003, ATM380 or ATM373)
- ECGS-004 Master's thesis seminar, 5 cr
- Methodological studies, 10 cr (compulsory ECGS-050, 5 cr & optional 5 cr according to students needs)

Discipline specific studies in EC or GS study tracks, 75 cr

ECGS-005 Master's thesis in EC, 30 cr
VIIKB-001 Master's maturity test, 0 cr

ECGS-006 Master's thesis in GS, 30 cr
VIIKB-001 Master's maturity test, 0 cr

ECGS-1000 Environmental Change Study Track, 45 cr

Major modules

- ECGS-010 Aquatic Sciences, 15 or 30 cr
- ECGS-090 Environmental soil science, 15 or 30 cr
- ECGS-550 Changing Arctic and northern environments, 15 or 30 cr
- ECGS-610 Agriculture and environment, 15 or 30 cr
- ECGS-930 Urban studies, 30 cr

Minor modules

- ECGS-500 Sustainable management of marine environments, 15 cr
- ECGS-077 Chemical pollution, 15 cr
- ECGS-700 Food and sustainability, 15 cr
- ECGS-800 Global land use, 15 cr
- ECGS-915 Urban studies, basic, 15 cr
- IND-500 Indigenous Studies, 15 cr
- ATM391 Climate University MOOC, 15 cr
- VIIKB-201 International Master level studies, 15 cr

ECGS-2000 Global Sustainability, Study Track, 45 cr

Major modules

- ECGS-080 Environmental policy and economics, 15 or 30 cr
- ECGS-200 Consumer citizens and sustainability transition, 15 or 30 cr
- ECGS-400 Forests, global changes and sustainability , 15 or 30 cr
- ECGS-930 Urban studies, 30 cr

Minor modules

- ECGS-500 Sustainable management of marine environments, 15 cr
- ECGS-100 Environment and development, 15 cr
- ECGS-700 Food and sustainability, 15 cr
- ECGS-800 Global land use, 15 cr
- ECGS-915 Urban studies, basic, 15 cr
- IND-500 Indigenous Studies, 15 cr
- ATM391 Climate University MOOC, 15 cr
- VIIKB-201 International Master level studies, 15 cr
- SOSM-503 Science and Technology Studies, 15 cr

Elective studies, 15 cr

- Elective studies according to students interests, to deepen specialization or broaden experience
- ECGS-153 Internship, ECGS-154 Research group training, ECGS-028 Portfolio for future, VIIKB-002 Tutoring, VIIKB-005 Participation in administrative bodies

ECGS programme structure, Biology subject teacher study track, 2023-2026

ECS-3000 Biology subject teacher

Compulsory advanced studies, 40 cr

- ECGS-001 Introduction to Sustainability Science, 5 cr, ECGS-004 Master's thesis seminar, 5 cr
- ECGS-008 Master's thesis for Subject teacher, 30 cr, VIIKB-001 Master's maturity test, 0 cr

Optional advanced studies, 15 cr

- ECGS-010 Aquatic Sciences, 15
- ECGS-550 Changing Arctic and northern environments, 15
- ECGS-077 Chemical pollution, 15 cr

Methodology, 5 cr

- ECGS-050 Science communication and thesis writing, 5 cr
- ECGS-910 Integrative methods in environmental social science, 5 cr
- ECGS-081 Analytical approaches to human environmental interaction, 5 cr
- AGERE-002 Cost-Benefit Analysis, 5 cr
- FOR-259 GIS and RS in environmental and land use applications, 5 cr
- Other methodological courses according to an agreement

PED100 Education, pedagogical studies for teachers 60 cr

ECGS-450 CORE STUDIES, 30 cr (EC and GS study tracks)

ECGS-4000 Sustainability Science, 15 cr

Compulsory

- ECGS-001 Introduction to Sustainability Science, 5 cr
- ECGS-002 Philosophical and Methodological Foundations of Sustainability Science, 5 cr

Optional studies in Applied sustainability science (choose at least 5 cr)

- ECGS-003 Practical application of sustainability science: learning project, 5 cr
- ATM380 Solutions.now, 5 cr
- ATM373 Leadership for Sustainable Change, 5 cr

Methodological studies according to students's needs, 15 cr

Compulsory methodological studies, 5 cr

- ECGS-004 Master's thesis seminar, 5 cr
- ECGS-050 Science Communication and Thesis Writing, 5 cr (previous ECGS-007) New course

Examples of Optional methodological studies (choose 5 cr)

- Methodological studies according to agreement (e.g. for Master's thesis)
- ECGS-024 Technology in ecological research and environmental monitoring, 5 cr
- ECGS-081 Analytical approaches to human environmental interactions, 5 cr
- AGERE-002 Cost-Benefit Analysis, 5 cr
- **ECGS-910** Intergrative methods in environmental social science**, 5 op**
- FILK-224 Filosofisen ajattelun menetelmät, 5 cr
- FILM-353 Taloustieteen filosofia, erikoistuminen, 5 op
- FILK-222 Yhteiskuntatieteiden filosofia, 5 cr
- FILM-305 Yhteiskuntatieteiden filosofia, syventävä, 5 cr
- FOR-108 Qualitative empirical research methods, approaches and research ethics, 5 cr
- ATM308 Statistical tools for climate and atmospheric science

ECGS-1000 ENVIRONMENTAL CHANGE STUDY TRACK, Advanced Studies, 75 cr

Compulsory advanced studies, 30 cr

- ECGS-005 Master's thesis, 30 cr
- VIIKB-001 Master's maturity test BY, 0 cr

Optional advanced studies, 45 cr

(Choose one 30 cr module or two 15 cr modules from EC Major modules and one 15 cr module from EC Major or Minor modules)

EC Major modules

ECGS-010 Aquatic Sciences, 15 or 30 cr

Compulsory studies

- ECGS-011 Advanced aquatic and sediment biogeochemistry, 5 cr

Optional studies

- ECGS-013 Restoration of lake ecosystems, 5 cr
- ECGS-023 Functional marine ecology, 5 cr
- ECGS-017 Fisheries management, 5 cr
- ECGS-016 Fish research, 5 cr
- ECGS-019 Advanced aquatic ecosystems research, 5 cr

- ECGS-020 Nutrient loading of aquatic ecosystems, 5 cr

ECGS-090 Environmental soil science, 15 or 30 etcs

Compulsory studies

- AGRI-411 Soil Hydrology , 5 cr
- AGRI-412 Environmental Soil Science Readings II, 5 cr
- AGRI-413 Advanced Soil Science, 5 cr

Optional studies

- AGRI-414 Pedogenesis and Soil Classification, 5 cr
- AGRI-415 Soil Science Laboratory III, 10 cr

ECGS-550 – Changing Arctic and northern environments, 15 or 30 etcs

Compulsory studies

- ECGS-039 (combined ECGS 031-601) Arctic climate change, 5 cr New course
- ECGS-034 Seminar in northern ecosystems and environment, 5 cr. Name change

Optional studies

- ECGS-068 (combined ECGS-067-065) Past environmental change, 5 cr. New course
- ECGS-036 Arctic and human beings, 5 cr
- ECGS-032 Field course on Arctic ecosystems, 10 cr
- *Other studies by agreement, 5 cr*

ECGS-610 Agriculture and environment, 15 or 30 cr

Compulsory studies, 15 cr

- AGRI-211 Wildlife in the Farming Environment, 5 cr
- AGRI-212 Ecological farming methods, 5 cr

Choose 5 cr

- either AGRI-213 Literature in Farmland Ecology, 5 cr, or
- AGRI-113 Environmental Technology in Crop Production, literature, 5 cr

Optional studies, 15 cr

- Study units agreed in the PSP

ECGS-930 Urban studies, 30 cr New module

Compulsory studies

- ECGS-049: Nature-Based Solutions 5 cr
- ECGS-904: Urban Environmental Policy 5 cr
- ECGS-907: Urban Biodiversity 5 cr
- ECGS 903: Urban Ecosystem Ecology 5 cr
- ECGS 901: Field Course in Urban Environmental Ecology 5 cr

Optional studies, choose one

- ECGS-076: Urban Ecotoxicology (5 cr)
- ECGS-906: Urban Climates (5 cr, only given every 2nd year [2024, 2026]
- ECGS-910: Integrated Methods in Environmental Social Sciences (5 cr).

EC Minor modules

ECGS-500 Sustainable management of marine environments, 15 cr

Compulsory studies

- ECGS-014 Diagnosis of environmental problems in aquatic ecosystems, 5 cr

- AGERE-E14 Economics and governance of marine resources, 5 cr (previous ECGS-501)

Optional studies

- ECGS-003 Practical application of sustainability science: learning project, 5 cr
- AGERE-E12 International environmental agreements related to marine areas and resources, 5 cr
- AGERE-E06 Economics of Aquatic Resources: Numerical Models, 5 cr
- ECGS-017 Fisheries management, 5 cr

ECGS-077 Chemical Pollution 15

Compulsory , 10 cr

- ECGS-071 Advances in Environmental Chemistry 5 cr
- ECGS-079 Chemicals in Our Society, 5 cr New course

Optional. Choose 5 cr

- ECGS-078 Challenge Course, 5 cr
- ECGS-073 Fate and Transport of Pollutants, 5 cr

ECGS-700 Food and sustainability, 15 cr

Compulsory studies (10 cr)

- AGRI-222 Sustainable Food Systems, 5 cr, contact teaching in odd years, independent online course in even years
- EDUM504 Sustainable Culinary Culture, 5 cr, odd years, essay course every year

Elective courses (5 cr)

Elective courses can consist of a choice of the courses listed below but can also include other courses if approved by the responsible person for this module.

In field of food sciences:

- FOOD-401 European Food Safety, 5 cr, *even years,*

In field of agroecology and plant production:

- AGRI-221 Agroecology: Working with the Complexity of Farming Systems, 5 cr
- AGRI-223 Literature in Agroecology of Food Systems, 5 cr

In field of economics:

- EKM-103 Managing Innovation in Agrifood Value Chains for Sustainability, 5 cr

ECGS-800 Global land use 15 cr

Compulsory:

- FOR-281: Tropical landscape change, 5 cr (period tbd) R*esponsible teacher is Edward Webb*

Optional :

- GEOG-341: Geography of megatrends, environmental change and development in the Global South, 5 cr (period 1) ; R*esponsible teacher is Petri Pellikka*
- FOR-104: International Forest Policy 2, 5 cr (IV period); R*esponsible teacher is Maria Brockhaus*
- FOR-226: Restoration of Degraded Ecosystems: Theory and Application, 5 cr (IV period in odd-numbered years); R*esponsible teacher is Harri Vasander*
- FOR-282: Tropical landscape restoration, 5 cr (period tbd) R*esponsible teacher is Eshetu Yirdaw*

ECGS-915, Urban studies 15 cr New module

Compulsory studies:

- ECGS-904: Urban Environmental Policy, 5 cr
- ECGS-907: Urban Biodiversity, 5 cr
- ECGS 903: Urban Ecosystem Ecology ,5 cr

IND-500 Indigenous Studies, 15 cr

- IND-510 Indigenous peoples, epistemic and linguistic diversity, 5 cr
- IND-511 Methodologies and research ethics in Indigenous Studies, 5 cr
- IND-512 Biocultural approaches to the environment and conservation , 5 cr

ATM391 Climate University MOOC 15 cr

- ATM-302 Ilmastonmuutos nyt, 2-5 cr
- ATM378 Sustainable.now
- ATM308 Statistical tools for climate and atmospheric science
- ATM373 Leadership for Sustainable Change, 5 cr
- ATM379 SystemsChange.now, 5 cr
- ATM380 Solutions.now, 5 cr
- Maat-051 Introduction to Circular Economy, 3-5 cr

VIIKB-201 International Master level studies 15 cr

ECGS-2000 GLOBAL SUSTAINABILITY STUDY TRACK, Advanced studies, 75 cr

Compulsory advanced studies, 30 cr

- ECGS-006 Master's thesis, 30 cr
- VIIKB-001 Master's maturity test BY 0 cr

Optional advanced studies, 45 cr

(Choose one 30 cr module or two 15 cr modules from GS Major modules and one 15 cr module from GS Major or Minor modules)

GS Major modules

ECGS-080 Environmental policy and economics, 15 or 30 etcs

Compulsory studies

- ECGS-081 Analytical approaches to human environmental interaction 5 cr
- YET-208 Intermediate environmental economics 5 cr OR YET-214 Climate and energy policy 5 cr

Optional studies

- ECGS-084 Environment, technology and culture 5 cr
- FOR-111 Behavioural change and sustainability, 5 cr
- AGERE-011 Socio-cultural valuation methods 5 cr
- AGERE-E01 Environmental Economics I: Theory 5 cr
- AGERE-E02 Environmental Economics II: Mechanisms 5 cr
- AGERE-E12 International Environmental Agreements related to marine areas and resources 5 cr
- AGERE-E09 Advanced natural Resource Economics 5 cr
- GGL-309 International Environmental Governance 5 cr

ECGS-200 Consumer citizens and sustainability transition courses, 15 or 30 cr

Compulsory studies

- ECGS-201 Perspectives on sustainable consumption 5 cr

Optional studies, Choose at least 10 cr

- ECGS-202 Sociotechnical (re)construction of consumer society
- ECGS-203 Sustainability in everyday life 5 cr
- ECGS-204 Business in the natural environment 5 cr
- FOR-111 Behavioural change and sustainability 5 cr
- EDUM504 Sustainable Culinary Culture 5 cr

ECGS-400 Forests, global changes and sustainability, 15 or 30 cr

Compulsory studies

- FOR-104 International forest policy, politics and power

Optional studies

- FOR-101 Responsible business management in circular and bioeconomy 5cr
- FOR-111 Behavioural change and sustainability, 5 ects
- FOR-285 Climate change mitigation and adaptation in forestry, 5 ects
- FOR-276 Sustainable forestry and agroforestry in the tropics 5 ects
- FOR-281 Tropical Landscape Change 5 ects
- FOR-282 Tropical forest landscape restoration 5 cr 5 ects
- GEOG-341 Geography of megatrends, environmental change and development in the Global South, 5 cr

ECGS-930 Urban studies, 30 cr New module

Compulsory studies

- ECGS-049: Nature-Based Solutions 5 cr
- ECGS-904: Urban Environmental Policy 5 cr
- ECGS-907: Urban Biodiversity 5 cr
- ECGS 903: Urban Ecosystem Ecology 5 cr
- ECGS 901: Field Course in Urban Environmental Ecology 5 cr

Optional studies, choose one

- ECGS-076: Urban Ecotoxicology (5 cr)
- ECGS-906: Urban Climates (5 cr, only given every 2nd year [2024, 2026]
- ECGS-910: Integrated Methods in Environmental Social Sciences (5 cr).

GS Minor modules

ECGS-500 Sustainable management of marine environments, 15 cr

Compulsory studies

- ECGS-014 Diagnosis of environmental problems in aquatic ecosystems, 5 cr
- AGERE-E014 Economics and governance of marine resources, 5 cr (previous ECGS-501)

Optional studies

- ECGS-003 Practical application of sustainability science: learning project, 5 cr
- AGERE-E12 International environmental agreements related to marine areas and resources, 5 cr
- AGERE-E06 Economics of Aquatic Resources: Numerical Models, 5 cr
- ECGS-017 Fisheries management, 5 cr

SOSM-503 Tieteen ja teknologian tutkimus/Science and Technology Studies, 15 cr

Compulsory studies:

- SOSM-SL321 Tieteentutkimus, 5 cr
- SOSM-SL322 Teknologiantutkimus, 5 cr

Optional studies (choose at least one):

- SOSM-SL323 Tieteen- ja teknologiantutkimuksen erikoiskurssi, 5 cr
- SOSM-326 Datafication - critical perspectives ,5 cr
- SOSM-321 Digitaalisen yhteiskunnan rajapinnoilla, 5 cr
- SOSM-325 Digitalisoituva sosiaalisuus, 5 cr
- ECGS-081 Analytical approaches to human environmental interaction, 5 cr
- ECGS-084 Environment, technology and culture, 5 cr
- FILK-227 Tieteenfilosofia, 5 cr
- FILK-222 Yhteiskuntatieteiden filosofia, 5 cr

ECGS-100 Environment and development, 15 cr

Compulsory studies

- YMK-3303: Political ecology and resource politics, 5 cr
- YMK-3305: Classics in Global Development Studies, 5 cr
- YMK-3301 Development Policies and Interventions, 5 cr

ECGS-700 Food and sustainability, 15 cr

Compulsory studies (10 cr)

- AGRI-222 Sustainable Food Systems, 5 cr, contact teaching in odd years, independent online course in even years
- EDUM504 Sustainable Culinary Culture, 5 cr, odd years, essay course every year

Optional studies (5 cr)

Elective courses can consist of a choice of the courses listed below but can also include other courses if approved by the responsible person for this module.

In field of food sciences:

- FOOD-401 European Food Safety, 5 cr, *even years,*

In field of agroecology and plant production:

- AGRI-221 Agroecology: Working with the Complexity of Farming Systems, 5 cr
- AGRI-223 Literature in Agroecology of Food Systems, 5 cr

In field of economics:

- EKM-103 Managing Innovation in Agrifood Value Chains for Sustainability, 5 cr

ECGS-800 Global land use 15 cr

Compulsory:

- FOR-281: Tropical landscape change, 5 cr (period tbd) R*esponsible teacher is Edward Webb*

Optional :

- GEOG-341: Geography of megatrends, environmental change and development in the Global South, 5 cr (period 1) ; R*esponsible teacher is Petri Pellikka*
- FOR-104: International Forest Policy 2, 5 cr (IV period); R*esponsible teacher is Maria Brockhaus*
- FOR-226: Restoration of Degraded Ecosystems: Theory and Application, 5 cr (IV period in odd-numbered years); R*esponsible teacher is Harri Vasander*

- FOR-282: Tropical landscape restoration, 5 cr (period tbd) R*esponsible teacher is Eshetu Yirdaw*

ECGS-915, Urban studies 15 cr New module

Compulsory studies:

- ECGS-904: Urban Environmental Policy, 5 cr
- ECGS-907: Urban Biodiversity, 5 cr
- ECGS 903: Urban Ecosystem Ecology ,5 cr

IND-500 Indigenous Studies, 15 cr

- IND-510 Indigenous peoples, epistemic and linguistic diversity, 5 cr
- IND-511 Methodologies and research ethics in Indigenous Studies, 5 cr
- IND-512 Biocultural approaches to the environment and conservation , 5 cr

ATM391 Climate University MOOC 15 cr

- ATM-302 Ilmastonmuutos nyt, 2-5 cr
- ATM378 Sustainable.now
- ATM308 Statistical tools for climate and atmospheric science
- ATM373 Leadership for Sustainable Change, 5 cr
- ATM379 SystemsChange.now, 5 cr
- ATM380 Solutions.now, 5 cr
- ATM379 SystemsChange.now
- Maat-051 Introduction to Circular Economy, 3-5 cr

VIIKB-201 International Master level studies 15 cr

ELECTIVE STUDIES, 15 cr

Examples included, but any University courses eligible

- VIIKB-005 Demanding participation in administrative bodies and student organizations, 2-5 cr
- VIIKB-002 Tutoring BY, 5 cr
- ECGS-153 Internship period, 5-10 cr
- ECGS-154 Research group training, 5 cr
- ECGS-026 Portfolio for the future, 1-5 cr
- ECGS-027 Co-Creation lab (in ECGS-004)

ECGS-3000 BIOLOGY SUBJECT TEACHER'S STUDY TRACK, 120 cr

DICSIPLINE SPECIFIC STUDIES, Biology subject teacher, 60 cr

Compulsory advanced studies, 40 cr

- ECGS-001 Introduction to Sustainability Science, 5 cr
- ECGS-004 Master's thesis seminar, 5 cr
- ECGS-008 Master's thesis for Subject teacher, 30 cr
- VIIKB-001 Master's maturity test BY, 0 cr

Optional advanced studies (Choose at least one study module, 15 cr in total)

- ECGS-010 Aquatic Sciences, 15
- ECGS-077 Chemical Pollution, 15
- ECGS-550 Changing Arctic and northern environments, 15

Methodology (choose at least 5 cr)

- ECGS-910 Integrative methods in environmental social science, 5 cr
- ECGS-081 Analytical approaches to human environmental interaction, 5 cr
- AGERE-002 Cost-Benefit Analysis, 5 cr
- ECGS-050 Science Communication and Thesis Writing, 5 cr (previous ECGS-007) New course
- Other methodological courses according to an agreement

OTHER STUDIES: Study track of Subject Teacher, 60 cr

- PED100 Aineenopettajan pedagogiset opinnot (PKL), 60 cr

ECGS MODULES 2023-2026

ECGS-010 Aquatic Sciences, 15 or 30 cr

Akvaattiset tieteet opintokokonaisuus/ Akvatiska vetenskaper, studiehelhet

Grading scale 0-5, Weighted average of courses
Credits 15 cr or 30 cr
Responsible organisations ECGS

Responsible persons Leena Nurminen

Content description
The module gives a comprehensive insight to the functioning and managements of aquatic ecosystems in the changing world under human pressure.

Prerequisites No prerequisities

Learning outcomes

- Comprehensive knowledge on the functioning of aquatic ecosystems, both marine and freshwater, including their food webs, and biological, chemical and physical regulatory mechanisms
- Skills in planning and carrying out aquatic ecosystem research
- Knowledge on diagnosing the main environmental problems of aquatic ecosystems and means to apply research-based solutions in resolving them
- Comprehensive knowledge on planning and methodology of aquatic ecosystem management and restoration

When completing 30 cr, in addition to the above, the student will deepen her/his understanding of functioning and sustainable management of aquatic ecosystems under human pressure through the choices of elective courses.

Target groups Especially ECGS students

Term/teaching period when the module will be offered During master's studies

Recommended time or stage of studies for completion During master's studies

Expiry of studies
Module and the studies in it expire in 10 years. Module's expire date is calculated from the date of the last completed course.

Language of instruction
In ECGS language of instruction is English, completion in the multilingual ECGS programme can be English Finnish or Swedish or as specifically indicated in the individual course description.

Equivalencies with other studies -

Study module level Master's level studies, second-cycle degree/EQF level 7

Structure of the study module

Compulsory:
- ECGS-011 Advanced aquatic and sediment biogeochemistry, 5 cr

Optional:
- ECGS-013 Restoration of lake ecosystems, 5 cr
- ECGS-023 Functional marine ecology, 5 cr
- ECGS-017 Fisheries management, 5 cr
- ECGS-016 Fish research, 5 cr
- ECGS-019 Advanced aquatic ecosystems research, 5 cr
- ECGS-020 Nutrient loading of aquatic ecosystems, 5 cr

ECGS-077 Chemical Pollution Module, 15 cr

Ympäristön kemiallinen pilaantuminen/ Modulen i kemisk förorening ,

Grading scale Weighted average of courses
Credits 15 cr
Responsible organisations ECGS

Responsible persons Olli-Pekka Penttinen

Content description
Our society benefits greatly from manufactured chemicals; they provide the fabric of our surroundings, play a key role in hygiene and health, and generally enhance our life styles. Yet the same chemicals including an anthropogenic enrichment of some metals, in the wrong place at the wrong time and at high concentrations, can cause problems for human health and wildlife. The aim of this module is to make student to understand the importance of chemical pollution as a one major global environmental problem and to help them become aware of environmental fate and effects of the most harmful anthropogenic chemicals.

Prerequisites
Bachelor's level studies in environmental issues, or equivalent studies.

Learning outcomes
After completion, the student
- will be able to describe the different origins, sources and types of environmental pollution
- understand a meaning of industry, waste treatment and urban issues to the environment
- critically discuss local and global environmental issues based on scientific principles and data
- is able to analyze chemical and ecotoxicological simulation data

Target groups
Optional for ECGS students in EC study track but individual courses also available for all interested students, including international students

Term/teaching period when the module will be offered
ECGS: during master's studies or 1st or 2nd year of master's studies

Recommended time or stage of studies for completion
ECGS: during master's studies or 1st or 2nd year of master's studies

Expiry of studies
Module and the studies in it expire in 10 years. Module's expire date is calculated from the date of the last completed course.

Language of instruction
In ECGS language of instruction is English, completion in the multilingual ECGS programme can be English Finnish or Swedish or as specifically indicated in the course description.

Equivalencies with other studies
Information on study modules in the previous or current curriculum period whose completion is equivalent to completing this study module, if applicable

Study module level
ECGS-modules are Master's level studies, second-cycle degree/EQF level 7
This module can be used in Doctoral level = third-cycle (doctoral) degree/EQF level 8 excluding ECGS-078

Structure of the study module
Compulsory (10 cr) for

- ECGS-079 Chemicals in Our Society, 5 cr
- ECGS-071 Advances in Environmental Chemistry 5 cr

Optional

- ECGS-078 Challenge Course, 5 cr
- ECGS-073 Fate and Transport of Pollutants, 5 cr

ECGS-080 Environmental policy and economics, 15 or 30 etcs

Ympäristöpolitiikka ja talous, opintokokonaisuus/ Miljöpolitik och ekonomi, studiehelhet

Grading scale 0-5 Weighted average of courses
Credits 15 or 30
Responsible organisations ECGS, valttdk, mmtdk, oiktdk

Responsible persons Janne Hukkinen (valttdk, bytdk, mmtdk); Marko Lindroos (mmtdk)

Content description
The module provides the students with skills to analyze the economic, policy and governance aspects of human environmental interactions and to propose economically viable transition policies toward sustainability.

Prerequisites
Recommended but not required: ENV-103 Introduction to environmental policy 5 cr & Introduction to Environmental and Resource Economics, 5 cr

Learning outcomes
Students will learn to incorporate complex institutional, political, economic, socio-ecological, cognitive, behavioural, technological and cultural factors in their interdisciplinary expert assessments and recommendations. Innovative learning environments – such as group work, case studies, problem sets, simulations, discussions, lectures and text production – prepare the students for the challenging real-life interactions that characterize contemporary environmental governance in the public, private and nonprofit sectors.

Target groups
Environmental change and global sustainability (ECGS) master's programme; GS study line
Available for other students, but GS study line prioritized

Term/teaching period when the module will be offered
ECGS: during master's studies

Recommended time or stage of studies for completion
ECGS: during master's studies

Expiry of studies
Module and the studies in it expire in 10 years. Module's expire date is calculated from the date of the last completed course.

Language of instruction
English and Finnish

Equivalencies with other studies
ECGS-080 is equivalent to the same module in the previous curriculum.

Study module level
ECGS-modules are Master's level studies, second-cycle degree/EQF level 7
Selected courses in this module can be used for doctoral level studies = third-cycle (doctoral) degree/EQF level 8. Details should be discussed with the responsible course teachers.

Structure of the study module
Compulsory studies

- ECGS-081 Analytical approaches to human environmental interaction 5 cr
- YET-208 Intermediate environmental economics 5 cr **OR** YET-214 Climate and energy policy 5 cr

Optional studies

- ECGS-084 Environment, technology and culture 5 cr
- FOR-111 Behavioural change and sustainability (Annukka Vainio) , 5 cr
- SOSM-YP302 Sustainable welfare 5 cr
- AGERE-011 Socio-cultural valuation methods 5 cr (Christopher Raymond)
- AGERE-E01 Environmental Economics I: Theory 5 cr
- AGERE-E02 Environmental Economics II: Mechanisms 5 cr
- AGERE-E12 International Environmental Agreements related to marine areas and resources 5 cr
- AGERE-E09 Advanced natural Resource Economics 5 cr
- GGL-309 International Environmental Governance 5 cr

ECGS-090 Environmental Soil Science, 15 or 30 cr

Maaperä- ja ympäristötiede, opintokokonaisuus/ Mark – och miljövetenskap, studiehelhet

Target group: Master's Programme in Environmental Change and Global Sustainability

Timing: 1st and 2nd year of Master's studies

Objective/Learning outcomes:
After completing the module, the student:

- has in-depth knowledge of the advanced concepts and theories of Environmental Soil Science and can apply them in new contexts.
- knows advanced research methods in Environmental Soil Science
- can apply theoretical knowledge of Environmental Soil Science for solving advanced practical problems.
- has critical thinking and argumentation skills.
- can assess and develop his/her own know-how
- can work and co-operate in different transdisciplinary research groups.

Prerequisites:
Intermediate knowledge of Environmental Soil Science (B.Sc. level):
Environmental Soil Science module MAAT-400 in the B.Sc. Programme in Agricultural Sciences (Maataloustieteiden kandiohjelma), Environmental Soil Science module ENV-320 in the the B.Sc. Programme in Environmental Sciences (Ympäristötieteiden kandiohjelma), or similar courses.

Recommended optional studies:
The students specializing in Environmental Soil Science are strongly recommended to take AGRI-416 Environmental Soil Science Readings III (MAA570) as part of their free-choice studies.

Contents:
Compulsory studies

- AGRI-411 Soil Hydrology, 5 cr
- AGRI-412 Environmental Soil Science Readings II, 5 cr
- AGRI-413 Advanced Soil Science, 5 cr

Optional studies

- AGRI-414 Pedogenesis and Soil Classification, 5 cr
- AGRI-415 Soil Science Laboratory III, 10 cr

Study materials and literature:

Assessment practices and criteria: Weighted average of courses

Responsible person: Mari Pihlatie

ECGS-100 Environment and development, 15 cr

Ympäristö ja kehitys, opintokokonaisuus/ Miljö och utveckling, studiehelhet

Grading scale 0-5
Credits 15 cr
Responsible organisations ECGS (Global Development Studies, Faculty of Social Sciences, UH)

Responsible persons Anja Nygren

Content description
This module focuses on long-term pathways and current debates related to development and environment in the global South. The module deals with main approaches to analyse environment-development questions in the global South, and of the associated global North linkages. It introduces the main principles and main approaches of political ecology in order to understand multi-scale resource politics and governance in the global South, relevant for academic research, development policy, and societal

discussion. This module also introduces several classic thinkers and fields of research in Global Development Studies, and their relevance in the current academic and societal debates and discussions. In addition, this module deals with global justice issues related to the global climate change, and the diversity of perspectives, values, discourses, and politics involved.

Prerequisites
This module is available only for MA-level students. Courses included in the module can be taken either during the 1. or 2-year of Master Studies.

Learning outcomes
After completing this module, the student has good knowledge of the main approaches to analyse environment-development questions in the global South, and of the associated global North linkages. The student is familiar with main principles in political ecology and multi-scale resource governance in the global South and is able to apply the acquired knowledge in empirical research and policy-oriented work. The student has good knowledge of classic thinkers and theories relevant for Global Development Studies. In addition, the student has knowledge of the relevant discussions on global justice issues related to the climate change, and understands the diversity of perspectives, values, discourses, and politics involved.

Target groups
Target groups for the study module

Term/teaching period when the module will be offered
1st or 2nd year of master's studies

Recommended time or stage of studies for completion
During Master studies

Expiry of studies
Module and the studies in it expire in 10 years. Module's expire date is calculated from the date of the last completed course.

Language of instruction
In ECGS language of instruction is English, completion in the multilingual ECGS programme can be English Finnish or Swedish or as specifically indicated in the course description.

Equivalencies with other studies

Study module level
ECGS-modules are Master's level studies, second-cycle degree/EQF level 7
Only by permission with the Coordinating Teacher and with the Doctoral Programme representative/PhD supervisors in question, this module can be used in Doctoral level = third-cycle (doctoral) degree/EQF level 8

Structure of the study module
Compulsory
- YMK-3303 Political ecology and resource politics, 5 cr
- YMK-3305 Classics in Development, 5 cr
- YMK-3310 Climate change and global justice, 5 cr

ECGS-200 Consumer Citizens and Sustainability Transitions, Study Module, 15 or 30 cr

Kuluttajakansalaiset ja kestävyysmuutos, opintokokonaisuus/ Konsumtionsmedborgarna och hållbarhetsförändringen, studiehelhet

Grading scale Weighted average of courses
Credits 15 or 30 cr
Responsible organisations ECGS

Responsible persons Eva Heiskanen, Consumer Society Research Centre (Faculty of Social Science)

Content description
The module consists of one mandatory 5 cr course and 6 optional 5 cr courses. Depending on their interests, students can focus more on public policy, markets or practical local interventions.

Prerequisites
Bachelor's degree with at least 30 cr social science studies

Learning outcomes
Having completed this module,

- Students have the basic knowledge and skills enabling them to work as an expert in sustainable consumption in the public, private or third sector.
- They understand the research paradigms and main empirical research findings concerning sustainable consumption well enough to evaluate competing theoretical perspectives and critically assess research findings and policy proposals.
- They are able to structure and analyse policy, design and communications problems in sustainable consumption and to collect sensible primary and secondary data to inform solutions to these problems.
- They also have a conceptual and experiential understanding of different ways in which such problems can be framed.
- They have the capability to undertake a master's thesis project in sustainable consumption.

Additionally, students improve their practical research design, methods, data collection, writing, team work and communication skills.

Target groups ECGS students in the Global Sustainability study line

Term/teaching period when the module will be offered
ECGS: 1st - 2nd year of master's studies, all periods

Recommended time or stage of studies for completion
ECGS: 1st - 2nd year of master's studies

Expiry of studies
Module and the studies in it expire in 10 years. Module's expire date is calculated from the date of the last completed course.
If the student has acquired prior learning corresponding to the study module more than 10 years ago, it can be demonstrated pending separate agreement.

Language of instruction English, completion can be in English, Finnish or Swedish

Equivalencies with other studies none

Study module level
ECGS-modules are Master's level studies, second-cycle degree/EQF level 7
Studies of this module can be used in Doctoral level = third-cycle (doctoral) degree/EQF level 8

Structure of the study module
Compulsory

- ECGS-201 Perspectives on sustainable consumption 5 cr

Optional. Choose at least 10 cr

- ECGS-202 Sociotechnical (re)construction of consumer society
- ECGS-203 Sustainability in everyday life 5 cr
- ECGS-204 Business in the natural environment 5 cr
- FOR-111 Behavioural change and sustainability 5 cr
- EDUM504 Sustainable Culinary Culture 5 cr
- SOSM-YP302 Sustainable welfare 5 cr

ECGS-400 Forests, Global Change and Sustainability, 15 or 30 cr

Metsät, globaalimuutos ja kestävyys/ Skogar, global förändring och hållbarhet

Target group: Optional

Timing: Master's year 1-2

Objective/Learning outcomes: Students will gain a holistic understanding of the role of forests and forest-related people in realizing sustainability across multiple levels of governance, often in response to global drivers of change, such as climate change. In this context, they will be able to critically examine underlying politics and power in relevant international and domestic policy arenas, with particular focus on the Global South. In addition, students will understand tropical forest ecosystems and how forest and forestlands are impacted by global markets, forest management, and actors' underlying values and beliefs.

Prerequisites: According to programme prerequisites

Studies: According to course requirements

Contents:

Compulsory (5 credits):

- FOR-104 International forest policy, politics and power (M. Brockhaus), 5 , period IV

Optional (10-25 credits) :

- FOR-101 Responsible business management in circular and bioeconomy (Angelina Korsunova-Tsaruk)
- FOR-111 Behavioural change and sustainability (A. Vainio), 5 cr, period IV
- FOR-285 Climate change mitigation and adaptation in forestry, 5 cr
- FOR-276 Sustainable forestry and agroforestry in the tropics (E Webb), 5 cr, period tbd
- FOR-281 Tropical Landscape Change (E.Webb), 5 cr, period tbd
- FOR-282 Tropical forest Landscape Restoration (E. Yirdaw), 5 cr, period IV (from 2024 onwards every even year)
- GEOG-341 Geography of megatrends, environmental change and development in the Global South (P. Pellikka), 5 cr, period I

ECGS-500 Sustainable management of marine environments, 15 cr,

Merten kestävä hyödyntäminen, hallinta ja suojelu/ Hållbar användning, förvaltning och skyddande av havsmiljön

Grading scale 0-5, Weighted average of courses
Credits 15 cr
Responsible organisations
ECGS master programme is responsible of the module. Faculty of Biological and Environmental sciences and Faculty of Agriculture and Forestry are in charge of organizing the courses. Some of the courses are organized as cooperation between AGERE and ECGS master programmes

Responsible persons
Person coordinating the study module: Kari Hyytiäinen

Content description
This module provides a framework for understanding and analyzing environmental problems and sustainable use of marine environments. The module offers the tools for assessing risks in changing ecosystems, developing cost-effective solutions for mitigating marine pollution and planning sustainable pathways for economic sectors that make use of marine space and resources. The main legal frameworks, institutions, and civil society actors relevant for marine governance are introduced. The approach is solution-oriented and systemic. The causal interactions between human processes and ecosystem processes are studied. Economic, ecological, and social aspects of sustainability are considered. The methods and topics are generic, but the Baltic Sea is often used as a case study and model for other sea regions.

Prerequisites
B.Sc. in environmental economics, aquatic studies, environmental studies or other relevant field. Relevant prior candidate-level courses on environmental economics and aquatic ecosystems are recommended for those students not yet familiar with the concepts of these disciplines. The students are recommended to first take the course “Diagnosis of environmental problems in aquatic ecosystems”, and thereafter “Economics and governance of marine resources”-course.

Learning outcomes
The mandatory courses of the module provide you with skills to understand

- causal interactions why and how marine ecosystems change due to antropogenic pressures and disturbances
- the economic potential of marine resources and the multiple ways marine ecosystems contribute to human wellbeing and welfare
- how antropogenic pressures can be mitigated cost-effectively
- governance structures and the roles of institutions and civil society in governance of marine ecosystems
- opportunities and risks that future may bring to sustainable management of marine resources

The voluntary courses provide you with skills to use numerical methods as tools in analysis. The methods used include game-theoretical approaches, bayesian modelling, and static and dynamic models using non-linear optimization techniques
Courses include many opportunities for group work. You will learn how to access and make use of collective intelligence and learn multidisciplinary approaches to marine management.

Target groups
The module primarily serves the students of the ECGS programme. The module is optional and available for all interested students, including international students.

Term/teaching period when the module will be offered See the table of courses below

Recommended time or stage of studies for completion Either 1st or 2nd year of the master programme

Expiry of studies
The possibilities to replace the courses indicated by other relevant courses will be discussed and agreed case-by-case.

Language of instruction English

Equivalencies with other studies
The name of the module in 2020-23 was : Baltic Sea studies

Study module level All the courses are master level courses

Structure of the study module
The module consists of two mandatory courses and one voluntary course (to be picked from a tray of 4 courses).

Course	Responsible teacher	Faculty	Timing
ECGS-014 Diagnosis of environmental problems in aquatic ecosystems	Sakari Kuikka	Faculty of Biological and Environmental Sciences	I period
AGERE-E14 Economics and governance of marine resources	Kari Hyytiäinen	Faculty of Agriculture & Forestry	II period
ECGS-003 Practical application of sustainability science: learning project	Jaanika Blomster & Eva Heiskanen	Faculty of Biological and Environmental Sciences	IV period
AGERE-E12 International environmental agreements related to marine areas and resources	Marko Lindroos	Faculty of Agriculture & Forestry	III period (every second year)
ECGS-017 Fisheries management	Sakari Kuikka	Faculty of Biological and Environmental Sciences	III period
AGERE-E06 Economics of Aquatic Resources: Numerical Models	Kari Hyytiäinen & Marko Lindroos	Faculty of Agriculture & Forestry	I period

Compulsory
- ECGS-014 Diagnosis of environmental problems in aquatic ecosystems
- AGERE-E14 Economics and governance of marine resources

Optional
- ECGS-003 Practical application of sustainability science: learning project
- AGERE-E12 International environmental agreements related to marine areas and resources
- ECGS-017 Fisheries management
- AGERE-E06 Economics of Aquatic Resources: Numerical Models

ECGS-550 Changing Arctic and northern environments 15 or 30

Muutokset Arktisessa ja pohjoisessa ympäristössä / Föränderliga Arktiska och nordliga miljöer

Grading scale: Weighted average of courses
Credits: 15 or 30 credits
Responsible organization ECGS

Responsible person Tarmo Virtanen

Content description and learning outcomes:

- The module gives the student advanced knowledge of changing Arctic and northern ecosystems and environments, their pressing environmental issues and resulting socio-ecological impacts. Upon completion of the module, the student is capable of working in expert professions that require scientific knowledge and practical skills to study, assess and solve environmental questions in a northern context.

- The student has deeper understanding of the structure and functioning of Arctic and northern ecosystems and of the ongoing changes in northern environments at different time-scales and spatial contexts, and is aware of the causes, consequences and relevance of these changes.
- The student knows central theories, concepts, study approaches at different temporal and spatial scales, glossary of Arctic and northern ecosystem and environmental research, and can critically read and evaluate studies on these subjects.
- The student knows the main research methods, and data acquisition means, and has risk and uncertainty management skills.

Prerequisites:
Bachelor's degree in environmental or related sciences. Joint introductory studies in sustainability sciences or other relevant Master's programme studies.

Target group:
An optional module in the ECGS Master's Programme. Courses of the module are available also for students of other Master's Programmes, but ECGS students are prioritized.

Term and teaching period:
ECGS: during 1st or 2nd year of MSc studies.

Structure of the module:
Obligatory courses (10 cr):
- ECGS-039 (031-601) Arctic climate change, 5 cr
- ECGS-034 Seminar in Northern Ecosystems and Environment, 5 cr

Optional studies (5-20 cr):
- ECGS-068 (067-065) Past environmental change, 5 cr.
- ECGS-036 Arctic and human beings, 5 cr
- ECGS-032 Field course on Arctic ecosystems, 10 cr

ECGS-610 Agriculture and environment, 15 or 30 cr

Maataloustuotanto ja ympäristö/Agrikultur och miljö, studiehelhet

Grading scale Weighted average of courses
Credits Two options for implementing the module: Basic 15 cr and extended 30 cr.
Responsible organisations ECGS/AGRI

Responsible persons Irina (Iryna) Herzon

Content description
After completing the module, the student will gain understanding on agricultural production within its environmental context and impacts, and will gain some applied skills on planning environmentally sound production. Depending on the content of optional courses, the student can also deepen understanding between agriculture and environment from various perspectives of sustainability.

Prerequisites
BSc level degree in fields of agricultural sciences, rural development, sustainability sciences.

Learning outcomes
Having completed the study module the student is able to:

- conceptualise the agricultural ecosystem and describe key features of main farming systems
- identify main environmental impacts of agriculture and their causes
- identify and justify use of ecological farming methods suitable in the context of main farming systems
- apply conservation planning in farm conditions
- discuss impacts of agriculture as a sub-system within the broader production and consumption system.

When completing 30 cr, in addition to the above, the student will deepen her/his understanding of interactions between agriculture and environment as an issue of sustainability through the choices of elective courses.

Target groups Optional study track for other degree students.

Term/teaching period when the module will be offered
1st or 2nd year of master's studies

Recommended time or stage of studies for completion
During the MSc studies.

Expiry of studies
Module and the studies in it expire in 10 years. Module's expire date is calculated from the date of the last completed course.
If the student has acquired prior learning corresponding to the study module more than 10 years ago, she/he can demonstrate the skills by submitting a portfolio or coming for an interviews with a responsible person

Language of instruction English

Equivalencies with other studies NA

Study module level Master's level studies

Structure of the study module
The module contains two compulsory courses and one compulsory literature course of two options. Additional 15 credits are optional and need to be agreed with the responsible teacher.
***Compulsory* studies 15 cr**

- AGRI-211 Wildlife in the Farming Environment, 5 cr
- AGRI-212 Ecological farming methods, 5 cr

***Complemented with* 5 cr either:**

- AGRI-213 Literature in Farmland Ecology, 5 cr or
- AGRI-113 Environmental Technology in Crop Production, literature, 5 cr

***Elective* studies15 cr**
Study units agreed in the PSP

ECGS-700 Food and sustainability, 15 etcs

Ruoka ja kestävyys-opintokokonaisuus/ Mat och hållbarhet, studiehelhet

Target group: MSc ECGS (orientation: global sustainability)
Optional. Available by agreement to students in other programs.

Timing: 1st and 2nd year of the MSc program

Objective/Learning outcomes:
The module consists of two mandatory courses and an elective course.
Having completed the study module, the student will

- have a sound understanding of the structure and functioning of the food system from the perspective of sustainability,
- be able to find and interpret research reports, in which ecological efficiency, environmental impacts, or use of natural resources have been studied over the whole production and consumption cycle
- be able to list or illustrate key issues in ecological, social and economic dimensions of sustainability in these systems
- be able to conceptualise sustainable food consumption, sustainable diet or sustainable livelihoods, in order to address the complexity of the sustainability challenge in food systems

Prerequisites: BSc level degree in a relevant field or other applicable previous studies.

Contents:
Compulsory studies (10 cr)

- AGRI-222 Sustainable Food Systems, 5 cr (Hanna Tuomisto), *contact teaching in odd years in 2nd period, independent online course in even years*
- EDUM504 Sustainable Culinary Culture, 5 cr (Taru Lindblom, Johanna Mäkelä), *odd years, 4th period, essay course every year 2nd & 4th period*

Elective courses **(5 cr)**

Elective courses can consist of a choice of the courses listed below but can also include other courses if approved by the responsible person of this module.

In field of food sciences:

- FOOD-401 European Food Safety, 5 cr (Marina Heinonen), *even years, 3rd period*

In field of agroecology and plant production:

- AGRI-221 Agroecology: Working with the Complexity of Farming Systems, 5 cr (Iryna Herzon), *3rd period*
- AGRI-223 Literature in Agroecology of Food Systems, 5 cr (Hanna Tuomisto), *all periods*

In field of economics:

- EKM-103 Managing Innovation in Agrifood Value Chains for Sustainability, 5 cr (Bodo Steiner), *4th period*

Assessment practices and criteria: Average of the course grades, weighed by courses' credit points.

Responsible person: Hanna Tuomisto

Keywords: food, agriculture, food chain, food system, environment, sustainability

ECGS-800 Global Land Use, 15 cr

Global markanvändning, Globaali maankäyttö

Scope (credits): 15 credits

Target group: Masters students in the EC or GS study lines seeking in-depth focus on Global Land Use issues in the context of environmental change and sustainability.

Timing: Master's year 1-2

Responsible teacher Nicholas Hogarth

Objective/Learning outcomes:

Having completed the study module, students will:

- Have in-depth understanding of the key concepts and current trends in global land use across a range of geographies, governance, and land types in the context of sustainable development and global change processes.
- Gain understanding of the main ecological, economic, and societal drivers of land use change in the context of sustainability.
- Be able to critically examine underlying forest policies in relevant international and domestic policy arenas, with particular focus on the Global South.
- Have the ability to apply theories, frameworks and knowledge to critically engage in research and debates related to global land use change.
- Learn the ecological basis of climate change mitigation and adaptation measures of tropical forests.
- Learn the basic theory and skills necessary to start working with remote sensing data to analyse land use change.
- Be aware of the main research gaps, the current hot topics, and future directions in global land use.

Prerequisites: According to programme prerequisites

Contents
Compulsory:

- FOR-281: Tropical landscape change, 5 cr (period tbd) R*esponsible teacher is Edward Webb*

Optional :

- GEOG-341: Geography of megatrends, environmental change and development in the Global South, 5 cr (period 1) ; R*esponsible teacher is Petri Pellikka*
- FOR-104: International Forest Policy 2, 5 cr (IV period); R*esponsible teacher is Maria Brockhaus*
- FOR-226: Restoration of Degraded Ecosystems: Theory and Application, 5 cr (IV period in odd-numbered years); R*esponsible teacher is Harri Vasander*
- FOR-282: Tropical landscape restoration, 5 cr (period tbd) R*esponsible teacher is Eshetu Yirdaw*

ECGS-915, Urban Studies Module, 15 cr

Kaupunkitutkimuksen opintokokonaisuus/ Modulen i urbana studier

Grading scale Weighted average of courses

Credits 15 cr

Responsible organisations ECGS

Responsible persons Johan Kotze

Content description
The aim is to introduce students to urban research from an environmental perspective and to help them become aware of the impacts of urbanisation on nature, the world and human beings. Theoretical courses will prepare the student to meet urbanization challenges, such as ecosystem degradation, biodiversity loss and policy issues.

Prerequisites
Bachelor's level studies in environmental issues, or equivalent studies.

Learning outcomes
After completion, the student will be able to identify urban environmental/social problems, and have the toolkit to meet these challenges and solve the problems with other interested parties. More specifically, the module will enable students to:

- Define core concepts related to urban ecosystem ecology, urban biodiversity and urban environmental policy
- Apply core theories or methods of urban ecosystem ecology, urban biodiversity and urban environmental policy to real-world problems.

This 15 cr module focuses on urban ecosystem ecology, urban biodiversity and urban environmental policy.

Target groups
Those interested in urban environmental issues, from ecology, the environment, biodiversity, and policy. Exchange students are welcome.
Certain courses have a limited capacity of student intake (consult the course descriptions).

Term/teaching period when the module will be offered
Primarily during the 1st year of ECGS

- ECGS-904 (Year 1, Period 2)
- ECGS-907 (Year 1, Period 3)
- ECGS-903 (Year 1, Period 3)

Recommended time or stage of studies for completion
ECGS: during master's studies

Expiry of studies
Studies will expire in 10 years from the date of last completed study in the module.

Language of instruction
In ECGS language of instruction is English, completion in the multilingual ECGS programme can be English, Finnish or Swedish or as specifically indicated in the course description. Courses provided by English-speaking teachers should be completed in English.

Equivalencies with other studies

Study module level
ECGS-modules are Master's level studies, second-cycle degree/EQF level 7
Some courses are available as Doctoral level = third-cycle (doctoral) degree/EQF level 8

Structure of the study module
These are the compulsory courses for this module:

- ECGS-904: Urban Environmental Policy (Year 1, Period 2) (5 cr)
- ECGS-907: Urban Biodiversity (Year 1, Period 3) (5 cr)
- ECGS 903: Urban Ecosystem Ecology (Year 1, Period 3) (5 cr)

ECGS-930, Urban Studies Module, 30 cr

Kaupunkitutkimuksen opintokokonaisuus/ Modulen i urbana studier

Grading scale Weighted average of courses
Credits 30 cr
Responsible organisations ECGS

Responsible persons Johan Kotze

Content description
The aim is to introduce students to urban research from an environmental perspective and to help them become aware of the impacts of urbanisation on nature, the world and human beings. Both theoretical and practical courses will prepare the student to meet urbanization challenges, such as ecosystem degradation, biodiversity loss, urban climate, policy issues, sustainability, nature-based solutions, and planning.

Prerequisites
Bachelor's level studies in environmental issues, or equivalent studies.

Learning outcomes
After completion, the student will be able to identify urban environmental/social problems, and have the toolkit to meet these challenges and solve the problems with other interested parties. More specifically, the module will enable students to:

- Define core concepts related to urban ecosystem ecology, urban biodiversity and urban environmental policy
- Apply core theories or methods of urban ecosystem ecology, urban biodiversity and urban environmental policy to real-world problems.
- Critically discuss the direct and indirect drivers of urban biodiversity and sustainability challenges, and possible solutions to them.

This 30 cr module focuses on urban ecosystem ecology, urban biodiversity and urban environmental policy and includes skills such as nature-based solutions, fieldwork experience and a choice of subjects including ecotoxicology, urban climate and integrated methods in environmental social sciences.

Target groups
Disciplinary module for those interested in urban environmental issues, from ecology, the environment, climate, biodiversity, sustainability, nature-based solutions, policy and planning. Exchange students are welcome.
Certain courses have a limited capacity of student intake (consult the course descriptions).

Term/teaching period when the module will be offered
Primarily during the 1st year of ECGS, but optional studies are available during the 2nd year:

- ECGS-049 (Year 1, Period 1)
- ECGS-904 (Year 1, Period 2)
- ECGS-907 (Year 1, Period 3)
- ECGS-903 + 901 (Year 1, Periods 3 & 4)
- ECGS-076, ECGS-906, ECGS-910 (Year 2)

Recommended time or stage of studies for completion
ECGS: during master's studies

Expiry of studies
Studies will expire in 10 years from the date of last completed study in the module.

Language of instruction
In ECGS language of instruction is English, completion in the multilingual ECGS programme can be English, Finnish or Swedish or as specifically indicated in the course description. Courses provided by English-speaking teachers should be completed in English.

Study module level
ECGS-modules are Master's level studies, second-cycle degree/EQF level 7
Some courses are available as Doctoral level = third-cycle (doctoral) degree/EQF level 8

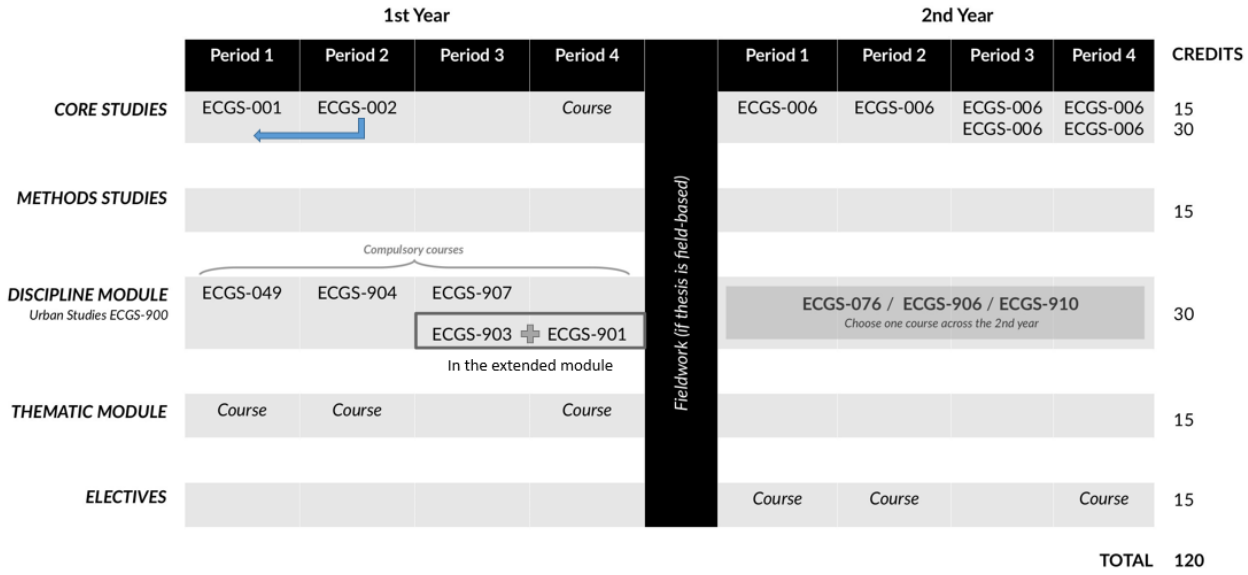
Structure of the study module

The following 5 courses are compulsory (25 cr):

- ECGS-049: Nature-Based Solutions (Year 1, Period 1) (5 cr)
- ECGS-904: Urban Environmental Policy (Year 1, Period 2) (5 cr)
- ECGS-907: Urban Biodiversity (Year 1, Period 3) (5 cr)
- ECGS 903: Urban Ecosystem Ecology (Year 1, Period 3) (5 cr)
- ECGS 901: Field Course in Urban Environmental Ecology (Year 1, Periods 4) (5 cr)

Choose one of the following 3 courses in year 2 to complete this module:

- ECGS-076: Urban Ecotoxicology (5 cr)
- ECGS-906: Urban Climates (5 cr, only given every 2nd year [2024, 2026, 2028…] in Period 3)
- ECGS-910: Integrated Methods in Environmental Social Sciences (5 cr).



ECGS COURSES 2023-2026

ECGS-001 Introduction to sustainability science, 5 cr

Johdatus kestävyystieteeseen, Introduktion till hållbarhetsvetenskap

Credits 5 cr
Responsible organisations ECGS

Responsible persons
Janna Pietikäinen (janna.pietikainen@helsinki.fi)

Equivalencies with other studies

Prerequisites
Bachelor degree in relevant field

Learning outcomes
After the course the student

- has basic understanding what sustainability science is and knows its historical development
- can discern the theoretical frameworks and key concepts behind sustainability science
- has basic understanding how human and natural systems interact
- can describe social-ecological systems and knows the fundamental principles of systems thinking, including matter and energy flows in a global context
- has understanding of inter- and transdisciplinary approaches and can communicate in interdisciplinary contexts
- is aware of planetary boundaries, can describe and analyse sustainability problems and suggest possible solutions through inter- and transdisciplinary thinking
- understands the institutional contexts and conditions of sustainability problems and their solutions
- has an understanding of the contents of the ECGS Master's programme

Content
The course introduces basic principles of sustainability science with special reference to its interdisciplinary and systemic dimensions. The focus of the course is on addressing real world sustainability problems like climate change, biodiversity loss, deteriorated aquatic ecosystems, access to clean water, land use change, food security, and other complex or wicked problems.

Completion methods
Participation in teaching
On-site lecture course. Possibility to complete by distance learning provided.

Grading scale Scale 0-5

Assessment practices and criteria
The learning outcomes are assessed using self and peer evaluation. The grading criteria are given in moodle.

Activities and methods in support of learning
Regular self-assessment during the course supports the reflection of student's individual learning progress. Group work and presentations enhance learning of interpersonal skills.

Target groups
Open to all master students and exchange students. Quota of places offered as open university studies.

Teaching period when the course will be offered Period 1

Recommended time or stage of studies for completion 1st year of Master's studies

Study module ECGS core studies

Expiry of studies Valid for 10 years

Language of instruction English

Language of learning English, Finnish or Swedish

Literature and learning material
Lecture material and other material assigned to the course in Moodle.

Course level Master's level second-cycle degree/EQF level 7

ECGS-002 Philosophical and Methodological Foundations of Sustainability Science, 5 cr

Credits 5 cr
Responsible organisations ECGS

Responsible persons
Michiru Nagatsu Michiru.nagatsu@helsinki.fi
Milutin Stojanovic Milutin.stojanovic@helsinki.fi

Equivalencies with other studies

Prerequisites
Bachelor's degree in relevant field.

Recommended prerequisites:
Basic courses in philosophy of science, philosophy of social science

Learning outcomes
After the course the student

- Can describe and apply key concepts discussed and used in sustainability science
- Understands the historical, methodological and ethical background of the field
- Is able to identify scientific questions in sustainability science
- Is able to identify interdisciplinary research strategies and their challenges to address these questions.
- Is able to use the key concepts to explain sustainability issues to a wider audience

Content

Completion methods
Writing the weekly diaries (summaries of what you have learned that week), 350 words each (graded only as pass/fail, the 7 diaries contribute in total to 50% of the final grade)
Participation in teaching (one lecture and one seminar each week) (in case you cannot attend the Friday seminar, you need to submit an additional, second diary for that week)
Final essay (2500 words, submitted at the end of the course) (50% of the final grade)

Assessment practices and criteria
Grading scale 0–5; the grade is based on the final essay (2500 words) (50% of the grade) and weekly reports/diaries (350 words) (50%). Detailed course evaluation criteria are available in Moodle.

Activities and methods in support of learning
In person lectures; individual reading and writing; classroom discussion; exam preparation

Target groups
ECGS master students + philosophy master students (participate with a different FILM code)"

Teaching period when the course will be offered "Period 1"

Recommended time or stage of studies for completion
1st study year in master's

Study module
Methodology and core module ECGS-4000 Sustainability science

Expiry of studies The course will expire after 10 years

Language of instruction English

Language of learning English

Literature and learning material
Lecture material and other material assigned to the course in Moodle.

Background Books:
Jeremy L. Caradonna (2014) : Sustainability: A History, Oxford University Press, 331 p.
Randall Curren and Ellen Metzgger (2017): Living well now and in the future: Why sustainability matters, MIT Press, 282 p.
Bert J.M. de Vries: Sustainability Science, Cambridge University Press, New York, 585 p.

Course level Master's level, (second-cycle degree/EQF level 7), Course level: basic

Additional information
Course is back to on-site teaching but keeps one day/week for self-study of Moodle materials.

ECGS-003 Practical application of sustainability science: learning project, 5 cr

Praktisk tillämpning av hållbarhetsvetenskap: lärandeprojekt, Kestävyystiede käytäntöön -projektikurssi

Credits 5 cr
Responsible organisations ECGS

Responsible persons
Jaanika Blomster, jaanika.blomster@helsinki.fi
Eva Heiskanen, eva.heiskanen@helsinki.fi

Equivalencies with other studies
-

Prerequisites
No prerequisites

Learning outcomes
The aim of the course is that the students

- can carry out project work in small groups
- will be able to analyze and apply theories of their own field in practice and in developing new ideas
- is able to work in a multidisciplinary group and utilize the knowledge of his/her own filed towards reaching the aims of the working group
- will get true working life contacts
- will get practice on skills on group work, communication and in making presentations
- becomes aware of her/his own skills and know-how and will be encouraged by it

Content
During the course students get familiar with project planning and mastering theory, and carry out true projects for employers on the field. Students present their project outcome in a seminar. The work on the course is intensive and requires commitment to the project and the group.

Completion methods
Participation in teaching. Student groups present their project outcome in a seminar. Most of the group work is done during the teaching sessions. The course includes compulsory face-to-face meetings and cannot be completed entirely by distant learning.

Grading scale Scale 0-5.

Assessment practices and criteria
The group will get a grade (0/1-5) of the work on the course. However, the final grade of a student can be affected by his/her activity on the course and the input on the project.
The grade is based on the group's self-evaluation and teacher evaluation. The partners will also be asked for their opinion about the group's work.

- **Grade 5**: The group works actively and supportively and all members are involved. All tasks are completed with an open mind and showing expertise. The group is committed to meeting its targets.
- **Grade 3**: The group collaborates well and all tasks are completed. However, the criteria for excellent work are not met.
- **Grade 1**: The group works together and completed the assigned tasks.

Target groups Primarily ECGS and AGERE students

Teaching period when the course will be offered period 4

Recommended time or stage of studies for completion 1st or 2nd year of

Study module ECGS-450 CORE STUDIES IN ECGS, 30 cr Optional

Expiry of studies Course is valid for 10 years

Language of instruction English

Language of learning English

Literature and learning material
Scientific literature related to the topic of the project. Lecture material and other material assigned to the course in Moodle

Course level Master's level, (second-cycle degree/EQF level 7).

ECGS-004 Master's thesis seminar, 5 cr

Maisterintutkielmaseminaari, Magisteruppsatsseminarium

Credits 5 cr
Responsible organisations ECGS

Responsible persons
Jaanika Blomster, jaanika.blomster@helsinki.fi
Eva Heiskanen, eva.heiskanen@helsinki.fi

Equivalencies with other studies -

Prerequisites -

Recommended prerequisites:
ECGS-001 Introduction to Sustainability Science, ECGS-002 Philosophical and Methodological Foundations of Sustainability Science

Learning outcomes
The aim of the course is that the student

- gets an overview of the thesis process
- will be able to formulate and write a research plan
- can plan and give oral presentations with visual material on one's own research plan and the results of the study
- will be able to critically analyse other students' research plans and results
- can give and receive feedback on the presentations

Content
Students plan their research, write the research plan and present the plan and the results in the Master's Thesis Seminar. The seminar consists of contact teaching common for all ECGS students, and seminar presentations and discussion sessions in groups formed according to research topics or approaches.

Completion methods
Participation in teaching (joint sessions, seminar groups) and independent work

Grading scale Pass/fail

Assessment practices and criteria
The student will pass the course once all tasks are completed:

- attendance of the common sessions and tasks related to them completed (5 sessions, 2 hr each)
- attending the discipline-specific seminar group sessions (8 sessions, 1.5 h each)
- presentations (2) in the discipline-specific groups

Activities and methods in support of learning

Target groups ECGS students only

Teaching period when the course will be offered Periods 1 and 3

Recommended time or stage of studies for completion

Recommended 1st year spring or 2nd year autumn

Study module
Compulsory in ECGS-450 CORE STUDIES module

Expiry of studies (New) Course is valid for 10 years

Language of instruction English

Language of learning English

Literature and learning material
Lecture material and other material assigned to the course in Moodle

Course level Master's level, (second-cycle degree/EQF level 7).

ECGS-005 Master's thesis, 30 cr

Target group: The course is compulsory for the students of Master's Programme in Environmental Change and Global Sustainability, Environmental Change study line.

Timing: Mainly second year of MSc studies. Research plan periods 3-4 during the first year of MSc studies, and gathering of data in the summer of the first study year or during periods 1-2 of the second study year; data processing and writing period 3 of the second study year.

Objective/Learning outcome:

After completing the thesis, the student will be able to

- to plan and implement a research project in a timeframe
- to define appropriate research questions and base them with a theoretical framework
- to design and carry out data collection under supervision
- to analyse and interpret the research results
- to present the results of the research according to scientific standards
- to receive and use feedback in his/her own research and writing
- to apply ethical principles in science.

Prerequisites:
The student needs to have the necessary knowledge and skills for collecting the data (field/laboratory) and processing (statistics) them, and skills for scientific writing.
Prerequisite studies: Introduction to Sustainability Science and Sustainability Science Concepts.

Contents:

The Master's thesis is usually based on an empirical research project and critical contemplation of the results in the light of scientific literature on the topic. The thesis may also consist of a theoretical literature study. A Master's thesis project usually consists of four distinct phases

1. design and planning of the study
2. gathering the data (field work and/or laboratory work and/or mathematical modelling)
3. analysing the data (validation/quality control, statistical analysis, plotting)
4. interpreting and discussing the results in the light of existing literature.

Literature and study materials:
Mainly international, scientific papers depending on the topic of the Master's thesis.

Assessment practices and criteria
Approval and grading is based on the written Master's thesis. The MSc thesis will be graded on the scale according the guidelines of the university.

Completion:
Student will write the MSc thesis on the basis of guidelines delivered in the Master's seminar. In many cases, the work is carried out in a research project in which the student has a clearly defined and independent role. The total workload (corresponding 30 cr.) starting from designing the project to its completion is approximately 4.5 months (800 hrs or 20 weeks at 40 hrs/week).
Detailed information about the Master's thesis is provided by the MSc programme.

Other information:
The Master's thesis project may not be started before obtaining an approval for the Master's thesis plan. For further information, see the general Instructions for Master's Theses.
Each MSc thesis must have at least one supervisor at the university or elsewhere.

Relations to other study units
Master's Thesis work is done in connection to Master's Thesis Seminar.
The thesis may not be approved before the student has passed the maturity test.

Responsible person: Head of the Master programme David Thomas.

ECGS-006 Master's thesis, 30 cr

Target group: The course is compulsory for the students of Master's Programme in Environmental Change and Global Sustainability, Global sustainability study line.

Timing: Mainly second year of MSc studies. Research plan periods 3-4 during the first year of MSc studies, and gathering of data in the summer of the first study year or during periods 1-2 of the second study year; data processing and writing period 3 of the second study year.

Objective/Learning outcome:

After completing the thesis, the student will be able to

- to plan and implement a research project in a timeframe
- to define appropriate research questions and base them with a theoretical framework
- to design and carry out data collection under supervision
- to analyse and interpret the research results
- to present the results of the research according to scientific standards
- to receive and use feedback in his/her own research and writing
- to apply ethical principles in science.

Prerequisites:
The student needs to have the necessary knowledge and skills for collecting the data (field/laboratory) and processing (statistics) them, and skills for scientific writing.
Prerequisite studies: Introduction to Sustainability Science and Sustainability Science Concepts.

Contents:
The Master's thesis is usually based on an empirical research project and critical contemplation of the results in the light of scientific literature on the topic. The thesis may also consist of a theoretical literature study. A Master's thesis project usually consists of four distinct phases

1. design and planning of the study
2. gathering the data (field work and/or laboratory work and/or mathematical modelling)
3. analysing the data (validation/quality control, statistical analysis, plotting)

4. interpreting and discussing the results in the light of existing literature.

Literature and study materials:
Mainly international, scientific papers depending on the topic of the Master's thesis.

Assessment practices and criteria
Approval and grading is based on the written Master's thesis. The MSc thesis will be graded on the scale according the guidelines of the university.

Completion:
Student will write the MSc thesis on the basis of guidelines delivered in the Master's seminar. In many cases, the work is carried out in a research project in which the student has a clearly defined and independent role. The total workload (corresponding 30 cr.) starting from designing the project to its completion is approximately 4.5 months (800 hrs or 20 weeks at 40 hrs/week).
Detailed information about the Master's thesis is provided by the MSc programme.

Other information:
The Master's thesis project may not be started before obtaining an approval for the Master's thesis plan. For further information, see the general Instructions for Master's Theses.
Each MSc thesis must have at least one supervisor at the university or elsewhere.

Relations to other study units
Master's Thesis work is done in connection to Master's Thesis Seminar.
The thesis may not be approved before the student has passed the maturity test.

Responsible person: Head of the Master programme David Thomas .

ECGS-008 Master's thesis for Subject teacher, 30 cr

Unit: Master's programme in Environmental Change and Global Sustainability

Target group: The course is compulsory for the students of Master's Programme in Environmental Change and Global Sustainability, subject teacher study line.

Timing: Mainly second year of MSc studies. Research plan periods 3-4 during the first year of MSc studies, and gathering of data in the summer of the first study year or during periods 1-2 of the second study year; data processing and writing period 3 of the second study year.

Objective/Learning outcome:

After completing the thesis, the student will be able to

- to plan and implement a research project in a timeframe
- to define appropriate research questions and base them with a theoretical framework
- to design and carry out data collection under supervision
- to analyse and interpret the research results
- to present the results of the research according to scientific standards
- to receive and use feedback in his/her own research and writing
- to apply ethical principles in science.

Prerequisites:
The student needs to have the necessary knowledge and skills for collecting the data (field/laboratory) and processing (statistics) them, and skills for scientific writing.
Prerequisite studies: Introduction to Sustainability Science and Sustainability Science Concepts.

Contents:
The Master's thesis is usually based on an empirical research project and critical contemplation of the results in the light of scientific literature on the topic. The thesis may also consist of a theoretical literature study. A Master's thesis project usually consists of four distinct phases

1. design and planning of the study
2. gathering the data (field work and/or laboratory work and/or mathematical modelling)
3. analysing the data (validation/quality control, statistical analysis, plotting)
4. interpreting and discussing the results in the light of existing literature.

Literature and study materials:
Mainly international, scientific papers depending on the topic of the Master's thesis.

Assessment practices and criteria
Approval and grading is based on the written Master's thesis. The MSc thesis will be graded on the scale according the guidelines of the university.

Completion:
Student will write the MSc thesis on the basis of guidelines delivered in the Master's seminar. In many cases, the work is carried out in a research project in which the student has a clearly defined and independent role. The total workload (corresponding 30 cr.) starting from designing the project to its completion is approximately 4.5 months (800 hrs or 20 weeks at 40 hrs/week).
Detailed information about the Master's thesis is provided by the MSc programme.

Other information:
The Master's thesis project may not be started before obtaining an approval for the Master's thesis plan.
For further information, see the general Instructions for Master's Theses.
Each MSc thesis must have at least one supervisor at the university or elsewhere.

Relations to other study units
Master's Thesis work is done in connection to Master's Thesis Seminar.
The thesis may not be approved before the student has passed the maturity test.

Responsible person: Head of the Master programme David Thomas

ECGS-011 Advanced aquatic and sediment biogeochemistry, 5 cr

Target group: Open to all
Timing: Period IV

Objective/Learning outcome:
The course develops the concepts taught in ENV-312, with a strong focus on biogeochemical processes in coastal and ocean-margin sediments

<u>Scientific knowledge gained during the course</u>

- Understanding of dissolved and particulate organic matter cycling in estuarine and coastal systems
- Understanding of nutrient regeneration/removal and carbon burial in estuarine and coastal systems
- Understanding of the diagenetic zonation of sediments, and coupled microbial processes in the sediment column
- Understanding of benthic oxygen fluxes and the role of benthic organisms in coastal habitats
- Understanding of silicate chemistry in ocean-margin sediments
- Understanding of authigenic mineral formation (carbonates, phosphates, sulfides) in sediments

- Understanding of the impact of sediment processes on greenhouse gas emissions

Specific skills gained or further developed during the course
- Ability to read and evaluate English-language scientific articles in the field of aquatic biogeochemistry
- Ability to perform calculations using chemical equations, for quantitative understanding of element cycling, and to place the results in context

Prerequisites:
It is an advantage if students have either completed, or are familiar with the concepts in, the BSc course ”Akvaattinen biogeokemia” (“Aquatic biogeochemistry”, ENV-312):
- Carbon, nitrogen and phosphorus cycling in aquatic systems
- Ocean circulation and the biological pump
- Early diagenesis in sediments and benthic nutrient fluxes
- Eutrophication and hypoxia
- Acid rain, acidification and recovery in freshwater systems
- Basic techniques in water and sediment chemical analysis

Contents:
Online lecture content
- Early diagenesis in sediments; redox zonation and microbially mediated reactions
- Coupled biogeochemical cycles in sediments and human impacts on reaction rates
- Dissolved organic matter cycling in boreal estuaries and implications for sediment organic matter composition
- Nutrient retention and release in coastal systems
- Benthic oxygen consumption and production in coastal ecosystems
- Impact of sediment processes on greenhouse gas emissions (CO_2, CH_4, N_2O)
- Authigenic mineral formation in sediments
- Sediment chemistry in marine oxygen minimum zones: carbon and silica cycling

Computer practical exercises
- Four interactive computer exercises based on the above topics

Minisymposium
- Attendance at a minisymposium featuring 4 PhD and postdoc researchers. Students listen to the presentations and formulate constructive questions.

Compulsory reading, completion of computer exercises and minisymposium report
- Each of the above components is augmented with additional tasks. Lectures have additional reading, the computer practicals contain extra tasks to be done in your own time, and a report must be written following the minisymposium.

Literature and study materials:
Teachers will provide a suitable amount of additional reading to accompany each lecture. This will mainly be based on scientific articles, and some book chapters. Further information is provided during the course.

Assessment practices and criteria: The grade is given on a scale of 0-5.

Assessment breakdown
- Reports of computer practical exercises: 40%
- Minisymposium report: 10%
- Final exam: 50%

Completion:
Course components

- Watching the online lectures (8 x 2h)
- Completing the associated reading (8 x 4h)
- Attending the supervised computer practical exercises (4 x 2h)
- Completing the additional computer tasks (4 x 4h)
- Attending the minisymposium (1 x 2 h)
- Writing the minisymposium report (1 x 8 h)
- Revision of material for exam (40 h)
- Final exam (1 x 3 h)

Total time 129 hr (= approx. half of your study time over the 2-month period)

Responsible person: Tom Jilbert

ECGS-013 Restoration of lake ecosystems, 5 cr

Järviekosysteemien kunnostus,

Credits 5 cr
Responsible organisations ECGS

Responsible persons
Jukka Horppila

Equivalencies with other studies -

Prerequisites
ECGS-011 recommended

Learning outcomes

- Knowledge on diagnosing the environmental problems of lake ecosystems and means to apply research-based solutions in resolving them.
- Comprehensive knowledge on planning and methodology of lake ecosystem management and restoration
- Ability to evaluate the effects of different lake restoration methods

Content

- Goals and methods of lake restoration
- Planning of lake restoration
- Positive and negative effects of different restoration methods
- Results from case studies of restoration

Completion methods

- Participating in contact teaching lectures
- Group work in essay writing
- Presentation of essay conclusions in course seminars

Participation in the on-site lectures is voluntary, but the group work and attending the course seminars are compulsory. The course cannot be completed as distance learning.

Grading scale Scale 0-5

Assessment practices and criteria
The grade of the course is calculated as an average of the grades given for the written essay (scale 0-5) and seminar presentation and activity (scale 0-5).

Activities and methods in support of learning

Target groups Primarily students in the EC-line of ECGS

Teaching period when the course will be offered
Period 3-4 (lectures period 3, seminars period 4)

Recommended time or stage of studies for completion
1st or 2nd study year in master's

Study module
Optional in ECGS-010 Aquatic sciences module

Expiry of studies The course is valid for 10 years

Language of instruction English

Language of learning English

Literature and learning material
Lecture material and other material assigned to the course in Moodle

Course level Master's level, (second-cycle degree/EQF level 7).

ECGS-014 Diagnosis of environmental problems in aquatic ecosystems, 5 cr

Ympäristöongelmien diagnoosi akvaattisissa ekosysteemeissä, Diagnos av miljöproblem i akvatiska ekosystem

Target group:
Mandatory for students expecting to accomplish the "Baltic Sea Studies" module. Optional for others.

Timing: The first or second year of the Master programme. Period I

Objective/Learning outcome:
The course follows the Driver-Pressure-State-Impact-Response framework. After the course, student will understand the main causal relationships in the ecosystem of the Baltic Sea. Moreover, students understand the mechanisms of how the states of the Baltic Sea ecosystem react to the various pressures. A course work based on causal modelling is required. The pressures on the drainage area are in a key role.

Prerequisites:
B.Sc. in environmental economics, aquatic studies, environmental studies or other relevant field.

Assessment practices and criteria
Passing the course: 80 % times present, one-page description of each talk, seminar presentation in the end.

Other information: Teaching is given in English, and the final report and the seminar talk are also given in English.

Relations to other study units
Replaces the former course 51878 Itämeritutkimuksen ajankohtaisia kysymyksiä 5 cr OR 863067 Vaihtuva teemakurssi 4 cr.

Responsible person:
Sakari Kuikka

ECGS-016 Fish research, 5 cr

Kalantutkimus, Fiskforskning,

Credits 5 cr
Responsible organisations ECGS

Responsible persons
Jyrki Lappalainen, e-mail: jyrki.t.lappalainen@helsinki.fi

Equivalencies with other studies

Prerequisites No prerequisites

Learning outcomes
After lectures and laboratory practices students have a knowledge of different basic methods used in fish research. They understand why a certain type of research method should be selected and used. Laboratory work aims to give practical skills in methods commonly used in fish research

Content
Course grade is based on both exam (65%) and practical exercises in laboratory and a short report (35%). Ten lectures of 2 h each. After lectures, practical guided laboratory exercises (10 h) and 10 h of independent personal working with selected fish samples. Laboratory exercises (total of 20 h) include a short personal report of fish samples analyzed

Completion methods
Compulsory participation to lecture exam. After that, compulsory practical guided laboratory exercises of 10 h and independent laboratory working of 10 h on your own fish samples. The course grade is based both on lecture exam (total of 65% of grade), laboratory work (20 h) and personal report (35% of grade)

Grading scale
Scale 0-5

Assessment practices and criteria
Exam gives 65% of total points, and laboratory work and personal report gives 35% of total points. Final grade (scale 0-5) is based on exam, laboratory work and personal report.

Activities and methods in support of learning
Lectures and other materials in moodle

Target groups
ECGS-students. Additional information: Students from other master's programmes can be accepted if places available

Teaching period when the course will be offered
Every year in period I

Recommended time or stage of studies for completion
1st and 2nd study year in master's

Study module
Optional in ECGS-010 Aquatic Sciences odule

Expiry of studies The course is valid for 10 years

Language of instruction English, Finnish

Language of learning English, Finnish

Literature and learning material
Lectures slides and other materials are in moodle

Course level Master's level, (second-cycle degree/EQF level 7). Basic Master's level

ECGS-017 Fisheries management , 5 cr

Kalastuksen säätely

Target group: Master students

Timing:
The first or second year of the Master programme. The course will be arranged in spring, in the fourth term.

Objective/Learning outcome:
Understanding the theoretical grounds of fisheries management and the application of practical management actions.

Prerequisites:
Akvaattisten tieteiden perusteet, Kalantutkimus: luennot, Kalantutkimus: harjoitustyöt, Kalakantojen arviointi, Todennäköisyysmallit ja päätösanalyysi, Tilastollisen Bayes-päättelyn perusteet ja Tilastollisen Bayes-päättelyn jatkokurssi

Contents:
The concepts and models of fisheries management, uncertainty of fish productivity and fisheries, applications of Bayesian decision analysis models to fisheries management. National and international fisheries policy, management strategies and practical implementation of policy actions.

Literature and study materials: The material will be provided on the course.

Assessment practices and criteria
Exam, rates 0 - 5

Completion.
Exam and course activity

Other information: All lectures will be in English.

Relations to other study units Replaces the former course 86109 Fisheries Management 6 cr.

Responsible person: Sakari Kuikka

ECGS-019 Advanced aquatic ecosystems research, 5-10 etcs

Vesiekosysteemien syventävä tutkimus
Utvecklad akvatisk ekosystemen forskning

Target group: ECGS programme, MSc level

Timing: Every other year (period open)

Objective/Learning outcomes:

- Capability of formulating solid structured questions and setups in aquatic research to answer preset research aims in a set scientific frame
- Understanding the causal relationships between abiotic and biotic factors in aquatic ecosystems
- Ability to search, read and apply relevant literature to research theme
- Ability to apply theoretical scientific knowledge to a larger scientific frame
- Ability to produce logical scientific text
- Has good group working skills

Contents:

- Aquatic ecosystem research
- Causal relationship between biotic and abiotic factors
- Aquatic ecology
- Land-water interface interactions

Completion: Participation in contact teaching, active self-guided work, active group work, scientific presentation of results

Evaluation/Assessment practices and criteria: Scaling 0-5
Responsible person: Kimmo Kahilainen

Relations to other study units/Prerequisites: ECGS-018 recommended,
Replaces courses ECGS-022 and ECGS-015

Other information:

Realisation and working methods:
Lectures, experimental and/or field work, self-guided work, scientific text output

Keywords: (i.e. if Suitable for exchange students)

Study materials and literature: Announced separately

ECGS-020 Nutrient loading of aquatic ecosystems , 5 cr

Vesiekosysteemien ravinnekuormitus, Näringsmängdsladdning av akvatiska ekosystem
Target group: Especially students in ECGS

Timing: Master studies, arranged every other year

Objective/Learning outcomes:

- Ability to evaluate the sources, magnitude, and consequences of external and internal nutrient loading of aquatic ecosystems
- Ability to analyze and interpret nutrient loading data
- Ability to use the field study methods in studies of internal and external loading of aquatic ecosystems
- Ability to choose and use the field equipment used in different methods
- Ability to compare the results obtained by different methods
- Skills for the methodology of continuous measurements

Contents:

- Sources and magnitude of nutrient loading in aquatic ecosystems
- Methodology for measurements of external and internal nutrient loading
- Consequences of nutrient loading for aquatic ecosystems
- Field methods and equipment for the estimation of nutrient loading
- The validity of different methods in various circumstances
- Calibration between methods

Completion:

- Participating in contact teaching
- Group work
- Report writing and presentation of results

Evaluation/Assessment practices and criteria: Fail/pass

Responsible person: Leena Nurminen

Relations to other study units/Prerequisites: ECGS-011 recommended

Other information:

Realisation and working methods: Lectures, field and laboratory work, report writing

Keywords: (i.e. if Suitable for exchange students)

Study materials and literature: Announced separately

ECGS-023 Functional marine ecology, 5 cr

Funktionaalinen meriekologia
Funktionell marinekologi

Target group: MSc level

Timing: Period IV, (every year)

Objective/Learning outcomes:
The objective of the course is to provide students with insights on the importance of global change on marine biodiversity, and to obtain skills to describe the link between the structure and function of coastal ecosystems. Emphasis will also be placed on quantification of biodiversity and ecosystem functioning relationship, with descriptions on how anthropogenic stressors can compromise these relationships. Students will get a grasp of the conceptual and analytical procedures necessary for quantification of key ecosystem processes in coastal habitats and placing results in context for their scientific reporting.

Contents:

- Theoretical background on biodiversity ecosystem function studies in marine systems
- Methods for the analysis of ecosystem structure and function in benthic and pelagic habitats
- Quantification of environmental drivers affecting biodiversity
- Combination of field studies and experiments to build strength of inference in addressing context-dependence of pattern and process
- Analysis of data and reporting

Completion:

Evaluation/Assessment practices and criteria: Grades 0-5. Grade is based on pre-course exam on background literature 1/3, field and lab work 1/3 and presentation of projects and report 1/3. Attendance is mandatory for all components.

Responsible person: Alf Norkko

Relations to other study units/Prerequisites: Completed basic aquatic courses in BSc-programme

Other information:

Realisation and working methods:
Ten-day field and lab course at Tvärminne Zoological Station including a pre-course exam. The course includes lectures, demonstrations, practical work in the field and lab, and group projects.

Keywords: (i.e. if Suitable for exchange students)

Study materials and literature:

ECGS-024 Technology in ecological research and environmental monitoring 5 cr

Teknologian käyttö ekologisessa tutkimuksessa ja ympäristömonitoroinnissa/ Teknik inom ekologisk forskning och miljöövervakning

Credits 5 cr
Responsible organisations ECGS

Responsible persons
John Loehr, john.loehr@helsinki.fi

Equivalencies with other studies -

Prerequisites
No prerequisites. Other courses supporting the knowledge of this course:
Courses which support the use of GIS software

Learning outcomes

- Ability to independently plan missions and operate remotely operated vehicles
- Ability to process data to make orthomaps and 3d models using online resources and photogrammetry software
- Ability to use GIS to make basic measurements on data
- Knowledge of ROV use in ecological research
- Ability to construct and deploy simple data loggers and analyse the data

Content

- Introduction to RPAS (Remotely Piloted Aerial Vehicle) and aquatic ROV (Remotely Operated Vehicle) technology
- Basic proficiency in operation of these vehicles. Includes European drone pilot A1/A3 qualification
- Planning and execution of 2d mapping mission
- 2d orthomapping and 3d photogrammetry
- Basic GIS analysis from data gathered
- ROV use in environmental research

In some years (depending on teaching resource availability) students will also have the opportunity to construct electronic measurement loggers which are placed in the field to gather data. The gathered data will also be analysed.
Students will plan and execute their own mini research projects using techniques learned during the contact days

Completion methods
Participation in teaching fieldwork. The course cannot be completed as distance learning.
Exam.

Assessment practices and criteria
Scale 0-5, awarded on basis of book exam (30%), project report (40%) and presentation (30%)

Activities and methods in support of learning
Students: hands on experience operating devices, planning and executing small research project, reporting of results, independent study, interaction with other students and teachers.
Teachers: lectures, demos, consultations with students

Target groups
Maximum 16 students. Selection priority if more registrations than the 16 student limit. 1. ECGS MSc students, 2. Faculty of Biology and Environmental Sciences MSc students, 3. Other Faculties

Teaching period when the course will be offered
Annual course held in September/October

Recommended time or stage of studies for completion
1st or 2nd study year in master's

Study module
Study modules to which the course belongs as optional: Methodological studies in ECGS-450 Core studies

Expiry of studies (New) Course is valid for than 10 years

Language of instruction English

Language of learning English, Finnish

Literature and learning material
Laboratory / field course:

- “Course / work handout and other material to be distributed during the course in Moodle / some other platform”
- Traficom online training for RPAS pilots
- Conservation drones, Wich and Koh 2018
- Other current journal publications from the field

Course level Master’s level, (second-cycle degree/EQF level 7).
The course is also suitable on Doctoral level, if PhD student needs basic knowledge of the use of drones, ROV’s etc. for PhD studies.
Course level: basic

ECGS-026 Portfolio for the future, 1-5 cr

Tulevaisuus portfolio, Portfolio för framtiden

Learning outcome
After the course student has gained e.g. following skills

- has the basic skills needed to participate seminars
- understands the importance of scientific communication
- has incresed labour market intelligence
- has gained understanding of generic skills required in future working life
- has incresed pathfinding capacity
- has increased ability to combine domain specific skills and generic skills
- recognizes the diverse elements of communication and professionalism

Completion
The student can participate e.g. to scientific seminars and report on student’s own learning by building portfolio from the information collected from the seminar presentations. The student choses the seminars to attend from the following categories: thesis defenses, specific seminars, congresses, workshops, short courses, group mentoring, or other clearly defined scientific or education events including also a role of organizer. The seminars should be from the area of ECGS study lines. After the course, students must return a portfolio reflection assignment that includes basic information of the seminars and reflection of the followed presentations. If you are unfamiliar or need support with your portfolio-work, please see further instructions for doing a portfolio from the ECGS Portfolio Moodle-page or responsible teacher. Portfolio are created using portfolio platform Qridi (under preparation) or other available platforms. 10 full day seminars with accepted portfolio assignments correspond 5 cp; 2 thesis defense sessions correspond one full day

Prerequisites Bachelor's degree

Target group Optional for students in ECGS

Timing First and second year of MSc studies

Contents Participation to scientific seminars

Assessment practices and criteria Pass/fail

Responsible person Olli-Pekka Penttinen

ECGS-027 Co-Creation Lab, 2 cr

Credits 2 cr
Responsible organisations ECGS

Responsible persons
Janna Pietikäinen, Nina Janasik, Michiru Nagatsu

Equivalencies with other studies -

Prerequisites
The students accepted in the Co-creation lab are required to participate in the Master's thesis seminar of their own MSc programme before or at the same time with the Co-creation lab. This does not apply to ECGS students, as ECGS students who are accepted in the Lab, register through ECGS-004 Masters' thesis seminar and select the Lab as one of their seminar groups.

Learning outcomes
After completing the course the student

- can act and work in a co-creation process
- understands what co-creation process is used for and what are the outcomes of the process
- can work in multidisciplinary and multi-actor groups
- has the experience of different steps in the co-creation process, and understands the goals of the individual steps
- has completed a master's thesis in a co-creation process

Content
In the Co-Creation Lab students tackle sustainability challenges presented by partners and produce new knowledge and/or solutions in their master's thesis. The lab is based on a cooperative, scheduled and facilitated process. During the first four lab meetings, the research topic, research questions, and the methodology are developed. This is followed by a research period, during which the master's students conduct individual research work. The last two lab meetings focus on interpretation of the data and presenting the research results. The six lab events are common and obligatory to all students. Students are assigned in thematic groups, which are gathered around challenges given the participating organisations. Each student will approach the challenge from the point of view of their own discipline, knowledge and interests. While the overarching challenge will be shared by all students in the team, each student will shape their own thesis topic and plan and do the thesis as individual work.

Completion methods
Active participation in six Co-Lab events. Commitment and participation in meetings, discussions and interaction within own challenge group. Completion of assignments or presentations to Co-Lab events.

Grading scale pass/fail

Assessment practices and criteria
Assessment is based on assignments submitted and presentations given.

Activities and methods in support of learning
Discussions in Co-Lab community and in challenge group. Individual studying and reading.

Target groups
The number of seats in Co-creation lab is limited. Depending on the overarching Lab challenge, students from all relevant Master's degree programmes are eligible to apply. Students are selected in the Co-Creation Lab based on the following criteria: 1) Relevant field of studies and methodological competence,

2) Plan how to commit to the Lab schedule, 3) Motivation regarding theme, 4) Motivation regarding co-creation, 5) Contents and style of application.
ECGS-027 is elective studies, and only for students accepted to the Lab from other MSc programmes than EGGS. ECGS students accepted in the Lab, register through ECGS-004 Masters' thesis seminar and select the Lab as their seminar group.

Teaching period when the course will be offered
Duration is four periods. Starts in rotation either in 1st period or 3rd teaching period.

Recommended time or stage of studies for completion
Recommended time to start in Co-Lab is in the 2nd or 3rd semester of master's studies

Study module Methodological studies in ECGS-450 core module

Expiry of studies Valid for 10 years

Language of instruction English

Language of learning English

Literature and learning material Materials assigned to the course in Moodle.

Course level Master's level, second-cycle degree/EQF level 7

ECGS-032 Field course on Arctic ecosystems, 10 cr

Arktisten ekosysteemien kenttäkurssi, Fältkurs i arktiska ekosystem

Credits 10 cr
Responsible organisations ECGS

Responsible persons
Person(s) coordinating the course: Tarmo Virtanen (tarmo.virtanen@helsinki.fi), Jan Weckström (jan.weckstrom@helsinki.fi), Kaarina Weckström (kaarina.weckstrom@helsinki.fi).

Equivalencies with other studies
- ECGS-035 Field course on Arctic ecosystems and climate change, 8 cr
- ECGS-032 Field course on arctic ecosystems and climate, 10 cr

Prerequisites
Recommended prerequisites: Bachelor degree in environmental or related sciences, course "ECGS-039 Arctic climate change" (Previously ECGS-031)

Learning outcomes
After the course the student:
- has a deeper understanding of Arctic ecosystems and their structure and functioning
- has the ability to analyse and identify climate change impacts on Arctic natural and human systems
- can plan and conduct a small-scale field study on some aspect of Arctic environmental change
- can analyse and interpret field-based data and present key findings of a research exercise
- learns to work in small groups
- can apply achieved information on various topics of environmental management and conservation

Content

Research project in small groups in the field, written project report, and presentation of its results in final seminar, seminar presentation on agreed topic during field part of the course.

Completion methods
Participation in course work and data collection in the field in Kilpisjärvi, laboratory and data analyses in Viikki, course work report, seminar presentations.

Grading scale Scale 0-5

Assessment practices and criteria Course field work and report 75%, Seminar presentation 25%. In addition, self and peer evaluation of course work.

Activities and methods in support of learning
Moodle page.

Target groups

Primarily for students in ´"Environmental Change and Global Sustainability"- Master's Programme and other Master's programmes in relevant fields. Students of "Changing Arctic and northern environments" – module are prioritised. If there is space on the course, also students from other Master's programmes from relevant fields can participate.

Teaching period when the course will be offered
Annual course. Students are selected during Periods II or III, and the introduction and planning meeting is held in Period III or IV. Field part (one week) in April or August in Kilpisjärvi, followed immediately by laboratory and data analysis and seminar in Viikki.

Recommended time or stage of studies for completion
1st year of Master's studies.

Study module
ECGS-550 Changing Arctic and northern environment module

Expiry of studies Course is valid for 10 years.

Language of instruction English

Language of learning English, Finnish or Swedish

Literature and learning material
Course material and instructions will be distributed during the course in Moodle
Literature needed in seminar and course work will be agreed on with the teachers of the course

Course level Master's level. The course is also suitable on Doctoral level.

ECGS-034 Seminar in northern ecosystems and environment, 5 cr

Pohjoiset ekosysteemit ja ympäristö –seminaari, Seminarium i norra ekosystem och miljö

Credits 5 cr
Responsible organisations ECGS

Responsible persons
Sirkku Manninen (sirkku.manninen@helsinki.fi), Jussi Eronen (jussi.t.eronen@helsinki.fi), Kaarina Weckström (kaarina.weckstrom@helsinki.fi)

Equivalencies with other studies
ECGS-037, ECGS-034

Prerequisites
ECGS-031 Arctic climate change

Learning outcomes
During and after the course, the student

- gains insight into environmental problems and potential solutions in northern areas
- gets practice in scientific information retrieval, critical reading, writing and oral presentation
- learns to act as an opponent
- has a wide view on topical research issues specific for Arctic and other northern areas

Content
The seminar deals with topical research in northern areas, covering atmospheric, climatic, terrestrial, fresh water, marine and socio-environmental sciences

Completion methods
Course info meeting, oral presentation and written essay, listening to presentations, acting as an opponent. Attendance mandatory (two absences allowed)

Grading scale 0-5

Assessment practices and criteria
Grade mean of presentation and essay

Activities and methods in support of learning
Feedback after the oral presentation, feedback on essay

Target groups
ECGS-students, EEB-students, Geology and Geophysics, and other interested students with fitting backgrounds. Open to exchange students

Teaching period when the course will be offered
Each year, period 4

Recommended time or stage of studies for completion
1st study year

Study module
"Changing Arctic and northern environments" module in ECGS

Expiry of studies (New) Valid for 10 years

Language of instruction English

Language of learning English, Finnish or Swedish

Literature and learning material
The seminar oral presentations and essays are prepared based on scientific articles

Course level Master's level, also suitable on Doctoral level

ECGS-036 The Arctic and human beings

Arktinen alue ja ihmiset, Arktiska området och människor

Credits 5 CR
Responsible organisations ECGS

Responsible persons
Ass. Prof Jussi T. Eronen (jussi.t.eronen@helsinki.fi), prof Reetta Toivanen (reetta.toivanen@helsinki.fi)

Equivalencies with other studies
ALKU-EH512, ALKU-EH513, ALKU-EH514, ALKU-EH515 and ALKU-305

Prerequisites
Prerequisite bachelor degree in environmental, social sciences or related field, or corresponding knowledge.

Learning outcomes

- has basic understanding of socioecological systems of the North
- gains understanding of human, non-human and environmental history of the North (inc. archeology)
- gains understanding of Arctic people and culture, including future conditions
- has knowledge of the climate and environmental impacts on various Arctic socio-ecological systems
- can critically assess the role of humans in the Arctic, including Indigenous people livelihoods and cultures
- can apply the achieved information to environmental management, climate mitigation and adaptation

Content
The course introduces the broad outlines of human history in Artic, as well as environmental history since the end of the ice age. The course includes focus on socio-ecological systems in especially Fennoscandia and Barents area from the past to the present. The course deals with the human resource use in the north as well as how cultures and languages have adapted to northern conditions, and what the present situation is. During the course the future conditions in the Arctic are critically assessed, as well as what this means for human living there and their environment. This is a flipped classroom course and involves group work.

Completion methods
Flipped classroom:
Lectures, Seminar presentation/report, reading summary, group work, blog post, essay

- Lectures with the following structure: short introduction to the subject followed by open discussion based on few easy-to-read scientific papers that are available before the lecture
- Lecture diaries
- Seminar presentations by students based on the lecture topics (with in-depth scientific literature)
- Writing in groups a blog posts and individually a short essay

Course and seminar attendance obligatory (no exceptions as this is a voluntary course)

Grading scale Pass/fail

Assessment practices and criteria
All assignments will be assessed including participation

Target groups Primarily master students

Teaching period when the course will be offered Annual courses: Period III & IV every year

Recommended time or stage of studies for completion
1st or 2nd study year in master's

Study module
Optional to any study module, especially suitable to the Arctic study module

Expiry of studies The course is valid for 10 years

Language of instruction English

Language of learning English

Literature and learning material
Literature and lecture material and other material assigned to the course in Moodle

Course level

Master's level, (second-cycle degree/EQF level 7). The course is also suitable on Doctoral level (third-cycle (doctoral) degree/EQF level 8 ,basic level

ECGS-039 Arctic climate change, 5 cr

Arktiset alueet ja ilmastonmuutos, Klimatförändringar i Arktis

Credits 5 cr
Responsible organisations ECGS

Responsible persons
David Thomas (david.thomas@helsinki.fi), Kaarina Weckström (kaarina.weckstrom@helsinki.fi)
Other teachers: Atte Korhola, Jussi Eronen, Maija Heikkilä, Jan Weckström, Minna Väliranta, Tarmo Virtanen, Kimmo Kahilainen, Jukka Horppila, Heikki Setälä

Equivalencies with other studies
Merges courses ECGS-031 and ECGS-601 that had a relatively similar content

Prerequisites
Bachelor degree in environmental or related sciences or corresponding knowledge of ecology

Learning outcomes
After the course the student

- has basic understanding of 1) climate features and processes specific for Arctic areas, 2) Arctic climatic changes during the Holocene and the Anthropocene, including future projections;
- can describe the links between organisms and functioning in different ecosystems and the potential changes that will appear in these links under climate change
- has knowledge of climate impacts on Arctic ecosystems and landscape elements over various time scales;
- can critically assess the role of natural versus human-induced climatic changes and factors involved;
- is prepared for providing evidence and validating his/her arguments when discussing current and future climate change effects on ecosystems;
- can apply the achieved information to environmental management and climate mitigation and adaptation

Content
The course includes lectures and literature of the effects of climate change on the organisms and functioning of Arctic terrestrial, peatland, freshwater and marine ecosystems. Lectures will cover the

subject in a broad ecological context covering varying time scales. The latest Summary for Policy Makers by the Intergovernmental Panel on Climate Change (IPCC) will be a central resource for the course.

Completion methods
To complete the course, the students are supposed to listen to the lectures (compulsory attendance at 50% of lectures), write a 1500 word essay based on the lecture series and related literature search, and prepare a document based on the provided IPCC material.

Grading scale Scale 0-5

Assessment practices and criteria
The course will be graded as 0-5 using the scores achieved from an assignment (50%) based around the IPCC summary, and a 1500-word essay based on the lecture series (50%)

Activities and methods in support of learning
Feedback on course assignments

Target groups
ECGS students, Geology and Geophysics, and other interested students with fitting backgrounds. Open to exchange students

Teaching period when the course will be offered
Period III

Recommended time or stage of studies for completion
1st study year in Master's

Study module
Compulsory course in "Changing Arctic and northern environments" module

Expiry of studies Valid for 10 years

Language of instruction English

Language of learning English, Finnish or Swedish

Literature and learning material
Course literature is freely available on the internet

Course level Master's level, also suitable on Doctoral level

Responsible persons
David Thomas (david.thomas@helsinki.fi), Kaarina Weckström (kaarina.weckstrom@helsinki.fi)
Other teachers: Atte Korhola, Jussi Eronen, Maija Heikkilä, Jan Weckström, Minna Väliranta, Tarmo Virtanen, Kimmo Kahilainen, Jukka Horppila, Heikki Setälä

ECGS-049 Nature-based Solutions

Luontopohjaiset ratkaisut, Naturbaserade lösningar

Credits 5 cr
Responsible organisations ECGS

Responsible persons
Christopher Raymond – Faculty of Agriculture and Forestry and Faculty of Biological and Environmental Sciences- christopher.raymond@helsinki.fi

Jussi Lampinen – Faculty of Agriculture and Forestry – jussi.lampinen@helsinki.fi
Viola Hakkarainen – Faculty of Biological and Environmental Sciences – viola.hakkarainen@helsinki.fi

Equivalencies with other studies

Prerequisites
No pre-requisites. It is desirable that students consider taking this course alongside Urban Environmental Policy.

Learning outcomes
After completing this course, it is intended that students will be able to:

- Define nature-based solutions and their applicability to different challenges in urban contexts, including environmental justice and social inclusion, human well-being, climate resilience and multi-level governance
- Use mixed-methods to assess the co-benefits and costs of nature based solutions on important urban challenges relevant to specific cases in Finland.
- Critically discuss the role of nature-based solutions in supporting transformations toward sustainability in urban contexts.

Content
The course will present an overview of the policy relevance of nature-based solutions and their role in addressing important challenges in urban areas. We will then critically review and discuss different concepts and associated methods for assessing the co-benefits and costs of nature-based solutions at planning, implementation and evaluation phases. Students will write an essay based on a topic selected from a pre-selected list. Students will then be asked to address a challenge of a city within Finland (or abroad) using a nature-based solution approach. They will organize in groups and produce a report and presentation concerning the challenge addressed, the potential and limitations of their proposed NBS to address the challenge, including an evaluation of the costs and benefits of the NBS on two or more of the following domains: social inclusion, environmental justice, human well-being, environmental governance and/or ecosystem resilience.

Completion methods
The course will consist of lectures, workshops, field trips, a group project and a final seminar presentation and an essay. Participation in teaching (lectures, group work / excursions / seminar, group presentations. The course includes compulsory face-to-face meetings and cannot be completed entirely by distance learning.

Grading scale
Grade = 0-5

Assessment practices and criteria
An individual essay (20%), group report (30%) and written exam (50%).

Activities and methods in support of learning
Students should be willing to work in interdisciplinary teams, drawing on concepts from e.g., environmental sciences, human geography, health sciences and political ecology. Students should also be willing to work on solutions-oriented research where the aim is to solve a problem relevant to cities in Finland or abroad.

Target groups
Inter-disciplinary module for Masters students of ECGS, AGERE, FOR and USP programs interested in having a more systemic understanding of the co-benefits and costs of nature on urban systems. Attendance will be recorded. Students can only miss a maximum of 10% of classroom, group or field work. The course is open for 30 master's students.

Teaching period when the course will be offered
Period I (September-October),

Recommended time or stage of studies for completion
1st or 2nd study year in master's degree phase

Study module
Compulsory to the ECGS-930 Urban studies Module

Expiry of studies
The course is valid for 10 years

Language of instruction English

Language of learning English, Finnish or Swedish

Literature and learning material
Study materials and literature:

- Albert, C., Schröter, B., Haase, D., Brillinger, M., Henze, J., Herrmann, S., Gottwald, S., Guerrero, P., Nicolas, C., Matzdorf, B., 2019. Addressing societal challenges through nature-based solutions: How can landscape planning and governance research contribute? Landsc. Urban Plan. 182, 12–21. https://doi.org/10.1016/j.landurbplan.2018.10.003
- Bulkeley, H., Marvin, S., Palgan, Y.V., McCormick, K., Breitfuss-Loidl, M., Mai, L., von Wirth, T., Frantzeskaki, N., 2019. Urban living laboratories: Conducting the experimental city? Eur. Urban Reg. Stud. 26, 317–335. https://doi.org/10.1177/0969776418787222
- Cohen-Shacham, E., Andrade, A., Dalton, J., Dudley, N., Jones, M., Kumar, C., Maginnis, S., Maynard, S., Nelson, C.R., Renaud, F.G., Welling, R., Walters, G., 2019. Core principles for successfully implementing and upscaling Nature-based Solutions. Environ. Sci. Policy 98, 20–29. https://doi.org/10.1016/j.envsci.2019.04.014
- Frantzeskaki, N., McPhearson, T., Collier, M.J., Kendal, D., Bulkeley, H., Dumitru, A., Walsh, C., Noble, K., van Wyk, E., Ordóñez, C., Oke, C., Pintér, L., 2019. Nature-Based Solutions for Urban Climate Change Adaptation: Linking Science, Policy, and Practice Communities for Evidence-Based Decision-Making. Bioscience 69, 455–466. https://doi.org/10.1093/biosci/biz042
- Kabisch, N Frantzeskaki, N., Hansen, R. (2021). Principles for urban nature-based solutions. Ambio, 1-14
- McPhearson, T., Cook, E.M., Berbés-Blázquez, M., Cheng, C.,Grimm, N.B. (2022) A social-ecological-technological systems framework for urban ecosystem services. One Earth 5 (5), 505-518
- Oscilowicz, E., Anguelovski, I., Triguero-Mas, M., García-Lamarca, M.,Baró, F. (2022) Green justice through policy and practice: a call for further research into tools that foster healthy green cities for all. Cities & Health, 1-16
- Raymond, C.M., Frantzeskaki, N., Kabisch, N., Berry, P., Breil, M., Nita, M.R., Geneletti, D., Calfapietra, C., 2017. A framework for assessing and implementing the co-benefits of nature-based solutions in urban areas. Environ. Sci. Policy 77. https://doi.org/10.1016/j.envsci.2017.07.008
- Seddon, N., Chausson, A., Berry, P., Girardin, C.A.J., Smith, A., Turner, B., 2020. Understanding the value and limits of nature-based solutions to climate change and other global challenges. Philos. Trans. R. Soc. B Biol. Sci. 375. https://doi.org/10.1098/rstb.2019.0120
- Seddon, N., Turner, B., Berry, P., Chausson, A., Girardin, C.A.J., 2019. Grounding nature-based climate solutions in sound biodiversity science. Nat. Clim. Chang. https://doi.org/10.1038/s41558-019-0405-0
- Tozer, L., Hörschelmann, K., Anguelovski, I., Bulkeley, H., Lazova, Y., 2020. Whose city? Whose nature? Towards inclusive nature-based solution governance. Cities 107, 102892. https://doi.org/10.1016/j.cities.2020.102892

- Toxopeus, H., Kotsila, P., Conde, M., Katona, A., van der Jagt, A.P.N., & Polzin, F. (2020). How 'just' is hybrid governance of urban nature-based solutions? Cities, 105, 102839, https://doi.org/10.1016/j.cities.2020.102839
- Seddon N, Smith A, Smith P, Key I, Chausson A, Girardin C, House J, Srivastava S, Turner B (2021) Getting the message right on nature-based solutions to climate change, Global Change Biology, 27, 1518-1546. https://doi.org/10.1111/gcb.15513
- Xie, L., Bulkeley, H. (2020) Nature-based solutions for urban biodiversity governance. Environmental Science & Policy, 110, 77-87, https://doi.org/10.1016/j.envsci.2020.04.002

Other materials to be provided during the course.

Course level, Master's level, intermediate

ECGS-050 Science Communication and Thesis Writing 5 cr

Tiedeviestintä ja tutkielman kirjoittaminen, Vetenskapskommunikation och Magisteravhandlingen arbete

Credits 5cr
Responsible organisations ECGS

Responsible persons
Christopher Raymond – Faculty of Agriculture and Forestry - christopher.raymond@helsinki.fi
David Thomas – Faculty of Biological and Environmental Sciences - david.thomas@helsinki.fi
Roope Kaaronen – Faculty of Biological and Environmental Sciences, HELSUS – roope.kaaronen@helsinki.fi

Equivalencies with other studies ECGS-007

Prerequisites
A bachelor's degree (or equivalent) in natural or social sciences. The course is tailored to Finnish Master's thesis requirements.

Learning outcomes
By the end of this course, students who effectively engaged with course material should be able to:
- Identify the structural factors that contribute towards a quality scientific paper in the social sciences or natural sciences
- Identify and apply the principles of effective science communication with respect to oral presentations and writing for a wider non-specialist audience.
- Apply time management and project management techniques to deliver projects on time and overcome writer's blocks and other creative slowdowns
- Critically read scientific publications and integrating critical literature reviews into a Master's thesis dissertation

Content
A core course which will support all courses in the ECGS program. The course provides students with the skills to write a high quality Master's thesis and to communicate the results of their work to scientific and societal audiences. The course also teaches time management skills and tools to deliver projects and dissertations in time.
- Lectures on science comm, project management, scientific writing and dealing with deadlines
- Popular science workshops and exercises. Choose between, e.g., a "pop science" article, video, speech or similar medium of scientific communication.
- Workshops on how to effectively communicate science on social media.

Completion methods
"Participation in lectures, group work, excursions and practical workshops. The course includes compulsory face-to-face meetings and cannot be completed entirely by distance learning.

Grading scale Scale 0-5

Assessment practices and criteria

- Individual assignment (2000 words): Critical analysis of a scientific paper, taking account of ten Critical Analysis Questions
- Group assignment (15 mins per group): Oral presentation on a science topic of global and current relevance to ECGS, applying the principles of effective communication learnt during the course
- Group blog: Short blog or a popular science style short article (800 words per group) that communicates the main ideas in the oral presentation to a general audience rather than a scientific one.
- Final presentations to be delivered in-person at an overnight camp (subject to funding), which will provide opportunities for network across disciplines and the possibility for constructive feedback on presentations following the "observe", "analyse", "commend/recommend" model of presenter feedback.

Activities and methods in support of learning

- Lectures presenting on the theory of critical reading and analysis and science communication will be conducted 1 day per week (online)
- Workshops enabling students to practice the main principles of effective oral communication and blog writing will be conducted 1 day per week (in-person)
- Separate to this we encourage each assignment group to meet 1-day per week to organise and create their oral presentation and blog (self-organised online or in-person).

Target groups
Open primarily to ECGS master students and secondarily AGERE or FOR master students. Open to Erasmus students.

Teaching period when the course will be offered Period 2

Recommended time or stage of studies for completion
Compulsory for all ECGS Masters students. Ideally taken in second year of Masters Program, prior to commencement of thesis writing.

Study module
Compulsory methodological study in ECGS-450 core studies-module

Expiry of studies The course is valid for 10 years

Language of instruction English

Language of learning English, Finnish or Swedish

Literature and learning material

- We will be drawing on the open access book and learning templates from Wallace and Wray (2021). 4th Edn. "Critical Reading and Writing for Postgraduates". Sage Publications. https://uk.sagepub.com/en-gb/eur/critical-reading-and-writing-for-postgraduates/book269501
- The critical reading template (introductory version) will serve as a basis for the individual assignment https://study.sagepub.com/sites/default/files/critical_analysis_template_introductory_version.docx
- Wu, J. Improving the writing of research papers: IMRAD and beyond. *Landscape Ecol* 26, 1345–1349 (2011). https://doi.org/10.1007/s10980-011-9674-3

"Lecture material and other material assigned to the course in Moodle. Some course material to be handed out during workshops separately to Moodle platform.

Course level
Master's level, (second-cycle degree/EQF level 7). The course is also suitable on Doctoral level (third-cycle (doctoral) degree/EQF level 8)
Course level: intermediate.

ECGS-068 Past environmental change, 5 cr

Menneet ympäristömuutokset (FI), Gångna miljöförändringar (SE)

Credits 5 cr
Responsible organisations ECGS

Responsible persons
Jan Weckström, jan.weckstrom@helsinki.fi
Maija Heikkilä, maija.heikkila@helsinki.fi

Equivalencies with other studies
ECGS-067 and ECGS-065 together are equivalent (in a broader format) to the present course

Prerequisites
Compulsory prerequisites: Bachelor's degree in a relevant field
Recommended prerequisites: ECGS-031 Arctic climate change

Learning outcomes
The main objective of this course is to provide the student with fundamentals of reconstructing past natural and anthropogenic climate and environmental change, and an understanding of long-term variability as a backbone for environmental management and conservation. The student will apply the gained knowledge and practical skills to carry out their own research project.
By completing the course the student will be able to:

- understand and apply various approaches (field sampling, sediment dating, microscopic and data analytical techniques) to study long-term climate and environmental changes using peatland, lake sediment and marine sediment archives
- critically evaluate and compare the strengths and the weaknesses of research approaches and results
- distinguish between anthropogenic and natural changes in different ecosystems

Content
Principles of palaeoecology, environmental archives and proxies, dating methods and data treatment, applications in past environmental reconstruction. Potential of past environmental information in detection and evaluation of natural and anthropogenic environmental changes and in environmental management and conservation. Group research projects: data collection and analysis, a research seminar and a brief research report.

Completion methods
Lecture course (Period III) followed by laboratory practicals (Period IV) and group work. The course includes some compulsory on-site practicals (in Period IV) and cannot be completed entirely by distance learning. Lectures will not be streamed, but lecture recordings will be provided.

Grading scale Scale 0-5

Assessment practices and criteria
Final grade (0-5) is based on the lecture series learning report (50%), research project seminar (20%) and research report (30%). In addition, to pass the course the student will need to submit "take home messages" after each lecture (pass/fail).

Activities and methods in support of learning
Lecture “take home messages”, topical readings with casted reading groups, laboratory and microscoping practicals, mentored project work in groups, forward-looking feedback.

Target groups
Students in Environmental Change and Global Sustainability, Aquatic Sciences, Geology and Geophysics, and other interested students with fitting backgrounds. Open to exchange students.

Teaching period when the course will be offered
Lectures Period III, Practicals and project work Period IV.

Recommended time or stage of studies for completion

Study module
ECGS-550 Changing Arctic and northern environments

Language of instruction English

Language of learning English, Finnish or Swedish

Literature and learning material
Course materials (lecture slides and recordings, handouts, readings) will be distributed in Moodle.

Course level Master’s level, suitable on Doctoral level

ECGS-071 Advances in environmental chemistry

Credits 5 cr
Responsible organisations ECGS

Responsible persons
Anna-Lea Rantalainen, anna-lea.rantalainen@helsinki.fi

Equivalencies with other studies

Prerequisites
Recommended prerequisites are fundamentals in chemistry and environmental chemistry.

Learning outcomes
Objectives of the course is to deepen knowledge on behavior of anthropogenic chemicals in the environment and gain experience of human impact on disturbed environment. Topics of the lectures are related to research at the research program and the aim is to realize how knowledge on chemistry can be used to solve environmental problems.
The student will be able to:

- understand a meaning of industry, waste treatment and urban issues to the environment
- explain the hazard of environmental chemicals to humans and the environment
- understand present status of environmental chemistry research

Content
In the lectures fundamentals of physico -chemical properties of contaminants are covered briefly. E.g. solubility, persistency, sorption and transformation reactions are presented. Some mathematical exercises support learning of these properties. Persistent organic pollutants in the environment are presented with several case studies based on recent research and literature. Urban chemistry, pharmaceuticals in waste waters and in the environment and effect directed analysis are other examples of subjects.

Completion methods
Participation in lectures either online or via recordings is recommended. Compulsory homework tasks are either mathematical exercises, literature reviews or other exercises. Homework tasks have to be returned to Moodle. Participation and own oral presentation in a seminar (held in Zoom) is compulsory. Exam is in the end of the course and the grade is based on that.

Grading scale
Scale 0-5 is based on exam. In addition to that, certain part of homework needs to be completed.

Assessment practices and criteria
Scale 0-5 is based on exam. In addition to that, certain part of homework needs to be completed.

Activities and methods in support of learning
Homework exercises deepen understanding of issues presented on lectures. Furthermore, issues are connected to current scientific literature by reviews.

Target groups
Open to all master students, students of other degree programmes, non-degree students, open university students and exchange students.

Teaching period when the course will be offered
Period 2 every year.

Recommended time or stage of studies for completion
1st or 2nd study year in master's?

Study module
Course is compulsory in a module ECGS-077 Chemical pollution.

Expiry of studies Valid for 10 years

Language of instruction English

Language of learning English, Finnish or Swedish

Literature and learning material
Lecture material and other material assigned to the course is in Moodle platform. Lectures, exercises and seminar are given only as remote teaching. Links to recordings and answers to exercises are given in Moodle platform. Exams are completed on general exam days in Viikki campus.

Course level This is master's level intermediate course.

ECGS-073 Fate and transport of pollutants

Credits 5 cr
Responsible organisations ECGS

Responsible persons
Anna-Lea Rantalainen, anna-lea.rantalainen@helsinki.fi

Equivalencies with other studies –

Prerequisites
Recommended prerequisites are fundamentals in chemistry and environmental chemistry.

Learning outcomes
Objectives of the course is to

- develop an understanding of the range of compounds in the air, hydrosphere and geosphere
- understand connection of chemical substances and their fate in the environment
- develop skills in the scientific method of planning, developing, conducting, reviewing, and reporting experiments
- critically discuss local and global environmental issues based on scientific principles and data

Content

- Introductory lectures and exercises on transportation mechanisms of contaminants in each compartment.
- The student selects a chemical substance, which fate in the environment she/he will assess in certain environment. She/he prepares a model and present her/his results in a seminar.
- In journal club the students read scientific papers and discuss the topics concerning the fate and effect of various chemicals in the environment
- In the lectures fundamentals of physico -chemical properties of contaminants are covered briefly. E.g. solubility, persistency, sorption and transformation reactions are presented. Some mathematical exercises support learning of these properties. Persistent organic pollutants in the environment are presented with several case studies based on recent research and literature. Urban chemistry, pharmaceuticals in waste waters and in the environment and effect directed analysis are other examples of subjects.

Completion methods
The course is arranged from Lahti campus and remote learning is partly possible. Participation on lectures either being present, online or via recordings is recommended. Compulsory homework tasks are either mathematical exercises or other exercises. Homework tasks must be returned to Moodle. Participation and own oral presentation (modelling of selected chemical) are compulsory. The grade (0-5) is based on the performance in the modelling exercise and presentation.

Grading scale and assessment practices and criteria
Scale 0-5 is based on the modelling exercise and presentation. In addition to that, certain part of homework needs to be completed.

Activities and methods in support of learning
Homework exercises deepen understanding of issues presented on lectures. Furthermore, modelling of own imaginary pollution problem is rehearsing acquired knowledge. Seminar presentation strengthens both textual and oral presentation skills.

Target groups
Open to all master students, students of other degree programmes, non-degree students, open university students and exchange students.

Teaching period when the course will be offered
Period 4, odd years

Recommended time or stage of studies for completion
1st or 2nd study year in master's?

Study module
Course is optional in a module ECGS-077 Chemical pollution.

Expiry of studies Valid for 10 years

Language of instruction English

Language of learning English, Finnish or Swedish

Literature and learning material
Lecture material and other material assigned to the course is in Moodle platform. Lectures and exercises are offered as remote teaching. Links to recordings and answers to exercises are given in Moodle platform. Last two days of exercises and seminar is organized as contact teaching.

Course level This is master's level advanced course.

ECGS-076 Urban Ecotoxicology

Kaupunkiekotoksikologia, Urban ekotoxikologi

Credits 5 cr
Responsible organisations ECGS

Responsible persons
Olli-Pekka Penttinen (olli-pekka.penttinen@helsinki.fi)

Equivalencies with other studies

Prerequisites
BSc degree in relevant field, basic course in Ecotoxicology, chemistry and ecology recommended

Learning outcomes
After completing this course, students will be able to:

- describe the different origins, sources and types of environmental pollution, especially in urban environments.
- demonstrate awareness of the great differences between the many possible biological endpoints in ecotoxicology, and to understand and explain the pros and cons of using these response metrics.
- define the most harmful chemicals in urban systems
- critically discuss complex connections and interlinkages between systems regarding urban pollution

Content
Our society benefits greatly from manufactured chemicals; they provide the fabric of our surroundings, play a key role in hygiene and health, and generally enhance our life styles. Yet the same chemicals including an anthropogenic enrichment of some metals, in the wrong place at the wrong time and at high concentrations, can cause problems for human health and wildlife. Urbanization brings different aspects to our ecosystems and within this course we will point out some of those from an ecotoxicological point of view. Overall, the fate and effects of harmful chemicals in urban environments is highly complex and differs between chemicals based on their structure, type, and environmental and ecological factors. Furthermore, urban systems are not closed, and can be influenced by and influence the area surrounding them. This means that it is incredibly difficult to summarize and simplify the ecotoxicity of chemicals in an urban system. This complexity is the content of the course.

Completion methods
Online lecture course with mandatory face-to-face oral examination

Grading scale Scale 0-5

Assessment practices and criteria
Scoring is based on the final report (60%), oral examination (20%) and two short essays (20%).

Activities and methods in support of learning
The course consists of 24 h online lectures, 30 minutes oral examination, short activating essays and a final report

Target groups
Students in the ECGS programme and other master level students interested in ecotoxicology including exchange students

Teaching period when the course will be offered Period 1

Recommended time or stage of studies for completion
2nd study year in ECGS

Study module
Optional course in the ECGS-900 Urban Studies module

Expiry of studies Valid for 10 years

Language of instruction English

Language of learning English, finnish, Swedish

Literature and learning material
Literature in Moodle, book suggestions during the course.

Course level Master's level, (second-cycle degree/EQF level 7).
Course level: intermediate

ECGS-078 Challenge Course

Ongelmanratkaisun haasteet, En kurs I problemlösning

Credits 5 cr
Responsible organisations: ECGS

Responsible persons Person(s) coordinating the course, email addresses
Olli-Pekka Penttinen, Olli-Pekka.Penttinen@helsinki.fi

Equivalencies with other studies
Information on courses in the previous or current curriculum period whose completion is equivalent to completing this course, if applicable
Joint course with LUT University

Recommended prerequisites B.Sc. degree

Learning outcomes
Upon completion of the course, the student will be able to act as an active member of an interdisciplinary project team in different roles. The student can:

- describe the outline of the project plan and apply different methods to divide the project into subtasks and to schedule the project
- prepare a budget for the project and monitor it
- document the group's and her/his project work results both orally and in writing
- reflect her/his actions as a member of the team and assess the outcome of the project and the other team members' work

- recognize the key elements in project risk management,
- apply knowledge and skills acquired in other courses to complete the project

Content Description
Varying themes according to the ongoing research

Completion methods
Participation in course works

Grading scale 0-5

Assessment practices in relation to learning outcomes
Participation in course works, grading scale 0-5

Activities and methods in support of learning

Target groups M.Sc. or Ph.D. students, international students

Teaching period when the course will be offered
Every second year in uneven years, periods 3-4

Recommended time or stage of studies for completion
1st or 2nd study year in master's?

Study modules to which the course belongs as optional/compulsory
Optional in ECGS-077 Chemical Pollution

Expiry of studies The course is valid for 10 years

Language of instruction English

Language of learning English

Literature and learning material Will be given in the course

Course level
Master's level, (second-cycle degree/EQF level 7).
Course level Advanced

ECGS-079 Chemicals in our society – simulations

Kemikaalit yhteiskunnassa - simulaatiota, Kemikalier i samhället - simuleringar

Credits 5 cr
Responsible organisations ECGS

Responsible person
Olli-Pekka Penttinen (olli-pekka.penttinen@helsinki.fi)

Equivalencies with other studies
This is a new course – no equivalencies

Prerequisites
BSc degree in relevant field, basic course in Ecotoxicology, chemistry and ecology recommended

Learning outcomes

After completing this course, students will be able to:

- utilize and analyse different chemical and toxicological simulation
- use Labster virtual labs
- demonstrate an understanding of and the ability to apply the scientific method in virtual environment
- critically evaluate and interpret scientific data, information, and laboratory resultsContent
- produce supporting online material

Content

The course is online simulation course where students utilize laboratory stimulation in the field of chemistry, pollution sciences and laboratory safety. In the Moodle all the findings are discussed and summarized. Students produce supporting online material to be used in Moodle platform.

Completing method
The course consists of demo lectures, simulation exercises, independent simulation works, report and essay writing

Grading scale 0-5

Assessment practices and criteria
Participation in lectures, simulation exercises, laboratory reports, final essay

Activities and methods in support of learning
The course consists of 8 h of lectures, 24 h of computer exercises and guided writing, group works

Target groups
Students in ECGS programme and other master level students interested in ecotoxicology including exchange students

Teaching period when the course will be offered
Period IV

Recommended time or stage of studies for completion
2nd study year in ECGS

Study module
Compulsory in ECGS-077 Chemical Pollution module

Expiry of studies Studies will expire in 10 years

Language of instruction English

Language of learning English, Finnish, Swedish

Literature and learning material
Literature in Moodle, Labster instruction in their course page

Course level Master's level, (second-cycle degree/EQF level 7).
Course level, intermediate

ECGS-081: Analytical approaches to human environmental interaction, 5 op

Analyyttisiä lähestymistapoja ihmisen ja ympäristön vuorovaikutukseen
Analytiska perspektiv på växelverkan mellan människan och miljön

Credits
5 cr

Responsible organisations
ECGS, valttdk

Responsible persons
Janne Hukkinen, janne.i.hukkinen@helsinki.fi

Equivalencies with other studies
N/A

Prerequisites
Recommended: ECGS-083 Introduction to environmental policy , 5 cr; ECGS-084 Environment, technology and culture , 5 cr

Learning outcomes
After the course the students can conduct critical interdisciplinary analyses of problems arising in interactions between technology, society and the environment. They can propose theoretically sound, evidence based and sustainable solutions to complex environmental problems. They have the communication skills to convincingly present the solutions to the relevant stakeholders. They are mentally prepared to take on professional challenges in environmental policy analysis, planning, decision-making, implementation and assessment.

Content
The course is an advanced integrative introduction to social scientific approaches for understanding interactions between key dimensions of sustainability: technology, society and environment. Guiding questions include: What is technology? What boundary conditions do technology, organizations and social institutions pose for environmental decision making? How can risks be managed in complex socio-ecological systems? How to ensure environmental innovations based on risk taking and experiments while managing inherent environmental risks? What is expertise in sustainability? Analytical approaches covered in the course include socio-ecological systems theory, science and technology studies, institutional theory, organization theory, risk governance, and behavioral governance. Student are divided into groups that analyze an environmental policy issue by applying one or more of the analytical approaches covered in the course. Each group presents their analysis at the end of the course.

Completion methods
1) systematic reading from course literature on environmental and technology studies
2) oral presentation with slides or poster prepared in groups and based on course themes and literature
3) individual exam.

Grading scale
Scale 0-5

Assessment practices and criteria
There is a reading assignment from course literature each week. Student evaluation is based on group work (30%), and individual exam (70%). Total student workload is 135 h, of which 20 h lectures, 10 h tutoring sessions and oral presentations, 40 h group work, 62 h reading literature and individual study, 3 h exam taking.

Target groups
Target groups for the course. Primary target group is ECGS/GS study line students. The course is open to everyone. Suitable for exchange students. To ensure effective group work, access to the course is limited to the first 30 registered participants.

Teaching period when the course will be offered
Period 3

Study module
Compulsory course in ECGS-080 EPE

Expiry of studies
Valid for 10 years

Language of instruction
English

Language of learning English, Finnish or Swedish

Literature and learning material
Learning material: Lecture material and other material assigned to the course in Moodle.
Literature: Mandatory course reader compiled of 20-25 articles and book chapters is available on course web pages in Moodle.
Supplementary reading (not required):

- J. Hukkinen, Institutions in Environmental Management: Constructing Mental Models and Sustainability. London: Routledge, 1999.
- Y. Haila and C. Dyke, How Nature Speaks: The Dynamics of the Human Ecological Condition. Durham: Duke University Press, 2006.
- J. Hukkinen, Sustainability Networks: Cognitive Tools for Expert Collaboration in Social-Ecological Systems. London: Routledge, 2008.
- W.E. Bijker, T.P. Hughes and T. Pinch (eds) The Social Construction of Technological Systems, Cambridge, MA: The MIT Press, 1987.

Course level
Master's level, (second-cycle degree/EQF level 7). The course is also suitable on Doctoral level (third-cycle (doctoral) degree/EQF level 8).
Course level: advanced

ECGS-084 Environment, technology and culture 5 cr

Ympäristö, teknologia ja kulttuuri
Miljö, teknik och kultur

Credits 5 cr
Responsible organisations ECGS, valttdk

Responsible persons
Janne Hukkinen, janne.i.hukkinen@helsinki.fi

Equivalencies with other studies
N/A

Prerequisites
Recommended: ENV-103 Introduction to environmental policy (5 cr)

Learning outcomes
After the course students will have gained introductory level theoretical and methodological foundations for an interdisciplinary understanding of interactions between the environment, technology and culture. They recognize the analytical challenges involved in solving wicked sustainability problems.

Content
The course identifies interdisciplinary connections between two pertinent analytical approaches to environmental policy: problem oriented socio-ecological research on one hand, and science and technology studies on the other.

Completion methods
Exam: Literature exam based on required course literature. The exam contains 4 essay questions, one question per book. All 4 books are examined in a single exam. The exam is an electronic exam in the Examinarium system.
Independent study

Grading scale Scale 0-5

Assessment practices and criteria
Total student workload is 135 h, of which 132 h is individual study and 3 h exam taking.

Activities and methods in support of learning
N/A

Target groups
Primary target group: ECGS GS study line students in optional studies. Secondary target group: Open to all master's students and exchange students.

Teaching period when the course will be offered
Periods 2, 3, 4. Exam opportunities are indicated on the Completion methods tab.
The course will be offered for the last time in the spring of 2025 (period 3).

Recommended time or stage of studies for completion
1st study year in master's

Study module
Optional ECGS-080 Environmental Policy and economics.

Expiry of studies Valid for 10 years

Language of instruction English

Language of learning English, Finnish or Swedish

Literature and learning material
Book exam: Required literature:

- Lee K N: Compass and Gyroscope: Integrating Science and Politics for the Environment, Washington, DC: Island Press.
- Cudworth E: Environment and Society. London: Routledge.
- Winner L: The Whale and the Reactor: A Search for Limits in an Age of High Technology. Chicago: University of Chicago Press.
- Hård M and Jamison A: Hubris and Hybrids: A Cultural History of Technology and Science, New York: Routledge.

Course level Master's level, (second-cycle degree/EQF level 7).
Course level: basic.

ECGS-153 Internship period

Työharjoittelu, Arbetspraktik

Credits 5 – 10 cr
Responsible organisations ECGS

Responsible persons
Anna-Lea Rantalainen, anna-lea.rantalainen@helsinki.fi

Equivalencies with other studies

Prerequisites No prerequisites.

Learning outcomes
After engaging in internship, the student

- is familiar with working life on her/his own field
- can integrate theory and practice by applying their field specific knowledge in a work environment
- knows her/his competence better for the future carrier development
- is able to reflect her/his strengths and weaknesses
- has gained larger network of colleagues and co-operation partners

Content
Practical training and portfolio performances.

Completion methods
The student must agree with the coordinator university lecturer Anna-Lea Rantalainen (anna-lea.rantalainen@helsinki.fi) that their planned traineeship is suitable for the programme. Minimum length of the traineeship is one month (5 cr) or two months (10 cr). A minimum duration of a university subsided traineeship is two months. More information on traineeship can be found on the page: https://guide.student.helsinki.fi/en/traineeships

After permission to perform the traineeship in selected place, first portfolio is returned to Moodle (https://moodle.helsinki.fi/course/view.php?id=31008). After the traineeship, the second portfolio is returned along with work certificate. Instructions for portfolios are available as general UH guidelines for internships: https://guide.student.helsinki.fi/en/article/traineeship-nutshell and ECGS Portfolio Moodle-page.

Grading scale pass/fail

Assessment practices and criteria
Approved internship portfolios and a certificate of the work.

Activities and methods in support of learning
Learning is reflected in portfolios.

Target groups
Open to all ECGS master's programme students.

Teaching period when the course will be offered
Continuously in any period.

Recommended time or stage of studies for completion
1st or 2nd study year in master's?

Study module No

Expiry of studies Valid for 10 years

Language of instruction English

Language of learning English, Finnish or Swedish

Literature and learning material
Instructions in Moodle platform.

Course level
This is master's level intermediate course.

ECGS-154 Research group training, 5 cr

Tutkimusryhmäharjoittelu, Forskingspraktik

Target group: Master's students in Environmental Change and Global Sustainability

Timing: Organised every year, period I- IV, recommended for 2nd year students

Objective/Learning outcome:
After the course the student

- has a basic knowledge of practical research work in the research group
- has the basic skills needed to work independently in a research group
- is able to interact with researchers
- has sufficient domain knowledge of the research area
- can evaluate personal research results in the light of corresponding research in the subject area.
- can collaborate and manage time
- be able to write a clear report of the work done.

Prerequisites
BSc in relevant field. The theoretical major subject studies should be completed to an appropriate extent, and the student should be sufficiently familiar with relevant research methods

Contents:
The goal of this course is to provide students short-term experience in the practical work in a research group at the University, a research institute or a company. The minimum practical training period consists of 15 working days. The student and the research group must negotiate the timetable. Prior to the practical work, the student should contact the responsible teacher and agree upon the project with him. After the course, student will write a portfolio with specific artefacts indicating importance of the work and what was student's own role in the project. The portfolio should include a timeline of activities during the training period, as well as information on knowledge and basic skills received during the training period.

Study materials and literature:
Scientific literature related to the project

Assessment practices and criteria
Scaling pass/fail (report and supervisor's statement)

Completion:
Portfolio assessment. Purpose of an assessment portfolio is to document student's learning during Research group training (RGT). The items in the portfolio must be designed to elicit the knowledge and skill specified in the outcomes. Instruction preparing for portfolio is given in the Moodle page of the RGT (course id= 37507)

ECGS-201 Perspectives on sustainable consumption

Näkökulmia kestävään kulutukseen, Synpunkter på hållbar konsumption

Credits 5 cr

Responsible organisations ECGS

Responsible persons
Eva Heiskanen, eva.heiskanen@helsinki.fi

Equivalencies with other studies
-
Prerequisites No prerequisites

Learning outcomes
Having completed this course, students are able to identify, describe and critically assess the basic research approaches (economics, sociology, psychology) and main research contributions to sustainable consumption. Students are able to explain how and why different theoretical and methodological research traditions present different pictures of sustainable consumption. Students are also able to apply the different research approaches and findings to practical and policy problems and anticipate their policy implications. They have a basic capacity to develop real-world research questions and find appropriate theoretical and methodological ways to answer them. They are able to describe the skills-set of experts working in this field and can imagine what skills they themselves would need to serve in such expert positions. They can also present constructive and academically grounded criticism toward present-day sustainable consumption policies.

Content
- Research traditions in consumer studies and their implications for sustainable consumption research and policy
- Relationships between individualist and structural approaches to sustainable consumption research and policy interventions
- Research-policy interactions in sustainable consumption and the nature of sustainable consumption expertise

Completion methods
- Lectures and group discussions
- Exam
- Independent assignment

Grading scale Scale 0-5

Assessment practices and criteria
Graded on a scale of 0-5. Attendance in class and individual assignment (30%), exam (based on lectures, assignments and readings, 70%). Evaluation criteria for exam: application of knowledge, understanding, argumentation, logical structure, personal reflection. More detailed criteria available on the course Moodle page.

Activities and methods in support of learning
The course consists of 21 hours of classroom teaching (+21 hours notes & reflection), 10 hours of off-campus assignment, 50 hours of readings, and a Moodle exam (20 hours incl. preparation).
Alternative way to complete the course: https://moodle.helsinki.fi/course/view.php?id=26234

Target groups
Master's students in Environmental Change and Global Sustainability, Master's students in Social Sciences
No longer available to Master's students in Food Economy and Consumption

Teaching period when the course will be offered
Annual course, Period 1

Recommended time or stage of studies for completion
1st study year in master's

Study module
Compulsory in ECGS-200 Consumer-Citizens and Sustainability Transitions

Expiry of studies valid for 10 years

Language of instruction English

Language of learning English, Finnish or Swedish

Literature and learning material
Lecture course: Lecture material and articles assigned to the course in Moodle

Course level Master's level, (second-cycle degree/EQF level 7).
Course level: intermediate

ECGS-202 Sociotechnical (re)construction of consumer society

Kulutusyhteiskunnan sosiotekninen (uudelleen) rakentuminen, Sosioteknisk (åter) skapande av konsumtionssamhället

Credits 5 cr

Responsible organisations ECGS

Responsible persons
Kaisa Matschoss, kaisa.matschoss@helsinki.fi, Centre for Consumer Society Research (Faculty of Social Science)

Equivalencies with other studies
In the Environmental Change and Global Sustainability Master's program, this course is part of the Consumer Citizens and Sustainability Transitions module. It is also in the Social Science Master's program. In these two, it can be replaced with the course EDUM504 Sustainable culinary cultures from the Master's Programme in Human Nutrition and Food-Related Behaviour.

Prerequisites
Students should have a good basic knowledge (corresponding to Bachelor's degree) in an appropriate subject (social sciences, environmental sciences, economics, consumer studies). It is also helpful if students have completed the methodological courses in their Master's subject.

Learning outcomes
Students are able to analyse consumption patterns in a broader socio-technical context. They can discuss the main research traditions in science and technology studies that are relevant to sustainable consumption. They are able to compare historical, statistical and media data to investigate the historical evolution of consumption and production patterns and conceptualize processes of socio-technical change. Students gain experience of collaboratively assessing major ongoing efforts to change the course of unsustainable consumption patterns. They have the ability to develop researchable problems, compile answers to these problems, critically evaluate their own and others' research findings, and identify relevant implications for policy and practice.

Content
- Theoretical frameworks of sociotechnical change
- Empirical findings concerning the historical evolution of main consumption domains (e.g. built environment, mobility, food, urban infrastructures, retail) and their sustainability implications
- Application of theoretical frameworks and historical developments to analyse practical present-day problems
- Analysis of forces of stability and change in successful and unsuccessful attempts toward sustainability

Completion methods
Lectures and seminar sessions (18 h), readings (37 h), groupwork assignment: analysis of system evolution and reform efforts in a selected field (individual contributions and a group presentation) (80 h).
Alternative way to complete the course: https://moodle.helsinki.fi/course/view.php?id=26236 . If you want to complete the course in this alternative way, please contact Kaisa Matschoss, kaisa.matschoss@helsinki.fi.

Grading scale Scale 0-5

Assessment practices and criteria
Self-assessment of students' work (20%) and the group report (20%), and group assignment (40%). Attendance in class is not obligatory but contributes to 20% of the final grade. Detailed evaluation matrix for the evaluation of the group assignment available on the course Moodle page.

Activities and methods in support of learning
Lectures, reading the course literature, group work

Target groups
Master's students in Environmental Change and Global Sustainability
Master's students in Social Sciences

Teaching period when the course will be offered
3rd period

Recommended time or stage of studies for completion
No recommendation

Study module
Consumer Citizens and Sustainability Transitions

Expiry of studies
Expiry of the course in 10 years.

Language of instruction English

Language of learning
This course is part of a multilingual program: papers and assignments can be written and presented in English, Finnish or Swedish.

Literature and learning material
Lecture material and literature assigned to the course can be found in Moodle in the course page.

Course level Master's level, (second-cycle degree/EQF level 7).
Course level: advanced

ECGS-203 Sustainability in everyday life

Arkielämän kestävyys, Hålbarhet i vardagen

Credits 5 cr

Responsible organisations ECGS

Responsible persons
Eva Heiskanen, eva.heiskanen@helsinki.fi
Jenny Rinkinen, jenny.rinkinen@helsinki.fi

Equivalencies with other studies
-

Prerequisites
No prerequisites

Learning outcomes
Students understand and are able to apply *practice theory* to analyse and improve the conditions for sustainable consumption. They can identify relevant everyday consumption issues that have sustainability implications. They master basic research design, data collection and analysis methods (focus on qualitative and observational methods), research writing skills, as well as groupwork organization skills. They are able to condense and communicate pertinent insights from their small-scale research and identify relevant addressees for their research implications. They have gained personal experience of research communication using social media.

Content
Practice theory: practice-as-performance and practice-as-entity
Observational analysis of everyday life practices
Policy implications of more and less sustainable everyday practices
Succinct communication of research findings

Completion methods
- Lectures and group discussions
- Reaction paper
- Group assignment, report and presentation
- Alternative way to complete the course: https://moodle.helsinki.fi/course/view.php?id=26235

Grading scale Scale 0-5

Assessment practices and criteria
Graded on a scale of 0-5. Attendance in class (10%), reaction papers (30%) and group assignment (60%). Detailed criteria available on the course Moodle page.

Activities and methods in support of learning

Course completion: Lectures (16 h) + readings (29 h) + reaction papers (20 h), groupwork assignment (paper, presentation and social media communication) on identification and researching of a selected consumption practice using different methods (interviews, observation), as well as reflection on the reasons for unsustainability and options for improvement (60 h).

Target groups
Master's students in Environmental Change and Global Sustainability, Master's students in Social Sciences, Suitable for exchange students (max 5 students)

Teaching period when the course will be offered
Annual course, Period 2

Recommended time or stage of studies for completion
1st study year in master's

Study module
Optional in ECGS-200 Consumer-Citizens and Sustainability Transitions

Expiry of studies valid for 10 years

Language of instruction English

Language of learning English, Finnish or Swedish

Literature and learning material
Lecture course: Lecture material and articles assigned to the course in Moodle

Course level Master's level, (second-cycle degree/EQF level 7).
Course level: intermediate

ECGS-204 Business in the natural environment

Liiketoiminta luonnossa, Företagsverksamhet i naturen

Credits 5 cr

Responsible organisations ECGS

Responsible persons
Eva Heiskanen, eva.heiskanen@helsinki.fi

Equivalencies with other studies
-

Prerequisites
No prerequisites

Learning outcomes
After having completed the course, students are familiar with the main discussions, developments, organizations and tools in corporate environmental responsibility and have the capability to monitor developments in the field and find further information. Students understand the mainstream and critical research perspectives on business and the natural environment and are able to develop an empirical research question that connects to a body of academic research in the field. They can write credibly, objectively and critically about corporate environmental responsibility

Content

Basics and critical analysis of

- The role of business in environmental sustainability
- Environmental management systems
- Sustainable supply chain management
- Sustainability reporting
- Innovation
- Human resource management
- Conceptual approaches to analysing business in the natural environment

Completion methods

The course is completed completely online, as independent study. The course consists of two parts:
Overview: Each student completes an online (Moodle) exam consisting of 10 short questions. Each question points to online information sources: webcasts, research articles, websites of relevant organizations or statistical reports, which you will need to study in order to answer the question. The aim of this part of the course is to ensure that you have an overview of the field and its practices (such as environmental management systems, the global reporting initiative, product-service systems)

Research perspectives essay: Drawing on the book Hoffman, A. & Georg, S. (2018) Business and the Natural Environment (Routledge Focus), each student should write a 10-page essay where you:

- select and describe a research perspective on business sustainability that interests you (3-4 p.)
- select and describe an empirical research topic that you could investigate from this perspective (3-4 p.)
- frame and motivate your essay with a good introduction (1-2 p.)
- end your essay with concluding reflections concerning the pros and cons of using this research perspective (1-2 p.)
- carefully copy-edit your text and make sure your references are in good order.

Grading scale Scale 0-5

Assessment practices and criteria

Graded on a scale of 0-5. Moodle exam, 50% and essay, 50%.

Activities and methods in support of learning

Independent study, including reading articles, watching webcasts, analyzing statistics and news items (40 hours) in order to answer questions in Moodle exam. Reading the textbook (30 hours) and writing the assigned essay (65 hours).

Target groups

Master's students in Environmental Change and Global Sustainability, Master's students in Social Sciences

Teaching period when the course will be offered

Twice yearly: Period 1 and 3

Recommended time or stage of studies for completion

1st study year in master's

Study module

Optional in ECGS-200 Consumer-Citizens and Sustainability Transitions

Expiry of studies valid for 10 years

Language of instruction English

Language of learning English, Finnish or Swedish

Literature and learning material
Independent study, materials available on Moodle

Course level Master's level, (second-cycle degree/EQF level 7).
Course level: intermediate

ECGS-901 Field Course in Urban Environmental Ecology

Urbaaniekologian kenttäkurssi, Fältkurs i stadsmiljöekologi

Credits 5 cr

Responsible organisations ECGS

Responsible persons Johan Kotze (johan.kotze@helsinki.fi)

Equivalencies with other studies -

Prerequisites
Recommended prerequisites: ECGS-903 (Urban Ecosystem Ecology), which provides a basic understanding of urban environmental issues. In the new Urban Studies Module (ECGS-930), both ECGS-903 and ECGS-901 are compulsory, with ECGS-901 starting immediately after ECGS-903 is completed.

Learning outcomes
In this field/laboratory course students will learn basic research methods in urban environmental ecology. Using these skills the knowledge they have gained during lectures (especially ECGS-903) will be practically implemented. "Urban laboratories" in the Helsinki metropolitan area, with labwork in Lahti, will serve as model sites to teach students how to use scientific research methods in management and planning processes in environments of varying degrees of urbanisation.

Content
The course consists of introductory lectures, field excursions and fieldwork, laboratory work and a seminar. Various urban themes are explored, for instance; urban soils, urban climate, urban water, urban biodiversity, social.

Completion methods
The course cannot be completed as distance learning. Intensive fieldwork, 2 times per week (full days), for about a month (mid-April to the end of May). The fieldwork will be done in Helsinki (and in Lahti for those students living in Lahti), while sample analysis will happen in Lahti (during the latter part of the course).
Course is connected to the ECGS-903 course

Grading scale Scale 0-5

Assessment practices and criteria
Group report on one of the themes executed during the course. Seminar presentation and participation are compulsory.

Activities and methods in support of learning
Active participation in the "start-up" lectures, in collecting data in the field, in analysing the data in the laboratory, basic statistical analyses of the data, writing a report and participate in the seminar (both presenting and critiquing other presentations).

Target groups
Students of ECGS, especially those taking the Urban Studies Module (ECGS-930). This course is compulsory for the 30 cr Urban Studies Module, and it's recommended to take it after ECGS-903. Students from other degree programmes and exchange students are welcome but preference will be given to those taking the 30 cr Urban Studies Module. Space is limited to 30 students.

Teaching period when the course will be offered
Period IV, The course will now be given every year, and is connected to the ECGS-903 course.

Recommended time or stage of studies for completion
1st study year in ECGS

Study module
ECGS-930 Urban Studies Module. Compulsory for the 30 cr module

Expiry of studies Valid for 10 years

Language of instruction English

Language of learning English

Literature and learning material
Course / work handout and other material to be distributed during the course in Moodle. Literature on the basics of experimental design will be provided, together with summary articles on the themes chosen for that particular year.

Course level Master's level, (second-cycle degree/EQF level 7).
Course level, intermediate to advanced

ECGS-903 Urban Ecosystem Ecology

Kaupunkiekosysteemiekologia,

Credits 5 cr
Responsible organisations ECGS

Responsible persons
Heikki Setälä (heikki.setala@helsinki.fi)

Equivalencies with other studies

Prerequisites
Basic knowledge in ecology and/or environmental science

Learning outcomes
This course builds upon introducing and understanding two concepts of urban ecology: 1) ecology in cities, and 2) ecology of cities. The former focuses on examining urban sites as "novel ecosystems" into which species from the surrounding natural ecosystems should adapt in order to establish viable populations/communities. The latter considers cities/towns as ecosystems focusing on ecosystem-level phenomena in urbanised areas, such as material cycles and energy flows. Additionally we learn about ecosystem services, the concept of socioecological systems, the threats urbanization causes to urbanites, and ways to mitigate these various challenges.

Content
Lecture themes include: Introduction to Urbanisation; human impacts at a global level, Are cities ecosystems; Urbanisation and water resources; Urban water management; Theoretical aspects in urban ecology; Urban ecology in Finland, focusing on insects and vegetation; Urban ecosystems – adaptation; Carbon and nutrient cycles in terrestrial urban ecosystems. Contemporary global research performed by the Lahti team.

Completion methods
Participation in teaching & a seminar, Exam.
The course consists of eight 2 hr online lectures (16h), a discussion session on contemporary research performed in Lahti, a one-day field trip in the city of Lahti and a seminar based on urban environmental issues discussed during the course (in Helsinki). Students will participate in small group projects focusing on specific challenges, develop solutions to their own challenge, based on the content of the lectures and seeking relevant supplementary material. Each group will prepare a seminar presentation and present this to their peers and the teachers. Students will then have two weeks' time to finalise reports of their projects, utilizing the feedback from their peers. The lectures will be made available online. The course concludes with three compulsory full days (a long lecture in Helsinki, a field trip to Lahti, and a seminar in Helsinki).

Grading scale Scale 0-5

Assessment practices and criteria
A written exam (60% of the final grade) and a group essay (40% of the final grade).

Activities and methods in support of learning
Online lectures, field trip, group working, seminar

Target groups
Students of ECGS, especially those taking the Urban Studies Modules (ECGS-915 and ECGS-930). This course is compulsory for both the 15 and 30 cr Urban Studies Module, and it's recommended to take it before doing ECGS-901 (in the 30 cr module). Students from other degree programmes and exchange students are welcome, especially Urban Studies and Planning MSc students (https://www.helsinki.fi/en/programmes/master/urban-studies-planning), and other students interested in urban ecology. Space is limited to 50 students.

Teaching period when the course will be offered
Period III

Recommended time or stage of studies for completion
1st study year in ECGS

Study module
Compulsory in ECGS-915, ECGS-930 Urban Studies Modules.

Expiry of studies Valid for 10 years

Language of instruction English

Language of learning English

Literature and learning material
Lecture material and scientific literature (book available in Moodle).

- Book: Adler FR, & Tanner CJ 2013. Urban ecosystems: ecological principles for the built environment. Cambridge University Press.

Course level
Master's level, (second-cycle degree/EQF level 7). Course level, intermediate to advanced

ECGS-904 Urban Environmental Policy

Kaupunkiympäristöpolitiikka, Stadmiljöpolitik

Credits 5 cr
Responsible organisations ECGS

Responsible persons
Sirkku Juhola (sirkku.juhola@helsinki.fi)

Equivalencies with other studies

Prerequisites
A good background knowledge of governance and policy processes. The course is for MA level students.

Learning outcomes
The objective is to introduce the main concepts of urban environmental policy in the context of global urbanisation trends and increasing challenges of sustainability. At the end of the course, the students will have a good grasp of how environmental policy in urban areas is made, who takes part and what kinds of policy instruments are used.

Content
The main theoretical approaches in urban environmental policy are explored, as well as the main concepts that are related to the way in which environmental policy is discussed in the urban context. The course also covers different modes of urban governance, the actors involved in decision making and instruments used in steering environmental action in the urban context.

Completion methods
The course consists of participation in lectures (16h), compulsory core readings for lectures, a presentation and a written assignment English.

Grading scale Scale 0-5

Assessment practices and criteria
Course is assessed based on the written assignment (100%).

Activities and methods in support of learning
(Online) lectures, group work, seminars, writing exercises

Target groups
Students enrolled in the ECGS Urban Studies module are given priority, maximum of 25 participants. The course is for MA level students.

Teaching period when the course will be offered
Period II

Recommended time or stage of studies for completion
1st study year in ECGS

Study module
Compulsory in ECGS-915 and ECGS-930 Urban Studies Modules.

Expiry of studies Valid for 10 years

Language of instruction English

Language of learning English

Literature and learning material
Literature in catalog form (can be divided into compulsory and optional).

Course level Master's level, (second-cycle degree/EQF level 7). Course level: intermediate

ECGS-906 Urban Climate

Kaupunki-ilmasto, Urbant klimat

Credits 5 cr
Responsible organisations ECGS

Responsible persons
Leena Järvi (leena.jarvi@helsinki.fi)

Equivalencies with other studies

Prerequisites
Basic knowledge on QGIS is recommended.

Learning outcomes
The student can describe the basic principles of urban climate (Urban heat island, wind, pollution) and what are its controlling effects. The student can describe the basic principles of thermal effects and surface-atmosphere interactions. The student knows basic principles of QGIS based The Urban Multi-scale Environmental Predictor (UMEP) model. The student can simulate simple urban planning scenarios with UMEP. The student has basic understanding on the connection between urban planning and climate.

Content
Basics and controlling factors of urban climate including urban heat island, pollution and wind. Basics on the interaction between the urban surface and the atmosphere including radiation and energy balance. Basics of UMEP. Application of climate knowledge in urban planning and design

Completion methods
The course consists of lectures, exercises, group work, a final report and presentation of the group work.

Grading scale Scale 0-5

Assessment practices and criteria
Evaluation matrix can be found from Moodle pages. 50 % of the exercises needs to be calculated. Grading is based on exercises (20%), project work evaluated by each group (10%) and final report and presentation (70%).

Activities and methods in support of learning
Learning diary. Moodle pages.

Target groups
The course is open to other Master degree programs, but the priority is for ECGS and Urban Studies and Planning MSc students (https://www.helsinki.fi/en/programmes/master/urban-studies-planning).

Teaching period when the course will be offered
Period III, every 2nd year (2024, 2026, 2028…)

Recommended time or stage of studies for completion
2nd study year in ECGS

Study module
Optional course in the ECGS-930 Urban Studies module

Expiry of studies Valid for 10 years

Language of instruction English

Language of learning English

Literature and learning material
- Book: Oke et al., Urban Climate, 2018 + lecture material + UMEP manual
- Literature to be agreed with the person in charge of the course

Course level Master's level, (second-cycle degree/EQF level 7). Course level: advanced

ECGS-907 Urban Biodiversity

Kaupunkiluonnon monimuotoisuus, Urbant biologiskt mångfald

Credits 5 cr
Responsible organisations ECGS

Responsible persons
Ian MacGregor-Fors (ian.macgregor@helsinki.fi)

Equivalencies with other studies

Prerequisites
Basic knowledge in biodiversity, ecology, and environmental science

Learning outcomes
This course introduces various theoretical concepts related to biodiversity and how the urban environment drives wildlife communities. General patterns of biodiversity, from the global to the local scale are clearly depicted. Methodological frameworks are reviewed and the most generally used one is put into practice. tools are also provided for urban biodiversity studies, as well as way to link the generated knowledge in the practical world.

Content
Community ecology and biodiversity concepts and measurements. Basic urban ecology concepts and paradigms. Methodological approaches to tackle urban biodiversity questions. General responses of wildlife groups to urbanization (patterns and processes).

Completion methods
Students will actively participate in lectures (including breakout groups), discussion sessions and go on a 1-day field trip. Students will develop a report based on the data gathered in the field. The course will culminate in a final seminar provided by students on diverse topics and a final exam that will consist of an essay. Invited talks may take place upon acceptance of fellow colleagues, which could add one day to the course.

Grading scale Scale 0-5

Assessment practices and criteria
Field trip participation (20%), presentation in seminar (30%), final exam (50%)

Activities and methods in support of learning
Active participation in lectures, in the required tasks to prepare for and for the field work day, in preparing a short seminar, and in writing a thought-provoking essay.

Target groups
MSc and PhD students covering the prerequisites (e.g., ECGS MSc students)

Teaching period when the course will be offered
Period III

Recommended time or stage of studies for completion
1st study year in ECGS

Study module
Compulsory for the ECGS-915 and ECGS-930 Urban Studies Modules.

Expiry of studies The course is valid for 10 years

Language of instruction English

Language of learning English

Literature and learning material
Literature will be distributed before lectures in Moodle

- Suggested book for preparation: Ossola A & Niemelä J 2017. Urban Biodiversity. From research to practice. Routledge Studies in Urban Ecology, 274 pp.

Course level Master's level, (second-cycle degree/EQF level 7). Course level, intermediate and advanced

ECGS-910 Integrative methods in environmental social science

Integroivat yhteiskuntatieteellisen ympäristötutkimuksen tutkimusmenetelmät/ Miljöbaserad samhällsvetenskap forskningsmetoder

Credits 5 cr
Responsible organisations ECGS

Responsible persons
Sirkku Juhola (sirkku.juhola@helsinki.fi)

Equivalencies with other studies

Prerequisites
A good knowledge of social science research methods.

Learning outcomes
The aim of the course is to deepen the knowledge of research methods in social sciences. This includes study of methodology literature and understanding research problem framing and the application of suitable methods. The student will use one or more methods during the course in a research exercise and will write up a research report.

Content
The course discusses the use of research methods in environmental social sciences and their application. The course also discusses the integration of several methods in one research project and the benefits and limits of several methods.

Completion methods
Compulsory articles for each lecture and supplementary reading list for the course. These will be provided before the course. Participation in a research project in small groups.

- Participation in teaching
- Exam
- Independent study

Grading scale Scale 0-5

Assessment practices and criteria
Assessment based on the group report.

Activities and methods in support of learning
14hrs lectures, 14hrs seminars, 30hrs group work, 20hrs writing research report, 30hrs independent study, group self-assessment 10hr.

Target groups
Students enrolled in the ECGS Urban Studies module are given priority, maximum of 25 participants. The course is for MA level students.

Teaching period when the course will be offered
Period II

Recommended time or stage of studies for completion
2nd study year in ECGS

Study module
Optional course in the ECGS-930 Urban Studies Module.

Expiry of studies Valid for 10 years

Language of instruction English

Language of learning English

Literature and learning material
Compulsory and optional literature in catalog form.

Course level Master's level, (second-cycle degree/EQF level 7). Course level: intermediate.

VIIKB-001 Master's maturity test BY, 0 cr

Vastuuyksikkö: Bio- ja ympäristötieteellinen tiedekunta
Arvostelu: Hyväksytty-Hylätty
Opintokohteen kielet: suomi, englanti, ruotsi
Suoritustavat: ECGS-maisteriohjelmassa kypsyysnäytteenä toimii maisterintutkielman tiivistelmä.

Leikkaavuudet:
570018FM-tutkinnon suomenkielinen kypsyysnäyte (perehtyneisyys opinnäytteen alaan)0.0 op

570023FM-tutkinnon englanninkielinen kypsyysnäyte (perehtyneisyys opinnäytteen alaan sekä suomen, ruotsin tai englannin kielen taitoa)0.0 op
80061Maisterin suomenkielinen kypsyysnäyte0.0 op

VIIKB-002 Tutoring BY, 5 cr

Vastuuyksikkö: Bio- ja ympäristötieteellinen tiedekunta

Arvostelu: Hyväksytty-Hylätty

Ajoitus:
Kandivaiheen tuutorointi pääsääntöisesti kandiopintojen 1. tai 2. lukuvuoden keväällä (tuutorikoulutus) ja 2. tai 3. lukuvuoden syksyllä (tuutorointi). Maisterivaiheen tuutorointi maisteriopintojen 1. lukuvuoden keväällä (tuutorikoulutus) ja 2. lukuvuoden syksyllä (tuutorointi).
IV periodi (tuutorikoulutus) ja orientoiva viikko (tuutorointi)

Osaamistavoitteet
Opiskelija tutustuu ryhmän perustamisen lainalaisuuksiin, ryhmäytymisen tukemiseen ja ryhmänohjaamiseen. Hän osaa myös vastata opintojen aloittamiseen liittyviin käytännön kysymyksiin. Opintojakson suoritettuaan opiskelija osaa ottaa vastuuta pienryhmäohjauksesta ja valmistaa toimintasuunnitelman ryhmän yhteisen tavoitteen saavuttamiseksi. Opiskelija syventää tietojaan Helsingin yliopistosta, omasta kampuksesta ja koulutusohjelmastaan sekä soveltaa niitä auttaessaan uutta opiskelijaa integroitumaan yliopistoyhteisöön.

Edeltävä osaaminen: Ei pakollisia edeltäviä opintoja

Sisältö:
Opintojen aloittamiseen ja oppimisympäristöön liittyvät käytännön tiedot. Tuutorisuunnitelman laatiminen itsenäisesti ja yhteistyössä muiden tuutoreiden ja koulutusohjelman henkilökunnan kanssa. Ryhmäteorian perusteet ja ryhmäytymisharjoitukset. Tuutoroinnin toteutus ja sen sekä oman oppimisen arviointi kirjallisessa tuutoriloppuraportissa.

Oppimateriaali ja kirjallisuus: Kirjallisuus ja muu oppimateriaali on saatavilla tuutorikoulutuksen Moodle-alueella.

Arviointimenetelmät ja -kriteerit:
Arvioinnin perusteena on osallistuminen tuutorikoulutukseen, tuutorointi orientoivalla viikolla sekä tuutorisuunnitelman ja tuutoriraportin palautus. Arviointiasteikko hyväksytty/hylätty

Suoritustavat:
Opintojakso sisältää muutaman pakollisen lähiopetuskerran. Sen lisäksi opiskelija opiskelee itsenäisesti hänelle osoitetun kirjallisuuden ja muun oppimateriaalin, tekee tuutorisuunnitelman, toimii tuutorina orientoivalla viikolla ja lopuksi kirjoittaa tuutoriraportin.

Lisätiedot:
Tuutorikoulutus on yhteinen BYtdk:n ja MMtdk:n tuutoreille. Opetuskielenä suomi/ruotsi/englanti.
Lisätietoa Opiskelijan ohjeissa: https://guide.student.helsinki.fi/fi/artikkeli/hae-tuutoriksi

Yhteydet muihin opintojaksoihin
Korvaa kurssit 570007 Opiskelijatuutorointi, 2 op ja 80077 Opiskelijatuutorivalmennus (Y205), 5 op

Vastuuhenkilö: Bio- ja ympäristötieteellinen tiedekunta

VIIKB-005 Demanding participation in administrative bodies and student organizations, 2-5 cr

Vastuuyksikkö: Bio- ja ympäristötieteellinen tiedekunta

Arvostelu: Hyväksytty-Hylätty

Opintokohteen kielet: suomi, English

Kohderyhmä
Nämä ohjeet koskevat 1.8.2017 tai sen jälkeen alkaneiden bio- ja ympäristötieteellisen tiedekunnan koulutusohjelmien opiskelijoita. Ohjeita löydät myös Opiskelijan ohjeista.
Hallinto- ja ainejärjestötoiminnasta myönnettävien opintopisteiden myöntämisperusteet eroavat ennen ja jälkeen 1.8.2017 alkaneissa koulutusohjelmissa. Jos opiskelet ennen 1.8.2017 alkaneessa koulutusohjelmassa, katso ohjeet Flammasta. Tällöin suoritat opintojakson 570006.

Osaamistavoitteet:
Tavoitteena on kehittää opiskelijan vuorovaikutustaitoja ja oman osaamisen ja asiantuntijaidentiteetin tunnistamista. Opiskelija saa hallinto- ja opiskelijajärjestötoiminnassa kuvan hallinnon toimintaperiaatteista ja osaa toimia aktiivisesti järjestötehtävissä. Opiskelijoiden osallistuminen hallinto- ja opiskelijajärjestötoimintaan tukee myös Helsingin yliopiston strategisia tavoitteita vahvistaa vuorovaikutusta ja oppimista tiedeyhteisössä sekä kehittää kilpailukykyisiä koulutusohjelmia ja tutkintoja opiskelijalähtöisesti.

Toteutus:
Opiskelijan tulee hakea hallinto- ja järjestötoiminnasta saatavia opintopisteitä ja osoittaa osaamisensa. Hakemus toimitetaan Opiskelijaneuvonnan Opiskelijapalvelupisteeseen.
Opiskelijan tulee osoittaa hallinto- ja opiskelijajärjestötoiminnan osaaminen toimielimen puheenjohtajan tai sihteerin tai järjestön vastaavan henkilön antamalla todistuksella. Todistuksesta tulee käydä ilmi opiskelijan rooli ja tehtävät sekä se, että opiskelijan toiminta on ollut aktiivista toimielimessä tai järjestössä. Toimielimen osalta todistuksesta tulee lisäksi käydä ilmi, kuinka suuressa osassa kokouksista opiskelija on ollut läsnä.
Toimiminen samassa toimielimessä tai järjestötehtävässä huomioidaan vain kerran.

Sisältö:
Osallistumisesta järjestötoimintaan annetaan opintopisteitä seuraavasti:
Opiskelijan on oltava läsnä vähintään puolessa pidetyistä kokouksista vähintään lukuvuoden tai kalenterivuoden ajan
Yliopistokollegio, hallitus, tiedekuntaneuvosto, laitosneuvosto, johtokunta, neuvottelukunta, opetustaitotoimikunta, opiskelijavalintatoimikunta/lautakunta, koulutusohjelman johtoryhmä, oikeusturvalautakunta tai muu rehtorin, vararehtorin tai tiedekunnan päätöksellä perustettu monijäseninen toimielin:
nimetty jäsen tai varajäsen: 1 opintopiste
Ylioppilaskunnan piirissä toimivan järjestön hallitus (luettelo järjestöistä on osoitteessa https://hyy.helsinki.fi/fi/j%C3%A4rjest%C3%B6t/hyyn-j%C3%A4rjest%C3%B6t)

- nimetty jäsen: yksi opintopiste
- puheenjohtaja, taloudenhoitaja tai sihteeri: kaksi opintopistettä
- Ylioppilaskunnan piirissä toimivan järjestön virkailija (luettelo järjestöistä on osoitteessa https://hyy.helsinki.fi/fi/j%C3%A4rjest%C3%B6t/hyyn-j%C3%A4rjest%C3%B6t)
- nimetty virkailija: yksi opintopiste (edellytetään määriteltyjä tehtäviä ja aktiivista toimintaa (esim. tapahtumien järjestäminen)
- Ylioppilaskunnan edustajisto, hallitus tai valiokunta
- jäsen: yksi opintopiste
- valiokunnan puheenjohtaja tai sihteeri: kaksi opintopistettä,

- hallituksen puheenjohtaja: kolme opintopistettä
- Oman opiskelualan kansallinen tai kansainvälinen opiskelijajärjestö
- jäsen: yksi opintopiste
- valiokunnan puheenjohtaja, taloudenhoitaja tai sihteeri: kaksi opintopistettä,
- hallituksen puheenjohtaja: kolme opintopistettä
- nimetty virkailija: yksi opintopiste (edellytetään määriteltyjä tehtäviä ja aktiivista toimintaa, esim. tapahtumien järjestäminen)

Arviointimenetelmät ja -kriteerit: Hallinto- ja opiskelijajärjestötoiminnan osaamisen arviointiasteikkona on hyväksytty-hylätty.

Suoritustavat:
Opiskelijan tulee hakea hallinto- ja järjestötoiminnasta saatavia opintopisteitä ja osoittaa osaamisensa. Hakemus toimitetaan Opiskelijaneuvonnan Opiskelijapalvelupisteeseen.
Opintopisteitä on mahdollista saada 2-5 op kandissa ja 2-5 op maisterivaiheessa ja 2-5 op tohtoritutkinnossa.

Yhteydet muihin opintojaksoihin:
Vastaa biologian kandiohjelmassa jaksoa 570006 Yliopiston hallinto- ja opiskelijajärjestötoiminta 2 op, vastaa ympäristötieteiden kandissa jaksoa 80114 (Y206) ja 570006.