



**HOCHSCHULE OSNABRÜCK**  
UNIVERSITY OF APPLIED SCIENCES

# **MODULE MANUAL**

**MASTER'S PROGRAM  
LAND USE TRANSFORMATION**

Examination regulation 01.03.2026

Date of status: 23.04.2026

**HOCHSCHULE OSNABRÜCK**

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# Notes on the module manual

## **Lower Saxony Study Accreditation Regulations**

The framework data listed in the module handbook, particularly the examination concept, are compliant with the regulations of the Model Law Regulations respectively the Lower Saxony Study Accreditation Regulations.

## **More information on ECTS**

The criteria for the successful passing of the module is listed in the ATPO (General Examination Regulations). Details on how the grades are determined can be found in the applicable study regulation and in the BTPO (Program Specific Examination Regulations). The grading scale from 1 to 5, which is common at German universities, is used to grade the examination performance(s). (cf. ATPO).

# AGRICULTURE, ENVIRONMENT AND NUTRITION POLICY

## Agriculture, Environment and Nutrition Policy

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0567 (Version 2) of 22.04.2026. Approval status: approved

<b>Module identifier</b>	44M0567
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only winter term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

Students know the historical context and development of agricultural, environmental as well as nutrition policies in industrial and developing countries. They understand the central economic, demographic and institutional determinants of these policies. In particular, they are able to discuss the role of political institutions, interest groups and the voters as determinants of policy outcomes are able to analyze the impact of changed constitutional rules as well as informal policy network structures on policy outcomes. Students can analyze and evaluate the impact of agricultural, environmental and nutrition policies on the one hand on the economic development and the environment and on the other hand with respect to a sustainable development of regions and countries.

#### Teaching and learning outcomes

Political economy theory on interrelations of different agricultural (rural development policy, regional policy, structural policy), environmental, climate and nutrition policy instruments; political decision making processes at international, supranational and national level; government performance and sustainable development; theoretical foundation of complex systems, graph and network theory, actor networks, technical progress and the role of information and innovation.

### Workload, teaching and learning methods

#### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

## Teaching and learning methods

### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
20	Lecture		-
10	Seminar		-

### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
30	Creation of examinations		-
60	Work in small groups		-
30	Exam preparation		-

## Requirements for the award of ECTS credit points

### Graded examination

- Portfolio exam or
- oral exam

### Remark on the assessment methods

The standard examination form is a portfolio of a presentation/report and an oral examination (max. 50 points + max. 50 points); deviations from this will be announced in the first four weeks after the start of lectures.

### Exam duration and scope

presentation/report: ca. 20–30-minute presentation with 5–10 page written analysis

## Requirements for participation

## Competency-based learning outcomes

### Knowledge Broadening

Identification of relevant research questions in the field of Agriculture, Environment and Nutrition Policy.

### Knowledge deepening

Problem formulation and formulation of hypotheses regarding sustainability and agriculture, environment and nutrition policy; structuring a scientific investigation.

### Application and Transfer

Students understand linkages between policies affecting climate mitigation, energy markets, and land use. They are able to discuss trade-offs and synergies between different policies, and understand the interconnections between e.g. food, energy and water systems. They further understand central players and political economy logics of decision-making processes. They acquire knowledge in understanding climate, energy and agricultural policies, policy processes and related outcomes.

### **Academic Innovation**

Students are able to discover and formulate a research problem; they identify models and data to describe and handle the problem; they plan and structure a research project; they are able to collect relevant literature and data.

### **Communication and Cooperation**

Students make oral presentations on scientific topics and oppose/discuss/comment on other scientific work.

### **Academic Self-Conception / Professionalism**

Students evaluate and deliberate deduced recommendations in the field of agriculture, environment and nutrition policy.

### **Literature**

Literature and teaching material will be provided during the course.

### **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)

### **People involved in the module**

#### **Person responsible for the module**

- Zubek, Nana

#### **Teachers**

- Straka, Dorothee
- Speck, Melanie

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# APPLICATIONS OF ARTIFICIAL INTELLIGENCE

## Applications of Artificial Intelligence

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0509 (Version 1) of 17.07.2025. Approval status: approved

<b>Module identifier</b>	44M0509
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only winter term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

In this seminar, students learn to understand the transformative power of AI across various domains. This course demystifies how AI operates and its role in solving complex, real-world problems. By exploring a range of AI use cases, students will gain insights into the technology's potential, limitations, and the ethical and legal considerations that accompany its implementation. Through collaborative hands-on work, exploration and group presentations, this seminar not only deepens the understanding of AI's mechanics but also encourages critical thinking about its implications in our rapidly evolving world. This module is tailored for those who seek to grasp the essence of AI's influence in their respective fields, preparing them for a future where AI's presence is increasingly significant.

#### Teaching and learning outcomes

Definition, overview, and classification of AI

Fundamentals of machine learning and neural networks

AI use cases in various domains

Current developments in the field of AI

Potential paths for the future of AI

### Workload, teaching and learning methods

#### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

## Teaching and learning methods

### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
25	Seminar	Presence	-

### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
25	Preparation/follow-up for course work		-
50	Work in small groups		-
25	Study of literature		-
25	Presentation preparation		-

## Requirements for the award of ECTS credit points

### Graded examination

- Oral presentation, with written elaboration or
- Written examination or
- oral exam

### Ungraded exam

- Regular participation

### Remark on the assessment methods

The standard examination form is a presentation/report; deviations from this will be announced in the first four weeks after the start of lectures.

Ungraded: Regular participation in the seminars

### Exam duration and scope

presentation/report: ca. 20–30-minute presentation with 5–10 page written analysis

## Requirements for participation

### Recommended prior knowledge

As prerequisites for this seminar, students are encouraged to embrace an open-minded attitude towards learning new concepts and should not hesitate to engage with technical and IT-related content, as this will be crucial for a comprehensive understanding of the applications of artificial intelligence.

## Competency-based learning outcomes

### **Knowledge Broadening**

Students can explain the term artificial intelligence, recognizing its multidisciplinary nature and citing definitions from different perspectives

Students are familiar with key sub-fields of artificial intelligence, understanding their distinct roles and applications.

Students can identify and differentiate between various machine learning strategies, such as supervised, unsupervised, and reinforcement learning, understanding their unique methodologies and use cases.

Students can articulate examples of AI applications within their field of study, illustrating how AI solves specific problems and discussing the potential impact.

Students explain the role of AI prediction in the decision-making process.

### **Application and Transfer**

Students utilize available AI tools and interfaces to build, evaluate, and refine solutions for selected use cases, focusing on understanding the tool's capabilities and limitations.

Students apply effective prompting techniques and other interaction strategies to utilize AI models efficiently, learning to tailor inputs for optimal outputs.

Students apply AI concepts to design new solutions to real-world problems in their domain, demonstrating the ability to translate theoretical knowledge into practical solutions.

### **Communication and Cooperation**

Students develop skills in collaborative project work, including research, analysis, and presentation, focusing on AI-related topics.

### **Literature**

The list of recommended literature for the seminar will be provided at the beginning of the semester, ensuring that the most current and relevant resources are included for your study and reference.

### **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)
- Applied Livestock Sciences
  - Applied Livestock Sciences M.Sc. (01.09.2025)
- Agriculture, Food Science and Business
  - Agriculture, Food Science and Business M.Sc. (01.09.2025)
- Applied Plant Sciences M.Sc. (01.09.2025)
  - Applied Plant Sciences M.Sc. (01.09.2025)

### **People involved in the module**

#### **Person responsible for the module**

- Meseth, Nicolas

## Teachers

- Meseth, Nicolas

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# BIODIVERSITY AND ECOSYSTEM FUNCTIONS

## Biodiversity and Ecosystem Functions

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0568 (Version 2) of 22.04.2026. Approval status: approved

<b>Module identifier</b>	44M0568
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only summer term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

This course addresses the different levels of biodiversity with a main focus on the diversity of species and ecosystems. Ecosystem functions and ecosystem services will be analysed and evaluated for different landscapes and ecosystem types.

The course starts with introductory lectures and seminars. During the vegetation period, field work with identification of species (plants and selected animal species groups) and habitat types will be carried out. The collected data will be analysed, described and discussed taking into account the actual scientific literature.

#### Teaching and learning outcomes

- What is biodiversity?
- What are ecosystem functions and ecosystem services in different types of landscapes?
- Relations between biodiversity and ecosystem services
- How can biodiversity and ecosystem services be protected?
- Practical part with field work, data analysis and scientific evaluation and discussion

### Workload, teaching and learning methods

#### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

## Teaching and learning methods

### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
10	Seminar		-
20	Practice		-

### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
35	Presentation preparation		-
30	Work in small groups		-
20	Study of literature		-
35	Creation of examinations		-

## Requirements for the award of ECTS credit points

### Graded examination

- Oral presentation, with written elaboration or
- Homework / Assignment or
- oral exam

### Ungraded exam

- Regular participation

### Remark on the assessment methods

Main examination type:

scientific talk and report

regular participation in the course

Deviations from this will be announced in the first four weeks after the start of lectures.

### Exam duration and scope

talk and report: ca. 20–30 minute presentation with 5–10 page written analysis

## Requirements for participation

### Recommended prior knowledge

Basic knowledge in ecology.

## Competency-based learning outcomes

### Knowledge Broadening

Students who have studied this module successfully have knowledge about different aspects of biodiversity, ecosystem functions and ecosystem services.

### **Knowledge deepening**

Students are able to do scientific literature research as a basis. They are able to analyse species diversity in different landscapes and ecosystem types and to evaluate the results of their assessment.

### **Knowledge Understanding**

Students are able to interpret both, literature data and data they collected during their field work taking into account the background of the international scientific knowledge about the respective subject.

### **Application and Transfer**

Students who have completed this course successfully are able to transfer their knowledge and methodological competences concerning biodiversity and ecosystem functions to study and evaluate other landscapes and ecosystem types.

### **Academic Innovation**

The students know the actual scientific literature and are able to formulate own research questions in order to analyse biodiversity and ecosystem functions in new contexts.

### **Communication and Cooperation**

Students are able to communicate about biodiversity and ecosystem functions at a scientific level.

### **Academic Self-Conception / Professionalism**

Students are able to use the scientific terminology as well as to present their research results in front of different stakeholder groups.

## **Literature**

Gaston K.J. & Spicer J.I. (2004): Biodiversity: An introduction. 2nd. Ed. Blackwell Publishing, Oxford.

IPBES (2019): Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. E. S. Brondizio, J. Settele, S. Díaz, and H. T. Ngo (editors). IPBES secretariat, Bonn, Germany. 1148 pages. <https://doi.org/10.5281/zenodo.3831673>

Millennium Ecosystem Assessment (2005): Ecosystems and Human Well-being: Synthesis. Island Press, Washington, DC. Download at: [www.millenniumassessment.org/en/Synthesis.html](http://www.millenniumassessment.org/en/Synthesis.html)

Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Biodiversity Synthesis. World Resources Institute, Washington, DC. [www.millenniumassessment.org/documents/document.354.aspx.pdf](http://www.millenniumassessment.org/documents/document.354.aspx.pdf)

## **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)

## **People involved in the module**

### **Person responsible for the module**

- Vogel, Sebastian

### **Teachers**

- Vogel, Sebastian

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# COALA-WORKSHOP: DIGITALIZATION AND SENSORS FOR SUSTAINABLE AGRICULTURE

## COALA-Workshop: Digitalization and Sensors for Sustainable Agriculture

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0168 (Version 1) of 26.08.2025. Approval status: approved

<b>Module identifier</b>	44M0168
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only summer term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

Seminar with student presentations on sensor technology in the biosciences, agricultural sciences, horticulture, bioprocess engineering and similar topics with a focus on generating sustainability, environmental protection and ecological synergy effects.

#### Teaching and learning outcomes

Student presentations in seminar form. Example topics include:

- Sensor development for partial area-specific management
- Sensors for determining animal welfare
- Satellite systems for agricultural weather forecasting and sustainability improvement

The topics are provided by the lecturers as suggestions at the beginning of the module. Students can also propose their own topics in these areas.

### Workload, teaching and learning methods

#### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

## Teaching and learning methods

### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
10	Individual coaching	Presence	-
40	Seminar	Presence	-

### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
15	Study of literature		-
20	Reception of other media or sources		-
65	Presentation preparation		-

## Requirements for the award of ECTS credit points

### Graded examination

- Oral presentation, with written elaboration

### Ungraded exam

- Regular participation

### Remark on the assessment methods

Regular participation: All papers will be presented in two block sessions in a joint seminar. The examination board consists of 2 examiners. presentation, discussion and all parts of the written summary are in English.

### Exam duration and scope

Presentation with written summary (Referat) on a topic agreed on with supervisor:

- a 30-minute academic presentation and 10 minutes of discussion, and
- a written summary in the form of a graph or diagram (1 page) plus 2 pages of text summarizing the take-home message of the presentation

## Requirements for participation

### Recommended prior knowledge

Sufficient knowledge of written and spoken English (good school level)

## Competency-based learning outcomes

### Knowledge Broadening

Students learn about different sensor systems through their own presentation research and through the presentations of other students. They also gain knowledge in new areas of application. They are able to read and evaluate literature in English. They are able to express themselves in English at a scientific level.

### **Knowledge deepening**

Students are able to grasp and understand the current state of knowledge in a specialized field and to present it in a scientific paper based on scientific publications.

### **Knowledge Understanding**

Students recognize the connections between technologies, engineering and sustainability and their interdependencies. They understand how sensor systems work and can evaluate their application in agriculture or related areas in terms of economy and sustainability.

### **Application and Transfer**

After successfully completing the module, students are able to select high-tech systems in the field of biosystems technology and agriculture, recognize advantages and disadvantages and critically question explanations of the systems. They are able to use appropriate sensor systems in studies or in agricultural practice.

### **Academic Innovation**

Students learn about the latest innovations in the field of biosensor technology and agricultural sensor technology. They learn how sustainability can be supported by modern technologies. They can transfer this knowledge to other issues and tasks.

### **Communication and Cooperation**

Students develop their presentation style and demonstrate the scientific nature of their presentations. They learn to discuss innovations and technologies at a high scientific level. By speaking and discussing in English, they learn to communicate confidently in an internationally accessible language and with specific technical terms.

### **Academic Self-Conception / Professionalism**

Students increase their professionalism through well-prepared presentations and lectures in English. This prepares them for future tasks in internationally active companies, institutes and educational institutions. They are able to appropriately summarize and present complex issues in front of an international audience. In doing so, they enhance their academic self-image.

## **Literature**

Scientific articles on the respective topic

## **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)
- Applied Livestock Sciences
  - Applied Livestock Sciences M.Sc. (01.09.2025)
- Applied Plant Sciences M.Sc. (01.09.2025)
  - Applied Plant Sciences M.Sc. (01.09.2025)

## **People involved in the module**

**Person responsible for the module**

- Rath, Thomas

**Teachers**

- Rath, Thomas
- Westerkamp, Clemens
- Korte, Hubert
- Hinrichs, Birgit
- Tiemann, Inga

**Further lecturer(s)**

N.N.

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# CONCEPTIONS OF NATURE IN THE ANTHROPOCENE

## Conceptions of Nature in the Anthropocene

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0569 (Version 1) of 23.02.2026. Approval status: approved

<b>Module identifier</b>	44M0569
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only summer term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

This module discusses and reflects on different perceptions of nature and landscape in the context of the Anthropocene debate.

#### Teaching and learning outcomes

- Presentation of different conceptions of nature in the context of their historical development (from domination of nature to current wilderness strategies), as well as in different cultural circles.
- Reflection on the development of the understanding of nature in the context of the Anthropocene debate
- Establishing the connection to the topics of landscape development and sustainable land use
- Elaboration of transformation strategies that reflect a contemporary understanding of nature (also based on best practice examples)

### Workload, teaching and learning methods

#### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

## Teaching and learning methods

### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
30	Seminar		-

### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
70	Creation of examinations		-
35	Other		-
15	Preparation/follow-up for course work		-

## Requirements for the award of ECTS credit points

### Graded examination

- Homework / Assignment or
- oral exam or
- Project Report, written

### Remark on the assessment methods

The standard examination form is a term paper (Hausarbeit); any deviations from this will be announced in the first four weeks after the start of lectures.

Additionally, students may be asked to complete a design task as an ungraded assignment.

### Exam duration and scope

The term paper is to be completed within 6 weeks and comprise ca 10-15 pages.

## Requirements for participation

### Recommended prior knowledge

none

## Competency-based learning outcomes

### Knowledge Broadening

Students expand their knowledge on the development of conceptions of nature. They also generate instrumental knowledge of planning strategies.

### Knowledge deepening

Students deepen their understanding of the impact of nature conceptions on strategies for implementing changes towards sustainable land use.

### Knowledge Understanding

In addition to target and factual knowledge, students also acquire instrumental transformation knowledge on the complex processes of sustainable land use.

### **Application and Transfer**

Analyzing international case studies, students develop knowledge that can be transferred to different application cases in the field of sustainable land use change.

### **Academic Innovation**

Students develop research questions and learn to understand and plan processes of change for sustainable land use and landscapes through inquiry-based learning.

### **Communication and Cooperation**

Students learn the relevance of understanding and consciously dealing with conceptions of nature.

### **Academic Self-Conception / Professionalism**

Students reflect on opportunities and limiting factors presented by socially anchored ideal images of nature. They reflect on their professional role in social communication processes.

## **Literature**

As assigned by lecturer

## **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)

## **People involved in the module**

### **Person responsible for the module**

- Schultz, Henrik

### **Further lecturer(s)**

N.N. Professur MLT

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# DIGITAL LANDSCAPE ARCHITECTURE

## Digital Landscape Architecture

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0559 (Version 1) of 21.08.2025. Approval status: approved

<b>Module identifier</b>	44M0559
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only summer term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

This module deals on a conceptual level with the design of work processes for drafting as well as implementation planning. The focus is on aspects such as collaboration between different project participants and trades, as well as the development of adequate procedures in different project phases based on a given task.

Based on existing skills in the use of CAD, BIM and visualization software, the focus here is on the independent implementation of a complex planning task within a planning team. There is no software training in the conventional sense. The acquisition of software knowledge is essentially self-taught or within short learning sequences that provide support for the context-related expansion of digital competencies.

#### Teaching and learning outcomes

This module covers

- Basics and characteristics of digital work processes compared to analog methods
- Conception of digital work processes using examples
- Implementation of digital work processes on a complex planning task.
- Application of digital methods and processes in typical design and planning phases using digital tools.

The methodological approaches range from parametric to generative methods to the independent development of scripts via codes. Bridging the gap to computer-aided manufacturing of components is also integrated on a case-by-case basis.

## Workload, teaching and learning methods

### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

### Teaching and learning methods

#### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
45	Seminar	Presence or online	-

#### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
55	Work in small groups		-
40	Creation of examinations		-
10	Study of literature		-

## Requirements for the award of ECTS credit points

### Graded examination

- Homework / Assignment or
- Field work / Experimental work or
- Written examination or
- oral exam or
- Project Report, written

### Remark on the assessment methods

Standard form of examination is a homework assignment ("Hausarbeit") in the form of an ArcGIS-StoryMap. Any deviation will be communicated at the start of lectures.

### Exam duration and scope

homework assignment ("Hausarbeit") in the form of an ArcGIS-StoryMap.

## Requirements for participation

### Recommended prior knowledge

User software knowledge in the areas of CAD, BIM, visualization.

## Competency-based learning outcomes

### **Knowledge Broadening**

- Understanding of digital tools and technologies in landscape architecture
- Familiarity with software applications for landscape design and analysis –
- Knowledge of digital visualization techniques and their applications
- Awareness of contemporary digital trends in landscape architecture
- Exposure to case studies and examples of digital landscape projects
- Integration of digital methodologies in sustainable landscape design

### **Knowledge deepening**

- In-depth application of advanced digital design tools and techniques
- Critical analysis of complex digital landscape projects and methodologies
- Proficiency in 3D modeling and simulation for landscape architecture
- Exploration of innovative technologies like virtual reality (VR) and augmented reality (AR) in landscape design
- Comprehensive understanding of data-driven landscape architecture solutions
- Expertise in integrating environmental data with digital landscape modeling –

### **Knowledge Understanding**

- Comprehension of interdisciplinary approaches involving digital landscapes
- Ability to develop and implement complex digital strategies in landscape architecture projects

### **Application and Transfer**

Ability to implement complex digital projects with adequate methods and tools

### **Academic Innovation**

Understanding digital processes and their characteristics as well as their potential for innovation in landscape architecture.

### **Communication and Cooperation**

- Effective communication of digital design concepts and strategies to diverse audiences
- Collaboration with multidisciplinary teams using digital platforms and tools
- Facilitation of stakeholder engagement through digital visualization techniques
- Development of collaborative projects utilizing cloud-based design tools
- Integration of feedback from various stakeholders into digital design processes
- Coordination of digital workflows and data sharing within project teams

### **Academic Self-Conception / Professionalism**

- Ability to articulate the advantages of digital approaches in landscape architecture

## Literature

JoDLA since 2016

Journal of Digital Landscape Architecture  
e-ISSN 2511-624X

VDE-Wichmann Verlag

Available on [gispoint.de](http://gispoint.de) -> [gis.open](http://gis.open)

## Applicability in study programs

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)
- Building – Environment – Management
  - Building – Environment – Management M.Eng. (01.09.2025)
- Landscape Architecture
  - Landscape Architecture M.Eng. (01.09.2025)

## People involved in the module

### Person responsible for the module

- Taeger, Stefan

### Further lecturer(s)

N. N. Professur "Digitale Prozesse und Anwendungen in der LA"

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# GENOME ANALYSIS AND ITS INNOVATIONS IN SUSTAINABLE CROP PRODUCTION

## Genome Analysis and its Innovations in Sustainable Crop Production

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0523 (Version 1) of 27.02.2026. Approval status: approved

<b>Module identifier</b>	44M0523
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only summer term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

Plant breeding is a historical discipline, which laid the foundations of modern agriculture. In the last decades, we have experienced a revolution in genome analyses methods that enable the dissection and quantification of the breeding traits at single gene up to the genome levels. These advances have changed the paradigm of breeding science and offered sophisticated methods to improve traits and selection at molecular level for the development of sustainable crop varieties. The primary aim of this module is to employ the innovations of genome analyses techniques in applied plant breeding for sustainable crop production.

## Teaching and learning outcomes

- Genome; the centre of heredity
  - Genetic vs epigenetic trait variations
  - Genome structure and organization in plants
- Genome analysis techniques
  - DNA cloning and PCR
  - DNA-marker
  - High-through-put genotyping
  - Next generation sequencing
- Genome analyses in applied plant breeding
  - Genetic linkage analysis
  - Gene-by-trait association (QTL and GWAS) analyses
  - Marker (gene) assisted selection/ precision breeding
  - Positional mapping and isolation of genes
- Genomic innovations in sustainable crop production
  - Creation and utilization of biodiversity
  - Disease resistance
  - Drought and heat stress tolerance
  - Bio-fortification, yield and quality
- Genome-editing: a newer tool for sustainability
  - CRISPR/Cas system
  - Potential applications in sustainable crop production

## Workload, teaching and learning methods

### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

### Teaching and learning methods

#### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
30	Lecture	Presence	-
30	Practice	Presence	-

#### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
30	Preparation/follow-up for course work		-
40	Exam preparation		-
20	Study of literature		-

## Requirements for the award of ECTS credit points

### **Graded examination**

- Portfolio exam or
- oral exam or
- Written examination

### **Ungraded exam**

- Regular participation

### **Remark on the assessment methods**

Standard graded examination: Portfolio with written exam, 2 hours (max. 80 points) + presentation (max. 20 points)

An alternative examination may be selected by the examiner and announced at the beginning of the course.

Regular participation in the practical course is required but ungraded.

### **Exam duration and scope**

Written exam - 2 hours

Presentation - approx. 20 minutes

Regular participation - minimum 80% of total hours

### **Requirements for participation**

#### **Recommended prior knowledge**

Basic knowledge of the subjects of genomics and crop production are helpful but not required.

### **Competency-based learning outcomes**

#### **Knowledge Broadening**

Students understand the relationship between genome analysis and sustainable crop production and can identify important genome analysis techniques and their uses in applied plant breeding. They can describe measures for genomic innovations that lead to an increase in specific facets of sustainability in crop production.

#### **Knowledge deepening**

Students can argue, according to the specific situation, which genomic measures are suitable for achieving specific sustainable crop production goals.

#### **Knowledge Understanding**

Students can formulate problem and hypotheses in applied plant breeding for sustainable crop production. They can employ innovative genome analyses techniques to test and evaluate their hypotheses.

### **Application and Transfer**

Students develop an understanding of how innovative genome analyses techniques can promote sustainable crop production and reflect on experimental findings.

### **Communication and Cooperation**

Students can present innovative concepts for genome analyses techniques in applied plant breeding for sustainable crop production on a scientific basis and discuss them with experts.

### **Academic Self-Conception / Professionalism**

Students evaluate and deliberate deduced recommendations genome analyses techniques in applied plant breeding for sustainable crop production.

### **Literature**

as assigned during the semester

### **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)
- Applied Livestock Sciences
  - Applied Livestock Sciences M.Sc. (01.09.2025)
- Applied Plant Sciences M.Sc. (01.09.2025)
  - Applied Plant Sciences M.Sc. (01.09.2025)

### **People involved in the module**

#### **Person responsible for the module**

- Naz, Ali Ahmad

#### **Teachers**

- Naz, Ali Ahmad

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# GIS AND ENVIRONMENTAL MODELLING

## GIS and Environmental Modeling

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0554 (Version 1) of 21.08.2025. Approval status: approved

<b>Module identifier</b>	44M0554
<b>Module level</b>	Master
<b>Language of instruction</b>	English, German
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only winter term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Special features of the module

This module does not include GIS software training in the traditional sense. Sufficient basic GIS knowledge is a prerequisite for access to this module. Online teaching materials are available, with the help of which sufficient basic knowledge can be acquired autodidactically before the start of the module.

### Module contents

#### Brief description

Digital working methods as well as GIS-based analyses and modeling are a natural part of almost all applications in landscape and environmental planning, climate adaptation and other complex transformation processes.

Here, GIS based processing has the particular task of determining and visualizing the current state of the relevant environmental media. Based on this, forecasts of future developments are to be conceived and their spatially concrete effects are to be shown. On this basis, planning concepts for future action are developed, which in turn have an influence on spatial development and are to be modeled in GIS.

In short: the module teaches skills on how to digitally model ecological or other spatially effective change processes and thus visualize future development states before they occur in the real world.

### Teaching and learning outcomes

Students learn the process of model building, i.e. the transformation of real-world phenomena such as ecosystems, habitats, landscape structures into digital models, by means of case studies. On the one hand, knowledge of the "real world" is required for this, on the other hand, GIS-supported methods of modeling. Both components are developed into a valid digital model and its informative value for planning processes is estimated.

In each case, the focus is on a concrete case study from the thematic complex of climate adaptation, climate resilience in the context of water availability, coping with climate hazards, preservation and development of biodiversity or other complex issues. All phases of modeling in GIS will be addressed based on the particular case study.

### Workload, teaching and learning methods

#### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

#### Teaching and learning methods

##### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
10	Lecture		-
20	Seminar		-

##### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
60	Preparation/follow-up for course work		-
60	Creation of examinations		-

### Requirements for the award of ECTS credit points

#### Graded examination

- Homework / Assignment or
- Field work / Experimental work or
- Written examination or
- oral exam or
- Project Report, written

#### Remark on the assessment methods

Standard form of examination is a homework assignment: ArcGIS-StoryMap. Any deviation from this will be announced at the start of the module.

### **Exam duration and scope**

Homework assignment [HA]: multimedia WebGIS presence (e.g. ArcGIS-StoryMap) to an appropriate extent for the semester assignment

alternative examination form: two-hour written exam

## **Requirements for participation**

### **Recommended prior knowledge**

Sufficient basic GIS knowledge is a prerequisite for access to this module. Online teaching materials are available, with the help of which sufficient basic knowledge can be acquired autodidactically before the start of the module.

## **Competency-based learning outcomes**

### **Knowledge Broadening**

- broader understanding of Geographic Information Systems (GIS) principles
- Introduction to environmental modelling techniques and applications
- Overview of spatial data collection and management
- Exposure to various types of environmental models and their uses
- Familiarity with GIS software and tools for environmental analysis
- Knowledge of key concepts in spatial analysis and geostatistics
- Understanding the of GIS in environmental decision-making processes
- Awareness of emerging trends and technologies in GIS and environmental modelling

### **Knowledge deepening**

- Advanced spatial analysis and geoprocessing techniques using GIS
- Proficiency in developing and applying complex environmental models
- In-depth understanding of GIS data structures and spatial databases
- Capability to conduct detailed geostatistical analyses for environmental data
- Expertise in the use of GIS for simulation and scenario development
- Critical assessment of model outputs and their implications for environmental management
- Ability to customize and automate GIS processes using scripting languages, such as Python
- Knowledge of integration of remote sensing data with GIS for enhanced environmental modelling

### **Knowledge Understanding**

Acquisition of competencies required for the processing of new complex tasks and problems as well as for the independent control of processes in a strategy-oriented professional field of activity. The requirement structure is characterized by frequent and unpredictable changes.

### **Application and Transfer**

Students possess specialized technical or conceptual skills for solving even strategic problems in a professional field of activity.

### **Academic Innovation**

Students will be able to design models as digital representations of real spatial development processes and to use them to support decision-making in planning processes. These are key competencies for coping with current transformation processes in a wide range of spatial and temporal scales.

### **Communication and Cooperation**

Students have skills in weighing alternatives even when information is incomplete.

### **Academic Self-Conception / Professionalism**

Students have skills to develop, apply, and evaluate new ideas or processes using a variety of assessment standards.

### **Literature**

Literatur wird im Kontext zu den jeweiligen Fallbeispielen des Semesters in ILIAS genannt.

Literature will be cited in context to each semester's case study in ILIAS.

JoDLA from 2016

Journal of Digital Landscape Architecture  
e-ISSN 2511-624X

Available on [gispoint.de](http://gispoint.de) -> [gis.open](http://gis.open)

AGIT

Journal für Angewandte Geoinformatik  
eISSN 2509-713X

Available on [gispoint.de](http://gispoint.de) -> [gis.open](http://gis.open)

### **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)
- Building – Environment – Management
  - Building – Environment – Management M.Eng. (01.09.2025)
- Landscape Architecture
  - Landscape Architecture M.Eng. (01.09.2025)

### **People involved in the module**

#### **Person responsible for the module**

- Taeger, Stefan

## Teachers

- Taeger, Stefan

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# GOVERNANCE AND TRANSFORMATION

## Governance and Transformation

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0565 (Version 1) of 01.09.2025. Approval status: approved

<b>Module identifier</b>	44M0565
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only summer term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

This module explores the development, definition and implementation of transformative goals and policies surrounding climate change mitigation and land use. To this end, it cultivates a deeper understanding of the central players involved, the political economy logics of decision-making processes, as well as the drivers and conditions of transformation.

#### Teaching and learning outcomes

- What is governance? What is transformation knowledge (e.g. Pohl 2022)? Foundational theories and key concepts defined
- How are climate and land use goals and international agreements developed and codified? What are the challenges of implementation, including funding, monitoring and enforcement? (e.g. Sustainable Development Goals)
- What are the central questions of governance shaping the transition towards sustainable forms of land use today?
- Who are the actors involved at different levels? What can we say about the webs of interest and relative power they represent?
- To what extent can we define and categorize transformation processes? What are the markers and relative (dis)advantages of top-down vs. bottom-up transformation processes?
- What can historical examples teach us about transformative governance?

### Workload, teaching and learning methods

## Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

## Teaching and learning methods

### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
50	Seminar		-
10	Practice		-

### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
30	Presentation preparation		-
25	Preparation/follow-up for course work		-
35	Study of literature		-

## Requirements for the award of ECTS credit points

### Graded examination

- Portfolio exam or
- Homework / Assignment or
- oral exam

### Remark on the assessment methods

The standard examination form is a portfolio; deviations from this will be announced in the first four weeks after the start of lectures.

### Exam duration and scope

presentation/report: ca. 20-30 minute presentation with 5-10 page written analysis

oral examination: ca. 20-30 minutes

## Requirements for participation

### Recommended prior knowledge

Basic knowledge on the topics of governance and/or sustainable land use is helpful, but not required.

## Competency-based learning outcomes

### Knowledge Broadening

Students demonstrate their knowledge regarding governance and transformation. Students can explain linkages between the goals and policies surrounding climate change mitigation and land use. They can differentiate political-economy logics of decision-making processes and categorize different transformation processes. They can discuss in more general terms the development of climate, energy and agricultural policies and practices, policy processes and related outcomes.

### **Knowledge deepening**

In a specific case study, they are able to sketch the web of interests and outline the potential trade-offs and synergies among the central players involved in developing different policies. They can describe the drivers and conditions of transformation and can discuss how governance dynamics may promote, structure and/or hinder the development of transformation processes.

### **Knowledge Understanding**

Students can contextualize transformation knowledge in terms of the related knowledge of objectives and facts and critically reflect on its potential use in the complex processes of land use toward sustainable development.

### **Application and Transfer**

Students can orient themselves and integrate their prior knowledge within a potentially new (disciplinary) perspective. They can adapt the knowledge they gain about governance and transformation to other contexts, such as collaborative projects involving diverse stakeholders.

### **Academic Innovation**

Students can apply their general understanding of governance and transformation knowledge to a specific case study in order to generate and analyse hypotheses.

### **Communication and Cooperation**

Students can effectively collaborate with others in group project tasks. They can communicate with an expert audience about their subject matter using the technical language, in speech and writing.

### **Academic Self-Conception / Professionalism**

Students can evaluate their personal strengths, challenges and areas of expertise. They can imagine their potential role as a member of the global community of researchers and practitioners collectively working on the challenges of land use.

## **Literature**

as assigned by the lecturer

## **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)

## **People involved in the module**

### **Person responsible for the module**

- Long-Gräuler, Shelby Irene

### **Further lecturer(s)**

N.N. (Professur MLT)

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# INTERNATIONAL MANAGEMENT

## International Management

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0512 (Version 2) of 22.04.2026. Approval status: approved

<b>Module identifier</b>	44M0512
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only winter term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

This module addresses the tasks of strategic corporate development with regard to activities in international sales and procurement markets in the agricultural and food industry.

#### Teaching and learning outcomes

1. opportunities and challenges of globalisation and internationalisation of companies in the agricultural and food sector
2. methods for analysing and selecting international markets and instruments for deriving internationalisation strategies
3. forms of international market entry, analysis and evaluation of typical internationalisation strategies in the sector based on an international case study in food retailing
4. analysis and evaluation of specific market entry barriers with regard to international market development
5. special features of processing international procurement markets
6. handling and researching international databases related to foreign trade

### Workload, teaching and learning methods

#### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

## Teaching and learning methods

### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
25	Seminar	Presence or online	-
5	Learning in groups / Coaching of groups		-

### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
50	Work in small groups		-
50	Creation of examinations		-
20	Preparation/follow-up for course work		-

## Requirements for the award of ECTS credit points

### Graded examination

- Project Report, written or
- Written examination or
- oral exam

### Remark on the assessment methods

The standard form of examination is a written project report; deviations from this will be announced in the first four weeks after the start of lectures.

The project report is prepared jointly as a team and is based on a real case study presented by company representatives.

### Exam duration and scope

Written project report - circa 15-20 pages per person in the project group, excluding any appendix or written exam, 2 hours, or oral exam circa 20-30 minutes

## Requirements for participation

### Recommended prior knowledge

Basic knowledge of economics. Knowledge in data research, especially the selection and evaluation of data quality. English language skills, as the entire lecture, the secondary data, the group work, the examination in the form of project work etc. will be conducted in English.

## Competency-based learning outcomes

### **Knowledge Broadening**

Students know the analysis procedures for selecting international markets and research options. They are familiar with normative internationalisation strategies and are able to critically evaluate and justify their selection with regard to a field of application. They know the prevailing ethical challenges of internationalised companies in relation to the industry. They understand the problems and challenges of sustainability in relation to internationalisation strategies.

### **Knowledge deepening**

Students have a detailed specialised knowledge of the methods of market analysis and selection. They know the opportunities and risks of various internationalisation strategies and can identify and evaluate companies and their internationalisation strategies with regard to strategic consistency. They know the tasks of market entry and can plan and prepare these for an entrepreneurial task. They are able to develop and test a scoring model for ranking country data and macro data from market analyses for meaningful use in a case study and apply the utility value analysis in country preselection.

### **Knowledge Understanding**

- Skills - instrumental competence: Students can handle international databases and research options, categorise the data and make it usable for an entrepreneurial question. They can apply market selection methods, know the advantages and disadvantages of the methods and can select and implement the right method for the respective issue. They can prepare a market entry for a company in the sector.
- Ability - communicative competence: Students can present the results of a project to analyse and prepare an international market entry and argue in front of experienced colleagues and specialists at a professional level.
- Ability - systemic competence: They can apply a range of common analytical skills, international database skills and market evaluation and selection techniques to develop and evaluate the internationalisation strategy for a company in the sector.

### **Application and Transfer**

The imparted knowledge and skills are meaningful for work in all types of companies that want to advance their strategy development in the area of internationalisation. Multidisciplinary teams are usually put together to deal with such complex issues. It can therefore be relevant to have acquired this knowledge and expertise, regardless of your future specialist career. In any case, it is highly relevant for people who want to work in the field of strategy development, foreign trade, management or setting up their own company.

### **Academic Innovation**

Consideration of sustainability strategies in international strategy development.

### **Communication and Cooperation**

Master's students are able to present, discuss and reflect on the analysis tool they have developed for international market selection as well as the results of the analysis, addressing the company providing the case. Complex sustainability issues and trade-offs in particular are recognised and strategically weighed up.

### **Academic Self-Conception / Professionalism**

Students develop a professional identity that aligns with the objectives and standards of professional practice, both within the academic sphere and in career contexts outside of academia.

### **Literature**

- Altmann, J. (2017): Außenwirtschaft für Unternehmen, UVK-Verlag, Stuttgart. - Soboda, B. et al.. (2021): Internationales Marketing, 4.Auflage, Franz Vahlen Verlag, München. Hill, C.W.L. (2021): Global Business Today, 12th Edition, McGraw-Hill Companies Inc., New York, USA. - Hill, C.W.L./Jones, G.R. (2023): Strategic Management - an integrated approach, 14th Edition, South Western Cengage Learning, Mason, USA. - Lane, H. W./Maznevski, M.L. (2019): International Management Behaviour - Global and Sustainable Leadership, Cambridge University Press, Cambridge, GB. - Diverse Artikel aus u.a. Absatzwirtschaft, Harvard Business Review, Journal of Marketing

### **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)
- Agriculture, Food Science and Business
  - Agriculture, Food Science and Business M.Sc. (01.09.2025)

### **People involved in the module**

#### **Person responsible for the module**

- Schnitker, Karin

#### **Teachers**

- Schnitker, Karin

#### **Further lecturer(s)**

Vertreter\*innen des Fall gebenden Unternehmens.

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# INTERNATIONAL PERSPECTIVES ON SUSTAINABLE LAND USE

## International Perspectives on Sustainable Land Use

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0570 (Version 1) of 01.09.2025. Approval status: approved

<b>Module identifier</b>	44M0570
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only summer term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Special features of the module

This intensive module is part of the three-week International Summer University at Osnabrück University of Applied Science.

### Module contents

#### Brief description

This intensive module highlights regularly changing topics from the fields of nature conservation, land use and landscape development through an international perspective. In international and interdisciplinary groups, students learn to understand different conceptions of and approaches toward solving global challenges in sustainable land use.

#### Teaching and learning outcomes

The module explores, in an international and/or comparative light, questions related to conservation and sustainable land use and landscape development. The concrete topics and any specific case studies examined change regularly. The exact teaching and learning content depend upon the special topic of study. Generally, the content is explored through the presentation of scientific literature and case studies, discussion groups, and research or project tasks.

### Workload, teaching and learning methods

#### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

## Teaching and learning methods

### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
10	Lecture		-
30	Seminar		-
20	Other		-

### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
20	Work in small groups		-
20	Creation of examinations		-
20	Preparation/follow-up for course work		-
30	Study of literature		-

## Further explanations

Lecturers may determine the best forms for their teaching and learning content according to the needs of their specific topic.

## Requirements for the award of ECTS credit points

### Graded examination

- Portfolio exam or
- oral exam or
- Case analysis, oral

### Remark on the assessment methods

The standard form of examination is a portfolio (group presentation and an oral examination, with each making up half of the final grade). Deviations from this will be announced at the start of the program.

### Exam duration and scope

presentation/report: ca. 20–30-minute presentation with 5–10 page written analysis

oral examination: ca. 20-30 minutes

## Requirements for participation

### Recommended prior knowledge

Basic knowledge on the topic of sustainable land use is helpful, but not required.

## Competency-based learning outcomes

### Knowledge Broadening

Students can identify factors influencing sustainable land use in relation to a specific topic and contextualize them using an international perspective.

### **Knowledge deepening**

Students can characterize the drivers and conditions shaping land use and landscape change within the special topic of study. They can draw comparisons and contrast cases in light of cultural and geographic differences.

### **Knowledge Understanding**

Students can critically reflect and discuss how approaches to knowledge and subject matter can vary according to the socio-cultural context of study.

### **Application and Transfer**

Students can interpret previously acquired subject knowledge in an international perspective. They can integrate a new perspective in their work and adapt their communication to an international context.

### **Academic Innovation**

Students can generate potential research questions and hypotheses, operationalize their knowledge of facts and methods to complete a research or project task and critically reflect on their results in light of an international perspective.

### **Communication and Cooperation**

Students exchange ideas, plan and organize their cooperative work in diverse groups in a goal-oriented and respectful manner. Students can effectively communicate with an expert audience about their subject matter using the technical language and taking cultural contexts into account.

### **Academic Self-Conception / Professionalism**

Students can evaluate their personal strengths and challenges and conceptualize their potential role as a member of the global community of researchers and practitioners collectively working on the challenges of land use.

## **Literature**

as assigned by lecturer

## **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)

## **People involved in the module**

### **Person responsible for the module**

- Long-Gräuler, Shelby Irene

### **Further lecturer(s)**

N.N. (Professur MLT)

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# INTERNATIONAL PROJECT SEMESTER

## International Project Semester

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0571 (Version 1) of 01.09.2025. Approval status: approved

<b>Module identifier</b>	44M0571
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	30.0
<b>Module frequency</b>	winter and summer term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Special features of the module

In their third semester of study in the Master Land Use Transformation, students have the option of completing an International Project Semester at a university or other organization abroad.

### Module contents

#### Brief description

During an international project semester, students apply their knowledge and skills in the field of land use transformation by completing a practical or scientific project abroad.

Students can address a particular topic as part of a larger research project under the supervision of a university lecturer at an international university (research variant). Or students may complete the international project outside of a university setting at a company or other institution abroad (transfer option), provided that the project task corresponds to the subject matter of the masters program. Details on the organization of the international project semester can be found in the "Regulations for the International Project Semester in the Master's Program in Land Use Transformation" (Appendix 2 of the MLT Study Regulations).

### Teaching and learning outcomes

1. Professional and organizational preparation phase:

- determining of the focus of interest
- identifying and corresponding with relevant contacts at host institution abroad
- defining the individual project according to the learning objectives (exposé)

2. Research phase:

- processing a specific research or project task,
- critically reflecting the applied methods and work steps or phases of work in light of the relevant literature

3. Reporting Phase:

- preparing and presenting the project results in the form of a written project report
- reflecting on professional and personal experiences in the written report

### Workload, teaching and learning methods

#### Overall workload

The total workload for the module is 900 hours (see also "ECTS credit points and grading").

#### Teaching and learning methods

##### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
10	Individual coaching	Presence or online	-

##### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
765	Other		practical project
100	Creation of examinations		-
25	Other		organization of project semester (before and after)

### Requirements for the award of ECTS credit points

#### Graded examination

- Project Report, written or
- Project Report, medial or
- Project Report, oral

#### Remark on the assessment methods

In order to coordinate the supervision of the IPS, the student must prepare an exposé outlining their individual project within the first 8 weeks of the project semester. This exposé must be submitted to and accepted by the supervisor at Osnabrück University of Applied Sciences. It is to be included as an addendum to the written project report.

### **Exam duration and scope**

Together the student and project supervisors (both abroad and at Osnabrück University of Applied Sciences) will define the length and specific contents of the project report, according to the individual project.

## **Requirements for participation**

### **Recommended prior knowledge**

Successful completion of the first two semesters of the Masters program Land Use Transformation

## **Competency-based learning outcomes**

### **Knowledge Broadening**

In addition to demonstrating specialist knowledge of objectives and facts related to their project topic in the field of land use transformation, students can outline the technical, organizational and communicative requirements involved in completing larger-scale project tasks in the field of land use transformation.

### **Knowledge deepening**

Students can integrate new subject-related knowledge generated through their project with their prior knowledge in the field of land use transformation. They can describe their methods and results, and discuss the relative merits of potential methodological approaches to their complex topic.

### **Knowledge Understanding**

Through the project abroad, students generate potential research questions and hypotheses and operationalize their knowledge of facts and methods to complete a larger-scale project task in the field of land use transformation. They also critically reflect on their project processes, methods and results.

### **Application and Transfer**

Students apply the practical self-management and project-organizational skills and specialist knowledge acquired in their study program to the international project semester. They demonstrate a planning-analytical understanding of how to deal with complex project tasks. They can critically evaluate their findings, as well as their use of knowledge and skills across cultural and institutional contexts.

### **Academic Innovation**

Students develop unique research questions and independently complete project tasks. They can successfully plan and execute project processes.

### **Communication and Cooperation**

Students can initiate and manage communication processes. They are able to present their ideas, methods and results in a structured manner to an expert audience using the technical language, in writing and speech, taking cultural contexts into account.

### **Academic Self-Conception / Professionalism**

Students can independently initiate and complete a project. They can assess their knowledge and skills in relation to the requirements of research and/or professional practice.

## Literature

Students will seek applicable literature as required by their specific project topic.

## Applicability in study programs

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)

## People involved in the module

### Person responsible for the module

- Long-Gräuler, Shelby Irene

### Further lecturer(s)

N.N. Professur MLT

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# LIFE CYCLE ASSESSMENT, RESOURCE EFFICIENCY

## Life Cycle Assessment, Resource Efficiency

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0572 (Version 1) of 17.07.2025. Approval status: approved

<b>Module identifier</b>	44M0572
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only summer term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

Life cycle analysis (also known as life cycle assessment or LCA) is a systematic analysis of the potential environmental impacts and energy balance of products throughout their life cycle. As part of the seminar, students are empowered to prepare a life cycle assessment based on a case study. Ideally in cooperation with a practice partner. In addition, concepts are developed around the resource efficiency of products and services. Different sets of ecological indicators are examined, including the consideration of CO<sub>2</sub> or land use.

## Teaching and learning outcomes

Introduction

Thematic orientation and contents of the module

Content-related processing framework of the respective product group

Processing interests of the module participants - initial ideas

Introduction to resource efficiency

Background and development of the topic of resource efficiency

Overview of tools for eco- and resource efficiency

Introduction to software (e.g. Umberto) and databases (e.g. ECOINVENT)

Criteria for assessing resource efficiency

Analysis

Analysis and assessment of products, services and/or value chains

Calculation of ecological impacts expressed in CO<sub>2</sub> or land use or biodiversity losses of products and services based on selected case studies using the provided software

In-depth case studies

Selection of case studies (products) for in-depth analysis of life cycle resource use, in case in living labs (directly used for primary data collection)

Implementation of the case studies in a seminar paper

Presentation of results in small groups

Preparation of the results in semester group

Presentation and discussion of the results from the case studies (possibly in combination with an excursion)

Documentation of the case study

## Workload, teaching and learning methods

### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

### Teaching and learning methods

#### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
60	Seminar	Presence or online	-

#### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
50	Work in small groups		-
15	Peer-Feedback		-
25	Creation of examinations		-

### **Further explanations**

In the course of the semester, a case study is prepared, analyzed and discussed within the framework of a case study incl. a written paper. Ideally in cooperation with a practice partner. Focus on the social or economic dimension of supply chain management.

## **Requirements for the award of ECTS credit points**

### **Graded examination**

- Case analysis, written

### **Remark on the assessment methods**

In the course of the semester, a life cycle assessment will be prepared, which is then to be explained, analyzed and discussed within the framework of a case study incl. written elaboration. Ideally in cooperation with a practice partner.

The module can be linked to the project modules Project A and Project B or can form a building block in this project work.

### **Exam duration and scope**

Case Study, written: ca. 13-15 pages

## **Requirements for participation**

### **Recommended prior knowledge**

Basic knowledge of natural sciences is recommended in this model and helpful for working through the case studies.

## **Competency-based learning outcomes**

### **Knowledge Broadening**

Students know the methods and concepts of life cycle assessment for the analysis and evaluation of products and services and are aware of the most important 5 steps (incl. critical review).

Students know the advantages and disadvantages of life cycle assessment and can evaluate them.

### **Knowledge deepening**

Students create extensive sensitivity analyses and scenarios based on their own case study in order to analyze and characterize the most important reduction potentials in an ecological sense.

Students create a criteria catalog for the improvement of ecological impact based on their own case study and therefore create a deeper understanding of focused assessment methods.

### **Application and Transfer**

Students will work in multi-disciplinary teams and will collect (if possible) primary data for their case studies

Within the module case study problems addressed to the students by the practice will be evaluated (it is also possible that the students also conduct their own case studies)

Therefore presentation and discussion techniques will be practiced

### **Academic Innovation**

Through case study work, existing data sets can be verified and expanded or new data sets can be empirically collected.

### **Communication and Cooperation**

Students will be able to identify and close their own knowledge gaps, critically reflect on their work results and approach.

The students will be empowered to communicate the module contents in appropriate technical language (in technical english), to transfer the application of the taught methods to the selected case studies.

Cooperative working will also be further practiced within the framework of the module.

Students will be able to independently coordinate their work and time allocation within the framework of the case study and bring it to a successful conclusion on their own responsibility.

Students present their results in a plenary session as part of peer feedback.

Students will present their case study results and there sensitivity analysis and improvement within workshops with practice (ideally).

### **Academic Self-Conception / Professionalism**

Students are empowered to research and prepare scientific facts and integrate them into their own case study work.

Further due to discussions with practice, the projects will interact with real modeling problems and further develop their case studies.

### **Literature**

- Hauschild et al. (2017): Life cycle Assessment: Theory and Practice. Springer. Berlin.
- Frischknecht (2020): Lebenszyklusanalyse. Springer Vieweg, Berlin, Heidelberg
- Ausberg, L. et al. (2015). Lebenszyklusanalysen. In: Kaltschmitt, M., Schebek, L. (eds) Umweltbewertung für Ingenieure. Springer Vieweg, Berlin, Heidelberg. [https://doi.org/10.1007/978-3-642-36989-6\\_5](https://doi.org/10.1007/978-3-642-36989-6_5). [https://link.springer.com/chapter/10.1007/978-3-642-36989-6\\_5](https://link.springer.com/chapter/10.1007/978-3-642-36989-6_5)

### **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)

### **People involved in the module**

#### **Person responsible for the module**

- Speck, Melanie

#### **Teachers**

- Speck, Melanie

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# MASTER THESIS (MLT)

## Master Thesis (MLT)

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0269 (Version 1) of 01.09.2025. Approval status: approved

<b>Module identifier</b>	44M0269
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	30.0
<b>Module frequency</b>	winter and summer term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

The Master's thesis concludes the degree program. By working independently on a scientific task and presenting the results in writing and orally, students demonstrate that they have achieved the educational objectives of the study program. To successfully complete the assignment students must apply the subject-specific and transdisciplinary learning outcomes they have acquired through the study program. Students demonstrate that they are able to apply their knowledge and understanding to a new unfamiliar problem, to develop solutions to problems within the framework of research or application-oriented projects and to represent them in professional discussions. In addition to completing the thesis, students attend a scientific colloquium to demonstrate their ability to engage in scientific discourse.

#### Teaching and learning outcomes

- Specification of the task, definition of the objective
- Creation of a project timeline
- Research to determine the state of the specialist discussion
- Systematic theory development, theory application, methodological knowledge and analysis of the historical situation
- Survey and evaluation of the situation on site
- Development of concepts and drafts to solve the task
- Evaluation of the concepts - detailing of the selected design or concept
- Presentation of the results in the Master's thesis
- Defense in a specialist discussion (colloquium open to the university public)

### Workload, teaching and learning methods

### Overall workload

The total workload for the module is 900 hours (see also "ECTS credit points and grading").

### Teaching and learning methods

#### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
10	Individual coaching		-
10	Seminar		-

#### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
845	Creation of examinations		-
35	Presentation preparation		-

### Requirements for the award of ECTS credit points

#### Graded examination

- Final Degree Thesis and Final Oral Examination

#### Ungraded exam

- Regular participation and Oral presentation, with written elaboration

#### Exam duration and scope

Length of the Master's thesis approx. 60-90 pages, depending on the subject.

### Requirements for participation

#### Recommended prior knowledge

Students who have passed the examinations of the first year of study and have acquired at least 60 credit points will be admitted to the Master's thesis. Students must apply for admission at the Registrar's Office.

Students should prepare themselves for the Master's thesis by choosing appropriate elective modules. We recommend that you discuss suitable module options with the lecturers who will later supervise your Master's thesis at an early stage.

### Competency-based learning outcomes

#### Knowledge Broadening

Students have a comprehensive understanding of the areas of knowledge relevant to the Master's thesis.

#### Knowledge deepening

Students have acquired a detailed and critical understanding of the theories, concepts and methods in the subject area defined by the assignment.

### **Knowledge Understanding**

Students demonstrate skills and creativity in using the methods relevant to the assignment. They can independently select suitable methods and approaches to work, question these critically, interpret and evaluate their results, present them clearly and professionally in writing and explain and defend them in a public university discussion.

### **Application and Transfer**

Students can integrate and transfer knowledge and deal with complexity. They can also make scientifically sound decisions on the basis of incomplete or limited information.

### **Academic Innovation**

Students can work independently to familiarize themselves with new subject areas and carry out independent research and application-oriented projects.

### **Communication and Cooperation**

Students can explain their ideas and findings clearly and communicate them to both experts and non-experts. When working on the task, they can establish contacts, negotiate and mediate between the demands of different interested parties.

### **Academic Self-Conception / Professionalism**

Students are able to develop and reflect on scientific tasks around the topic of sustainable land use, taking the relevant social and ethical aspects into account

## **Literature**

Relevant literature depends on the topic. Students are encouraged to make use of literature on scientific work and writing theses.

## **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)

## **People involved in the module**

### **Person responsible for the module**

- Long-Gräuler, Shelby Irene

### **Further lecturer(s)**

N.N. (Professur MLT)

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# NUTRITIONAL POVERTY AND NUTRITION SECURITY

## Nutritional Poverty and Nutrition Security

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0573 (Version 2) of 03.03.2026. Approval status: approved

<b>Module identifier</b>	44M0573
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only summer term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

Changes in society and climate lead to different forms of crises which negatively affect the food and nutrition system. This course specifically focuses on problems connected with progress towards the Sustainable Development Goals (SDGs) 1 and 2. The course explores the global and regional aspects of nutritional poverty as well as the status of nutrition and food security and discusses these from different perspectives.

#### Teaching and learning outcomes

- Specific aspects of global nutrition
- Definitions of poverty and especially nutrition poverty
- Model and theory of food and nutrition security
- Human right to food
- National and international actors
- Background and progress in reaching SDG 1 and 2
- global and regional development and progress
- influencing factors of reaching SDG 1 and 2

### Workload, teaching and learning methods

#### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

## Teaching and learning methods

### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
60	Seminar		-
15	Practice		-

### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
15	Preparation/follow-up for course work		-
20	Exam preparation		-
20	Study of literature		-
20	Work in small groups		-

## Requirements for the award of ECTS credit points

### Graded examination

- oral exam or
- Homework / Assignment

### Remark on the assessment methods

The standard form of examination is an oral exam. Any deviation from this will be announced in the first four weeks after the start of lectures.

### Exam duration and scope

Oral examination: ca. 20-30 minutes

## Requirements for participation

### Recommended prior knowledge

basic understanding of human nutrition

## Competency-based learning outcomes

### Knowledge Broadening

Students ...

- are able to describe theories and models of nutrition poverty as well as food and nutrition security.
- can identify the context between nutrition poverty, nutrition security and land use.

### **Knowledge deepening**

Students ...

- are able to describe potential solutions concerning social problems (e.g. population structure, migration), education and socio-economic structures leading to rising nutrition poverty.
- are able to reflect on availability, access, use and utilisation, and nutritional status as basics of the nutrition security.

### **Knowledge Understanding**

Students are able to contrast and compare different solutions for fighting nutritional poverty and achieving nutrition/ food security on regional, national and international levels.

### **Application and Transfer**

Students choose their own country examples for further research on specific problems concerning nutritional poverty and nutrition security and present their results.

### **Communication and Cooperation**

Students exchange their expertise and experience from different scientific fields and cooperate to identify driving problems of nutritional poverty and nutrition security and discuss solutions.

### **Academic Self-Conception / Professionalism**

Students develop a critical approach to scientific perspectives and a self-understanding of responsible cooperation and communication.

### **Literature**

Literature and lecture material will be provided during the course.

### **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)

### **People involved in the module**

#### **Person responsible for the module**

- Straka, Dorothee

#### **Teachers**

- Straka, Dorothee

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# PLANNING FOR SUSTAINABILITY IN LANDSCAPE ARCHITECTURE

## Planning for Sustainability in Landscape Architecture

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0574 (Version 1) of 24.02.2026. Approval status: approved

<b>Module identifier</b>	44M0574
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only summer term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

The design of livable environments, compact forms of settlement, innovative mobility models, public spaces for social interaction and the integration of extreme weather events are challenges faced worldwide. Complex strategies and creative solutions are necessary for a better mastery of local tasks in the future. In this module, we discuss approaches to the urban context ranging from the urban planning to the object planning scale and develop them using concrete planning tasks. The module emphasizes the integration of environmental, social and economic aspects of sustainability. Theoretical content is deepened and taught in a practical way through focused field trips and hands-on exercises. The module is aimed at students from various disciplines who are interested in the sustainable design of urban landscapes.

## Teaching and learning outcomes

The module provides detailed knowledge and practical experience in specific areas of sustainable landscape architecture and urban planning. The focus is on the intensive study of individual practice-relevant topics in an urban context, such as

- Adaptation to climate change (green-blue infrastructure, stormwater management)
- Promoting biodiversity (greening of buildings, biotope connectivity)
- Promoting social diversity, quality of life and quality of place
- health-promoting mobility concepts,
- resource-conserving choice of materials (cradle to cradle)
- cost-effective construction and renewable energy generation,
- Resilience and adaptability of urban spaces.

Field trips to best-practice projects and interviews with experts will deepen the theoretical content and make it tangible. The results of the research will then either be implemented in design concepts with a regional context, compiled in a documentation and/or exhibition, or discussed in depth in a specialist conference.

The module promotes interdisciplinary work and the development of sustainable planning strategies with a focus on urban spaces. The critical analysis of real projects and a conscious look outside the box to other disciplines promotes the development of integrative solutions.

Contents of the module:

1. introduction to sustainability
2. challenges and opportunities of sustainability in urban areas
3. focus on a key issue
4. field trips and expert discussions
- 5a. Development of own sustainable designs
- 5b. Documentation / Exhibition
- 5c. Professional conference

## Workload, teaching and learning methods

### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

### Teaching and learning methods

#### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
25	Seminar		-
5	Excursion		-

#### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
60	Work in small groups		-
60	Reception of other media or sources		-

## Requirements for the award of ECTS credit points

### Graded examination

- Project Report, written

### Ungraded exam

- Regular participation

### Exam duration and scope

written project report: ca. 15-20 pages (A4) Text, excluding pictures, plans, etc. and appendix or 2 posters in an exhibition

## Requirements for participation

### Recommended prior knowledge

Basic knowledge of architecture, landscape architecture and urban planning

Basic knowledge of graphics programs (Adobe, Affinity, etc.)

## Competency-based learning outcomes

### Knowledge Broadening

Students can define sustainability in the context of urban areas, outline the related challenges and opportunities and illustrate these with help of real-world examples.

### Knowledge deepening

Students can discuss various facets of planning for sustainability in urban contexts, including their interrelation and areas of overlap.

### Knowledge Understanding

Students can critically discuss the challenges and opportunities of design approaches to sustainability in a given case study.

### Application and Transfer

Students can apply their acquired knowledge on sustainability in planning and specific best practice cases to independently develop their own sustainable designs for a given case.

### Academic Innovation

Students independently develop their own sustainable designs.

### Communication and Cooperation

Students are able to present their own designs at a student exhibition. They can critically discuss sustainability in planning in terms of specific cases studies and proposed design solutions both with their peers and with experts from the field.

### **Academic Self-Conception / Professionalism**

Students are able to critically reflect on the sustainable design of urban contexts based on their theoretical and methodological knowledge. They act responsibly and consider environmental, social and economic aspects of sustainability in their professional decisions.

### **Literature**

The required literature will be introduced during the lecture.

### **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)

### **People involved in the module**

#### **Person responsible for the module**

- Junker, Dirk

#### **Teachers**

- Zimmermann, Astrid
- Junker, Dirk

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# PROJECT ABROAD

## Project Abroad

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0575 (Version 1) of 01.09.2025. Approval status: approved

<b>Module identifier</b>	44M0575
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	winter and summer term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Special features of the module

In their third semester of the Master Land Use Transformation, students have the option of completing a study semester at an accredited university abroad. The module "Project Abroad" (5 CP) is required as a complement to "Semester Abroad".

### Module contents

#### Brief description

This module accompanies the semester abroad and serves as the basis for independently developing and examining a complex research question with reference to the specific cultural and/or geographic context of the host country.

#### Teaching and learning outcomes

1. Professional and organizational preparation phase:

- determining of the focus of interest
- defining the individual project according to the learning objectives in cooperation with the module supervisor at Osnabrück University of Applied Science
- planing the independent work in light of the workload of the accompanying semester abroad coursework

2. Research phase:

- processing the specific research or project task,
- critically reflecting the applied methods and work steps or phases of work in light of the relevant literature

3. Reporting Phase:

- preparing and presenting the project results in the form of a written project report
- reflecting on professional and personal experiences in the written report

### Workload, teaching and learning methods

### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

### Teaching and learning methods

#### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
5	Individual coaching		-

#### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
50	Creation of examinations		-
30	Study of literature		-
65	Other		Project Task

### Further explanations

The student and module supervisor define the details of the project task on a case-by-case basis, according to the individual project focus.

### Requirements for the award of ECTS credit points

#### Graded examination

- Project Report, written or
- Project Report, medial or
- Project Report, oral

#### Remark on the assessment methods

The standard form of examination is a written project report. Deviations from this can be agreed upon between the student and module supervisor.

#### Exam duration and scope

The student and module supervisor define the required components of the written project report on a case-by-case basis, according to the individual project focus. Normally this comprises ca. 12-18 pages, excluding any appendix.

### Requirements for participation

#### Recommended prior knowledge

Successful completion of the first two semesters of the Masters program Land Use Transformation.

### Competency-based learning outcomes

#### Knowledge Broadening

In addition to demonstrating specialist knowledge of objectives and facts related to their project topic in the field of land use transformation, students can outline the technical, organizational and communicative requirements involved in completing an independent project task.

### **Knowledge deepening**

Students can integrate new subject-related knowledge generated through their project with their prior knowledge in the field of land use transformation. They can assess potential impacts of the cultural context of study. They can describe their methods and discuss the relative merits of potential methodological approaches to their topic.

### **Knowledge Understanding**

Through the project abroad, students generate potential research questions and hypotheses and operationalize their knowledge of facts and methods to complete an independent research or project task. They also critically reflect on their methods and results.

### **Application and Transfer**

In the course of completing their project task, students apply the practical self-management and project-organizational skills and specialist knowledge acquired in their study program to the project abroad and can critically reflect their use of knowledge and skills across cultural and institutional contexts.

### **Academic Innovation**

Students can develop unique research questions and independently complete project tasks. They can successfully plan and execute project processes.

### **Communication and Cooperation**

Students can communicate with an expert audience about their subject matter using the technical language and taking cultural contexts into account.

### **Academic Self-Conception / Professionalism**

Students can evaluate their personal strengths and challenges and conceptualize their potential role as a member of the global community of researchers and practitioners collectively working on the challenges of land use.

## **Literature**

Students will seek applicable literature for their specific project topic.

## **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)

## **People involved in the module**

### **Person responsible for the module**

- Long-Gräuler, Shelby Irene

### **Further lecturer(s)**

N.N. (Professur MLT)

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# RESPONSIVE VIRTUAL SPACES

## Responsive Virtual Spaces

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0576 (Version 1) of 22.08.2025. Approval status: approved

<b>Module identifier</b>	44M0576
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only summer term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

Responsive Virtual Spaces or Landscapes deal with the idea that landscapes and environmental structures can react flexibly to changes in their surroundings or to interactions. The module conveys the theoretical and conceptual foundations and also deals with the concrete operationalization using a case study.

#### Teaching and learning outcomes

Introduction to the concept of responsive landscapes, including historical development, theoretical foundations and highly topical discourses in the field of landscape architecture and digital design.

In-depth exploration of the technologies behind responsive and virtual landscapes, including sensor technology, data analysis, 3D modeling, augmented reality (AR) and virtual reality (VR).

Approaches to designing and planning landscapes that can respond to changes in their environment or to user interactions. This includes topics such as adaptive landscape elements, interactive ecosystems and the use of simulations in planning.

The role of responsive landscapes in promoting sustainability and adapting to climate change. This includes the integration of natural processes and cycles into design strategies.

Analysis and discussion of real projects and case studies that demonstrate responsive approaches to landscape design.

### Workload, teaching and learning methods

## Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

## Teaching and learning methods

### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
15	Lecture		-
15	Seminar		-

### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
70	Work in small groups		-
50	Creation of examinations		-

## Requirements for the award of ECTS credit points

### Graded examination

- Project Report, medial

### Exam duration and scope

Project report in media: ca. 30-minute presentation using at least two different media

## Requirements for participation

### Recommended prior knowledge

Previous knowledge of CAD, BIM, especially Rhino, Grasshopper, etc.

## Competency-based learning outcomes

### Knowledge Broadening

Students are enabled to reflect on the technical context and to use and combine specific IT applications in a targeted manner.

### Knowledge deepening

Students learn to use familiar software for extended application purposes. In addition to the familiar design methods, this includes the use of scenarios, sensor technology and the resulting developments and changes within the virtual landscapes.

### Knowledge Understanding

Students understand how to identify the planning-relevant parameters of virtual landscapes, implement them in models and use them to support decision-making.

### Application and Transfer

Students are able to communicate the basic ideas of modeling and its results to those involved in the planning and development process and to incorporate the model results into implementation processes.

### **Academic Innovation**

The implementation of responsive landscapes using existing modular software is one of the current fields of research in applied geoinformatics and transformation sciences. Dealing with this enables students to apply these current developments themselves and to contribute to their further development.

### **Communication and Cooperation**

Students are able to communicate the basic ideas of modeling and its results to those involved in the planning and development process and to incorporate the model results into implementation processes.

### **Literature**

follows later

### **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)

### **People involved in the module**

#### **Person responsible for the module**

- Taeger, Stefan

#### **Further lecturer(s)**

NN Lehrauftrag

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# RESTORATION ECOLOGY

## Restoration Ecology

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0207 (Version 1) of 24.06.2025. Approval status: approved

<b>Module identifier</b>	44M0207
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only winter term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

Worldwide, many landscapes have been degraded or destroyed by intensive anthropogenic land use, pollution or environmental hazards. Restoration ecology develops methods and measures for the ecological restoration of natural and semi-natural ecosystems in natural and cultural landscapes. This includes the optimization of environmental conditions (e.g. soil conditions, water balance, land use, management) and the re-introduction of habitat-specific plant and animal species and biocoenoses. During the planning and implementation of restoration projects all relevant stakeholders have to be involved.

#### Teaching and learning outcomes

1. Introduction to restoration ecology: history, terms and definitions, restoration goals
2. Measures for the optimization of water dynamics and soil conditions during ecological restoration
3. Introduction of target species and management optimization on restoration sites
4. Concepts for the planning and implementation of restoration projects
5. Examples for the ecological restoration of different ecosystem types

### Workload, teaching and learning methods

#### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

## Teaching and learning methods

### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
6	Lecture	Presence	-
10	Seminar	Presence	-
14	Practice	Presence	-

### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
30	Study of literature		-
30	Presentation preparation		-
10	Preparation/follow-up for course work		-
50	Creation of examinations		-

## Requirements for the award of ECTS credit points

### Graded examination

- Oral presentation, with written elaboration or
- Homework / Assignment or
- oral exam

### Remark on the assessment methods

Standard examination: Scientific talk (20-30 Min) with 5-10 pages written analysis.

Alternative examination type can be selected by the examiner and be announced at the start of the course.

### Exam duration and scope

ca. 20–30 minutes scientific talk with 5–10 pages written analysis

## Requirements for participation

### Recommended prior knowledge

Basic knowledge in soil science, hydrology, vegetation ecology and landscape ecology.

## Competency-based learning outcomes

### Knowledge Broadening

Students, who have completed the module successfully, know the ethical and societal foundations of restoration ecology. They have a fundamental understanding of the ecological processes and relationships relevant for successful ecological restoration. They are familiar with restoration strategies for different ecosystem types in natural and cultural landscapes.

### **Knowledge deepening**

The students are able to formulate goals for restoration practice based on ethical, societal and ecological considerations. They are able to explain different restoration strategies and to critically reflect on their suitability for achieving specific restoration goals. They are able to compare effects of different restoration measures on abiotic and biotic ecosystem components and processes.

### **Knowledge Understanding**

They can detect interdependencies between biotic and abiotic environmental factors in restoration projects and evaluate their effects on restoration success. They are able to assess the prospects for successful restoration according to the initial societal and environmental conditions.

### **Application and Transfer**

They can select suitable measures for the optimization of the hydrological and soil conditions of restoration sites and evaluate their effects. They are familiar with the advantages and disadvantages of different measures for species introduction and can recommend suitable practicable measures according to the starting conditions at the restoration site.

### **Academic Innovation**

The students are able to develop restoration concepts based on current scientific literature and to select suitable restoration measures for restoration projects in relation to the respective context. They are able to plan and justify the implementation of the selected restoration measures as well as measures for monitoring and controlling restoration success.

### **Communication and Cooperation**

The students are able to present restoration concepts, the effects of restoration measures and the results of restoration projects and reflect them critically in scientific discussions. They can communicate successfully with members of organizations in the field and relevant stakeholder groups.

### **Academic Self-Conception / Professionalism**

Through extensive review of scientific literature and discussions during the course, the students gain an overview of the state of the art in the ecological restoration of different ecosystem types. With their systemic understanding, students are able to plan restoration projects and develop concepts for implementation. They are enabled to develop and justify professional operations with theoretical and methodological knowledge.

## **Literature**

Gann G. D., McDonald T., Walder B., Aronson J., Nelson C. R., Jonson J., Hallett J. G., Eisenberg C., Guariguata M. R., Liu J., Hua F., Echeverria C., Gonzales E. K., Shaw N., Decler K., Dixon K. W. (2019): International principles and standards for the practice of ecological restoration. Second edition. *Restoration Ecology* 27: S1-S46.

Palmer M. A., Zedler J. B., Falk D. A. (2016) *Foundations of Restoration Ecology*. 2. Edition. Island Press, Washington.

Society for Ecological Restoration International (SER) Science & Policy Working Group (2004). *The SER International Primer on Ecological Restoration*. Tucson, Arizona

Van Andel, J. & Aronson, J. (2012): *Restoration Ecology - The new Frontier*. Wiley-Blackwell, Oxford.

## Applicability in study programs

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)
- Landscape Architecture
  - Landscape Architecture M.Eng. (01.09.2025)

## People involved in the module

### Person responsible for the module

- Kiehl, Kathrin

### Teachers

- Kiehl, Kathrin

### Further lecturer(s)

N. N.

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# RISK AND CRISIS MANAGEMENT IN FOOD SECURITY

## Risk and Crisis Management in Food Security

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0577 (Version 1) of 16.07.2025. Approval status: approved

<b>Module identifier</b>	44M0577
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only summer term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

In this module, students gain an overview of activities in the area of food security. They understand the importance of crisis and risk management and the positive influence of a functioning crisis and risk management system on food security in the supply chain.

#### Teaching and learning outcomes

Food security is a key issue in society and can be negatively affected by various influences. In order to minimize these negative influences, businesses and agricultural enterprises require successful risk and crisis management. This module addresses

1. topics relating to food security
2. potential risks and crises
3. the influence of food quality on the supply chain
4. the impact of risks and crises on the supply chain, society and the environment
5. risk and crisis management - methods, analyses and optimization potentials

### Workload, teaching and learning methods

#### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

## Teaching and learning methods

### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
30	Lecture		-
20	Learning in groups / Coaching of groups		-
10	Practice		-

### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
30	Study of literature		-
30	Preparation/follow-up for course work		-
30	seminar paper		-

## Requirements for the award of ECTS credit points

### Graded examination

- Written examination or
- oral exam

### Remark on the assessment methods

The standard examination form is a two-hour written exam; deviations from this will be announced in the first four weeks after the start of lectures.

### Exam duration and scope

The standard examination form is a two-hour written exam.

## Requirements for participation

### Recommended prior knowledge

Basic knowledge of the subject is helpful but not required.

## Competency-based learning outcomes

### Knowledge Broadening

Students gain an overview of activities in the area of food security. The knowledge gained can form the basis of a master thesis and new studies can be developed.

### Knowledge deepening

Practical case studies facilitate deepening the knowledge acquired. Students also work on their own case studies and identify potential risks and crises within those supply chains.

### **Application and Transfer**

The knowledge imparted in this module is applied in case studies. By analyzing existing crisis and risk management systems in companies, students filter out positive and negative points and identify any potential for improvement.

### **Communication and Cooperation**

Communication is a decisive factor in the case of risk and crisis management and should be carried out professionally. Students will learn how to communicate crisis and risk management and which media to use. They assess and analyze the effectiveness of different forms of communication.

### **Literature**

The required literature will be introduced during the lecture.

### **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)

### **People involved in the module**

#### **Person responsible for the module**

- Krieger-Güss, Stephanie

#### **Teachers**

- Krieger-Güss, Stephanie

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# SCIENTIFIC WORK

## Scientific Work

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0159 (Version 1) of 01.09.2025. Approval status: approved

<b>Module identifier</b>	44M0159
<b>Module level</b>	Master
<b>Language of instruction</b>	English, German
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only winter term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Special features of the module

The module is taught primarily in English. Special language-dependent topics such as academic writing and research funding are offered in English and German.

### Module contents

#### Brief description

The module prepares students to work and publish scientifically on the basis of 7 workshops. In the action-oriented workshops, the question of what science is and what criteria science has to fulfill is explored. Methods for realisation of science were discussed and trained. We also discuss and practise how science communicates to the outside world. The workshops focus on scientific aspects as well as planning and social science aspects. All module workshops will be held in English. Two language-oriented workshops are also offered in German.

## Teaching and learning outcomes

Workshops:

1. what is science and how do we put it into practice?
2. creation of posters
3. graphic and tabular presentation of research results
4. publication and scientific career
- 5a. Scientific writing (English)
- 5b. Scientific writing (German)
6. poster presentation and short presentations
- 7a. Research proposals and research funding (in English)
- 7b. Research proposals and research funding (D, EU, in German)

## Workload, teaching and learning methods

### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

### Teaching and learning methods

#### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
30	Lecture	Presence	-
20	Seminar	Presence	-
30	Practice	Presence	-

#### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
40	Creation of examinations		-
30	Exam preparation		-

## Requirements for the award of ECTS credit points

### Graded examination

- Presentation and Written examination

### Remark on the assessment methods

Poster presentation (50 %) +2 hour written examination. Two examiners will evaluate students within both examination forms.

The examinations are held in English.

**Exam duration and scope**

Poster presentation 10-20 minutes + two-hour written examination

**Requirements for participation****Recommended prior knowledge**

English language skills (good school level) spoken and written

If these skills are completely lacking, a language course must be taken at our university

**Competency-based learning outcomes****Knowledge Broadening**

In this module, students learn the basics of scientific work. To this end, various workshops are held in different subject areas. In joint poster presentations, they will also learn about connections from areas of knowledge that were previously not directly known to them.

**Knowledge deepening**

In this module, students learn specifically how to formulate a scientific topic from a research question, how it can be dealt with in concrete terms and what possibilities exist for making the new knowledge available to the public and the scientific community.

**Knowledge Understanding**

Students acquire the following skills:

1. methods for scientific data collection, experiment execution, project realization
2. methods for the presentation of scientific data, results and projects
3. methods for planning and structuring research projects and research proposals

**Application and Transfer**

The knowledge and skills acquired are used directly in projects and Master's theses of the respective degree program. Likewise, the methods and skills learned are of great importance in later professional life, especially in the scientific sector. In addition, the output of the module serves to better evaluate and assess the scientific nature of studies, data sources etc. in general.

**Academic Innovation**

By attending the module, students are trained to be able to decide more objectively which information, news and products are scientific innovations and which are not. They are also able to review and evaluate articles, projects, etc. and thus perform activities in the scientific community and innovation business.

**Communication and Cooperation**

The module trains students to be able to participate in scientific communication and discussion in their area of specialization in words, texts and images in English.

## **Academic Self-Conception / Professionalism**

- By confidently dealing with English-language bio sensor literature, English presentations and discussions, students gain professionalism and scientific self-confidence. They learn and practise communication in a foreign language at a scientific level. This enables them to give presentations at international conferences with confidence and self-assurance.

## **Literature**

Workshop-spezifische Umdrucke, Aufgabenstellungen und aktuelle Literaturlisten

Workshop-specific reprints, tasks and current literature lists

## **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)
- Applied Livestock Sciences
  - Applied Livestock Sciences M.Sc. (01.09.2025)
- Applied Plant Sciences M.Sc. (01.09.2025)
  - Applied Plant Sciences M.Sc. (01.09.2025)

## **People involved in the module**

### **Person responsible for the module**

- Rath, Thomas

### **Teachers**

- Rath, Thomas
- Dierend, Werner
- Kussin, Matthias
- Waßmuth, Ralf
- Naz, Ali Ahmad

### **Further lecturer(s)**

N.N. Professur MLT

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# SEMESTER ABROAD

## Semester Abroad

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0578 (Version 1) of 31.08.2025. Approval status: approved

<b>Module identifier</b>	44M0578
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	25.0
<b>Module frequency</b>	winter and summer term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Special features of the module

In their third semester of the Master Land Use Transformation, students have the option of completing a semester at an accredited university abroad. Modules completed abroad are compiled and recognized together under the module "Semester Abroad". The module "Project Abroad" (5 CP) is required as a complement to "Semester Abroad".

### Module contents

#### Brief description

During the semester abroad, students can complete Master level modules totaling 25 credit points (CP) at an accredited university abroad.

#### Teaching and learning outcomes

Students choose modules complementing the curriculum of the degree program Land Use Transformation according to the offerings of the university abroad.

The chosen modules are outlined prior to the start of the semester in the learning agreement, which must be updated with any changes within the first four weeks of lectures.

### Workload, teaching and learning methods

#### Overall workload

The total workload for the module is 750 hours (see also "ECTS credit points and grading").

## Teaching and learning methods

### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
0	Other	Presence or online	Modules at university abroad

### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
750	Other		Modules at university abroad

### Further explanations

Teaching and learning methods vary according to the chosen modules and requirements of the university abroad.

## Requirements for the award of ECTS credit points

### Remark on the assessment methods

Examination forms vary according to the chosen modules and requirements of the university abroad.

Information on the conversion of grades can be found in the official guideline of Osnabrück University of Applied Sciences (Point 4.3. in Leitlinie zur Umsetzung § 11 ATPO).

## Requirements for participation

### Recommended prior knowledge

Successful completion of the first two semesters of the Masters program Land Use Transformation.

## Competency-based learning outcomes

### Knowledge Broadening

After studying for a semester at a university abroad, students demonstrate new specialist knowledge of objectives and facts related to the field of land use transformation.

### Knowledge deepening

Students can draw connections between their new subject-related knowledge gained through their semester abroad and their prior knowledge in the field of land use transformation. They can compare and contrast their study experiences in different cultural and institutional contexts.

### Knowledge Understanding

Through the semester abroad, students can critically reflect on how approaches to knowledge and subject matter vary according to the cultural context of study. They can synthesize their learning outcomes in preparation for their masters thesis.

### Application and Transfer

Students apply the practical self-management and project-organizational skills in coordinating and completing the semester abroad. They can critically evaluate the specialist knowledge acquired in the course of their study abroad, as well as their use of knowledge and skills across cultural and institutional contexts.

### **Communication and Cooperation**

Students can communicate with an expert audience about their subject matter using the technical language, in speech and writing, taking cultural contexts into account.

### **Academic Self-Conception / Professionalism**

Students can evaluate their personal strengths, challenges and areas of expertise. They can imagine their potential role as a member of the global community of researchers and practitioners collectively working on the challenges of land use.

### **Literature**

as assigned in the chosen modules abroad

### **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)

### **People involved in the module**

#### **Person responsible for the module**

- Long-Gräuler, Shelby Irene

#### **Teachers**

- Schultz, Henrik

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# SOILS FOR CLIMATE CHANGE MITIGATION AND ADAPTATION

## Soils for Climate Change Mitigation and Adaptation

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0527 (Version 1) of 26.02.2026. Approval status: approved

<b>Module identifier</b>	44M0527
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only winter term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

Soils play an important role in climate change mitigation strategies. Their potential to act as a sink or source of carbon dioxide emissions is explored in this course, as are options for mitigating nitrous oxide emissions from soils. At the same time, adapting to climate change by increasing the resilience of soils is important for sustainable high-yield crop production. Students learn to understand the fluxes of climate relevant elements and the structuring processes in soils, and they practise applying methods for evaluating the ecosystem services of soils.

#### Teaching and learning outcomes

- 1 Climate change mitigation through soils
  - 1.1 Carbon dioxide fluxes from soils and carbon sequestration potential
  - 1.2 Nitrous oxide emissions from soils and mitigation options
- 2 Climate change adaptation through soils
  - 2.1 Improvement of water storage and movement in soils
  - 2.2 Enhancement of soil resilience through improvement of soil structure
- 3 Methods for evaluating soil services
  - 3.1 Analysis of carbon storage and fluxes
  - 3.2 Analysis of soil structure

### Workload, teaching and learning methods

## Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

## Teaching and learning methods

### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
30	Seminar		-
10	Practice		-

### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
40	Presentation preparation		-
40	Preparation/follow-up for course work		-
30	Exam preparation		-

## Requirements for the award of ECTS credit points

### Graded examination

- Portfolio exam or
- Field work / Experimental work or
- Homework / Assignment

### Remark on the assessment methods

The standard examination form is a portfolio with presentation/report and an oral examination (max. 50 points + max. 50 points); deviations from this will be announced in the first four weeks after the start of lectures.

### Exam duration and scope

presentation/report: ca. 20-30-minutes presentation with 5–10-pages written summary + oral examination  
ca. 20-30 minutes per student

alternative:

term paper, 15-20 pages

experimental work: 2-4 week of experimental analysis with 10 pages of written summary

## Requirements for participation

### Recommended prior knowledge

Basic knowledge in soil science is recommended.

For independent study of basics in soil science the following literature is helpful:

Weil, R. R. and Brady, N. C. (2016): The nature and properties of soils - global edition. Pearson International, p. 1104, ISBN 978-1292162232.

## Competency-based learning outcomes

### Knowledge Broadening

Students understand the relationship between soil and atmosphere and can identify important factors of soil management on climate change. They can describe measures that lead to an increase in the resilience of soils and thus ensure sustainable crop production.

### Knowledge deepening

Students can argue, according to the specific situation, which management measures are suitable for achieving climate protection goals and increasing the resilience of soils.

### Application and Transfer

Students can develop suitable concepts for climate-friendly soil management and assess their climate protection effect. They can adapt crop production systems to ensure the sustainable yield capacity of soils in light of climate change. They can determine and evaluate selected laboratory parameters to describe the climate protection effect and the resilience of soils.

### Communication and Cooperation

Students can present concepts for climate-friendly and climate-adapted land use on a scientific basis and discuss them with experts.

### Academic Self-Conception / Professionalism

Students are able to critically reflect on the design of adapted soil management systems based on their theoretical and methodological knowledge. They act responsibly and consider societal expectations and necessities for climate protection in their professional decisions.

## Literature

Paul, E. (Ed.). (2014): Soil microbiology, ecology and biochemistry. London: Academic press.

Articles of scientific journals.

## Applicability in study programs

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)
- Applied Plant Sciences M.Sc. (01.09.2025)
  - Applied Plant Sciences M.Sc. (01.09.2025)

## People involved in the module

### Person responsible for the module

- Deiglmayr, Kathrin

### Teachers

- Deiglmayr, Kathrin

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# SUSTAINABILITY IN PROCESS MANAGEMENT AND OPTIMIZATION

## Sustainability in Process Management and Optimization

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0579 (Version 1) of 16.07.2025. Approval status: approved

<b>Module identifier</b>	44M0579
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only summer term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

This module explores optimization of processes and the corresponding supportive tools. Aspects of sustainable processes in the food industry are in specific focus. Students are presented with tools for optimisation and apply them to practical case studies. Using digital systems, students develop and analyze processes, as well as different possibilities for their visualisation. They also calculate the benefit of a process optimization for the environment, society and supply chain.

#### Teaching and learning outcomes

The module explores the following themes:

1. The visualisation of processes - which tools are helpful?
2. Aspects of sustainable processes - which aspects are have to be considered and analysed when shaping sustainable processes?
3. Optimization of processes - which tool can be used to optimize for efficient processes?
4. Benefits of optimized processes - which benefits do optimized processes hold (for the environment, society, supply-chain etc.)?
5. Change Management - how can changes be communicated, implemented and deemed successful?

### Workload, teaching and learning methods

## Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

## Teaching and learning methods

### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
30	Lecture		-
30	Practice		-

### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
60	Work in small groups		-
30	Presentation preparation		-

## Requirements for the award of ECTS credit points

### Graded examination

- Portfolio exam

### Remark on the assessment methods

The portfolio is a presentation/report and term paper

### Exam duration and scope

presentation/report: ca. 20-30-minute presentation with 5–10-page written analysis (max. 50 points)  
and a term paper, ca. 10-15 pages (max. 50 points)

## Requirements for participation

### Recommended prior knowledge

Basic knowledge of the subject is helpful but not required.

## Competency-based learning outcomes

### Knowledge Broadening

The students can

- develop sustainable processes
- apply the right tools for the case in question
- evaluate the impact of processes on the environment, society and supply chain

### Knowledge deepening

The student deepen their knowledge through the case studies and practical examples explored in the module.

### Knowledge Understanding

The students demonstrate their grasp of the relevant knowledge through their work on case studies.

### **Application and Transfer**

Students can transfer their knowledge by integrating it in practical examples. They can also draw on this knowledge as the basis for their Master's thesis.

### **Communication and Cooperation**

The students

- can effectively explain process changes within an organisation
- can effectively communicate within case studies and practical projects.

### **Literature**

as specified by the lecturer

### **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)

### **People involved in the module**

#### **Person responsible for the module**

- Krieger-Güss, Stephanie

#### **Teachers**

- Krieger-Güss, Stephanie

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# SUSTAINABLE CROP PRODUCTION

## Sustainable Crop Production

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0528 (Version 1) of 31.08.2025. Approval status: approved

<b>Module identifier</b>	44M0528
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only winter term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

Based on case studies, students develop competences for the sustainable design of crop production practices and cultivation systems. Topics such as crop rotation, soil tillage with a special focus on conservation agriculture in a global context, organic crop production or agroforestry systems will be examined and evaluated with regard to their contribution to sustainability goals.

#### Teaching and learning outcomes

The teaching and learning content of the new module will be added as soon as the professorship "Sustainable Crop Production Systems" is filled.

### Workload, teaching and learning methods

#### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

## Teaching and learning methods

### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
30	Seminar		-
10	Excursion		-
5	Learning in groups / Coaching of groups		-

### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
45	Presentation preparation		-
30	Preparation/follow-up for course work		-
30	Exam preparation		-

## Requirements for the award of ECTS credit points

### Graded examination

- Portfolio exam or
- Homework / Assignment

### Remark on the assessment methods

The standard examination form is a portfolio of a presentation/report and an oral examination (max. 50 points + max. 50 points); deviations from this will be announced in the first four weeks after the start of lectures.

### Exam duration and scope

presentation/report: ca. 20-30-minute presentation with 5–10-page written analysis + oral examination ca. 20-30 minutes per student

## Requirements for participation

### Recommended prior knowledge

The module assumes basic knowledge of agricultural crop production and its environmental impacts.

## Competency-based learning outcomes

### Knowledge Broadening

Students learn about sustainable crop production practices and their impact on climate change mitigation, biodiversity and nutrition security.

### Knowledge deepening

Students can evaluate the sustainability of crop production practices based on the methods used. They can assess different methods in terms of their sustainability and evaluate optimization possibilities.

### **Knowledge Understanding**

Students can apply crop production practices and assess their impact. They are able to discuss cultivation practices from a sustainability perspective and argue for possible alternative courses of action.

### **Application and Transfer**

Students can evaluate various methods of sustainable crop production and optimize cultivation programs. The genetic resources of crop plants are also a focus here.

### **Academic Innovation**

Students can further develop aspects of sustainable crop production using modern methods. Students can formulate hypotheses on new forms of cultivation from a sustainability perspective and collect data on them.

### **Communication and Cooperation**

Students can explain sustainable cultivation systems and can use technically and ethically correct terminology. The practical orientation of the module provides a good basis for practical cooperation.

### **Academic Self-Conception / Professionalism**

Students can recognize the potential of modern systems of sustainable crop production. They can review their decisions professionally. They are able to scrutinize and critically reflect on cultivation concepts from a sustainability perspective.

## **Literature**

Publications from scientific journals selected depending on the case studies.

## **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)
- Applied Plant Sciences M.Sc. (01.09.2025)
  - Applied Plant Sciences M.Sc. (01.09.2025)

## **People involved in the module**

### **Person responsible for the module**

- Westerschulte, Matthias

### **Teachers**

- Westerschulte, Matthias

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# SUSTAINABLE LAND USE AND LANDSCAPE TRANSFORMATION

## Sustainable Land Use and Landscape Transformation

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0580 (Version 1) of 21.04.2026. Approval status: approved

<b>Module identifier</b>	44M0580
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only summer term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

This module teaches the basics of sustainable land use and facilitates a constructive discourse on intelligent ways to shape landscape change.

## Teaching and learning outcomes

This module is dedicated to

Basic research on:

- the drivers of landscape change, especially climate change and the loss of species/biodiversity
- competition for land from renewable energies, agriculture, nature conservation, settlements and industry, infrastructure in the areas of transport, networks, etc.
- impacts on land and soil, landscape, biodiversity, water balance, population and human health.

Discussion of planning strategies, such as:

- resilient, balanced utilization concepts,
- process-based cultural landscape development,
- climate adaptation concepts, including sponge landscapes,
- energy landscapes, including post-mining landscapes and agrivoltaics,
- sustainable forestry as a nucleus of sustainability and, in times of climate change, an increasingly convincing approach to sustainable land use, including for the provision of sustainable building materials (life cycle assessment).
- biosphere reserves as "real laboratories"

Reflection on:

- the role of landscape planning,
- the concept of ecosystem services,
- the role of human behavior change
- impact assessments

## Workload, teaching and learning methods

### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

### Teaching and learning methods

#### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
30	Seminar		-

#### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
50	Presentation preparation		-
30	Preparation/follow-up for course work		-
40	Creation of examinations		-

## Requirements for the award of ECTS credit points

## Graded examination

- Homework / Assignment or
- Oral presentation, with written elaboration or
- oral exam

## Remark on the assessment methods

The standard form of examination is a term paper (Hausarbeit). Alternative examination forms can be selected by the examiner and announced within four weeks from the start of lectures.

## Exam duration and scope

The standard form of examination is a term paper (Hausarbeit): ca. 10-15 pages

## Requirements for participation

### Recommended prior knowledge

none

## Competency-based learning outcomes

### Knowledge Broadening

Students expand their knowledge of facts and objectives regarding factors influencing sustainable landscape development. They generate instrumental knowledge about planning strategies.

### Knowledge deepening

Students deepen their understanding of the drivers and conditions of landscape change and how planning can influence its sustainable design.

### Knowledge Understanding

In addition to knowledge of objectives and facts, students also acquire instrumental transformation knowledge regarding the complex processes of sustainable landscape development.

### Application and Transfer

Students develop a planning-analytical understanding of how to deal with complex processes of landscape change and reflect on their findings in the context of planning strategies - using example projects, for instance.

### Academic Innovation

Students develop research questions and learn to understand and plan processes of sustainable land use and landscape change through research-based learning.

### Communication and Cooperation

Students learn how to communicate processes and planning strategies in text, images and conversation. They develop their own approaches to applying communication methods.

### Academic Self-Conception / Professionalism

Students reflect on opportunities and limiting factors in the professional and transdisciplinary shaping of landscape change. They understand the variety of possibilities for shaping their professional self-image at occupational interfaces.

## Literature

according to list provided by lecturer

## Applicability in study programs

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)

## People involved in the module

### Person responsible for the module

- Schultz, Henrik

### Teachers

- Schultz, Henrik

### Further lecturer(s)

N.N. Professur MLT

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# SUSTAINABLE LIVESTOCK FARMING

## Sustainable Livestock Farming

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0524 (Version 2) of 20.04.2026. Approval status: approved

<b>Module identifier</b>	44M0524
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only summer term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Special features of the module

Lectures will be held in English. If all students speak German as their native language, lectures will be held in German, with english course material.

### Module contents

#### Brief description

Sustainable livestock farming is an integrated approach that aims to meet the present needs of livestock farmers without compromising the ability of future generations to meet their needs. This involves minimising environmental impact and promoting animal welfare while optimising the use of resources.

The module provides an integrative understanding of sustainable livestock farming, taking into account ecological, economic, social, and ethical dimensions. Students learn to critically analyze existing production systems and to evaluate sustainable solutions on a scientific basis.

#### Teaching and learning outcomes

- Basic principles of sustainable livestock farming
- International concepts and frameworks
- The environmental impact of livestock farming and key sustainability indicators
- Animal welfare and animal health as a sustainability dimension
- Methods of sustainability assessment (e.g. LCA)
- Sustainability measures, their trade-offs and synergies

### Workload, teaching and learning methods

### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

### Teaching and learning methods

#### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
10	Lecture		-
10	Seminar		-
5	Practice		-
5	Excursion		-

#### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
30	Exam preparation		-
30	Preparation/follow-up for course work		-
30	Presentation preparation		-
30	Study of literature		-

### Requirements for the award of ECTS credit points

#### Graded examination

- oral exam or
- Written examination

#### Remark on the assessment methods

The standard examination form is an oral exam. Alternatively, a written exam may be chosen by the lecturers; the exam type will be defined upon the start of lectures.

The oral examination will be carried out by two examiners per student.

#### Exam duration and scope

ca. 20-30-minute oral examination (standard) or a 2 hour written exam (alternative)

### Requirements for participation

#### Recommended prior knowledge

Sound knowledge of livestock husbandry methods

### Competency-based learning outcomes

#### Knowledge Broadening

Students are familiar with key characteristics of sustainable livestock farming and know the principles of sustainable husbandry.

### **Knowledge deepening**

Students can evaluate the sustainability of animal husbandry based on various criteria. They can assess different methods and forms of animal husbandry in terms of their sustainability and evaluate opportunities for optimization.

### **Knowledge Understanding**

Students can apply assessment methods and evaluate the impact of animal husbandry. They can develop arguments on the sustainability aspects of husbandry systems and discuss possible alternative approaches.

### **Application and Transfer**

Students can identify and evaluate the ecological, economic and social impacts of animal husbandry and understand how to minimize these impacts.

### **Academic Innovation**

By addressing the impacts, frameworks and requirements of sustainable livestock farming, students are encouraged to discuss innovative solutions to the challenges faced by the sector and to question the status quo.

### **Communication and Cooperation**

Students can explain sustainable livestock farming systems using technically and ethically correct language. The practical orientation of the module creates a good basis for practical cooperation.

### **Academic Self-Conception / Professionalism**

Students can recognise the potential of modern livestock husbandry methods. They can review their decisions professionally. They can scrutinise and reflect critically on husbandry concepts from a sustainability perspective.

## **Literature**

- FAO (2022) The role of animal health in national climate commitments
- FAO (2018) Transforming the livestock sector through the Sustainable Development Goals
- FAO (2013) Tackling Climate Change through Livestock. A global assessment of emissions and mitigation opportunities
- Scientific review articles (depending on focus)

Other literature will be recommended during the course.

## **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)
- Applied Livestock Sciences
  - Applied Livestock Sciences M.Sc. (01.09.2025)

## **People involved in the module**

**Person responsible for the module**

- Münster, Pia

**Teachers**

- Münster, Pia
- Hinrichs, Birgit
- Waßmuth, Ralf

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# SUSTAINABLE RESOURCE MANAGEMENT

## Sustainable Resource Management

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0548 (Version 1) of 22.08.2025. Approval status: approved

<b>Module identifier</b>	44M0548
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only winter term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

Both, climate and natural resources like water, air, geomorphological formations and soils are essential for life on earth. The aim of this course is to give an overview about their interrelationships and their regulation as well as about environmental threats, pollution and the protection of natural resources. Sustainable land use and landscape planning have to consider not only climate change mitigation but also climate change adaptation. This module will include introductory lectures, seminaristic elements and a short field trip.

#### Teaching and learning outcomes

- Origin of raw material and environmental threats
- Soil protection
- Recycling (waste, soils, substrates, compost)
- Provision with water and water protection
- Land "consumption" and how it can be reduced
- Climate change mitigation and adaptation strategies

### Workload, teaching and learning methods

#### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

## Teaching and learning methods

### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
6	Lecture		-
14	Seminar		-
4	Excursion		-
6	Learning in groups / Coaching of groups		-

### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
20	Preparation/follow-up for course work		-
40	Presentation preparation		-
30	Study of literature		-
30	Creation of examinations		-

## Requirements for the award of ECTS credit points

### Graded examination

- oral exam or
- Homework / Assignment or
- Written examination or
- Oral presentation, with written elaboration

### Remark on the assessment methods

Standard: oral examination

### Exam duration and scope

Standard: oral examination ca. 30 minutes

## Requirements for participation

### Recommended prior knowledge

Basic knowledge in landscape ecology (soils, hydrology, climate etc.)

## Competency-based learning outcomes

### Knowledge Broadening

The students can define and describe natural resources, their interrelationships and environmental threats. They can identify strategies and measures to protect natural resources and to adapt to climate change.

### Knowledge deepening

The students can characterize and discuss the role, the regulation and the protection of selected natural resources and landscape elements.

### **Knowledge Understanding**

The students have a detailed comprehension of current topics of sustainable land use, environmental protection, climate change mitigation and adaptation. They can apply their knowledge and understanding to evaluate data and critically reflect on arguments related to these topics.

### **Application and Transfer**

The students are able to transfer the knowledge that they gained in this course to the practice of sustainable resource management.

### **Academic Innovation**

The students are able to analyze scientific literature on sustainable resource management to compile current knowledge and to draw their own conclusions.

### **Communication and Cooperation**

The students are able to correctly apply the scientific terminology concerning different aspects of sustainable resource management and environmental protection. They can cooperate interdisciplinary.

### **Academic Self-Conception / Professionalism**

Students reflect the professional relevance of sustainable resource management and environmental protection in their future career.

## **Literature**

Actual scientific literature concerning climate change mitigation and adaptation, natural resources and environmental protection.

European Environment Agency: <https://www.eea.europa.eu>

Umweltbundesamt (pages in English): <https://www.umweltbundesamt.de/en>

UN Environment Programme (UNEP): <https://www.unep.org/publications-data>

## **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)
- Building – Environment – Management
  - Building – Environment – Management M.Eng. (01.09.2025)
- Landscape Architecture
  - Landscape Architecture M.Eng. (01.09.2025)

## **People involved in the module**

### **Person responsible for the module**

- Wertebach, Tim-Martin

**Teachers**

- Wertebach, Tim-Martin

**Further lecturer(s)**

N. N.

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# SUSTAINABLE SUPPLY CHAIN MANAGEMENT

## Sustainable Supply Chain Management

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0582 (Version 1) of 25.08.2025. Approval status: approved

<b>Module identifier</b>	44M0582
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only winter term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

The holistic assessment of value chains has become even more important for companies, organizations and society, not least due to the legal changes in accordance with the so-called "Supply Chain Act"\*.

Within this scope the students develop a set of instruments for the quantitative and qualitative assessment of sustainability in various value chains. In addition to the (already well-known) ecological indicators, the focus is on further indicators for the evaluation of the social dimension as well as the "true costs".

In addition, different instruments should be investigated with regard to their possible applications. The module teaches a broad variety of methods. Furthermore, selected application methods should be practiced by the students themselves and analyzed in a differentiated manner.

\*Lieferkettensorgfaltspflichtengesetz vom 16. Juli 2021 (BGBl. I S. 2959)

#### Teaching and learning outcomes

- Stakeholder analysis for the evaluation and prioritization of the results
- Step-by-step familiarization with the various phases
- Presentation of the interim and final results, discussion of methodological and content-related work steps
- Comparison of different variants of methods

### Workload, teaching and learning methods

## Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

## Teaching and learning methods

### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
60	Seminar	Presence or online	-

### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
50	Work in small groups		-
15	Peer-Feedback		-
25	Creation of examinations		-

## Requirements for the award of ECTS credit points

### Graded examination

- Case analysis, written

### Remark on the assessment methods

In the course of the semester, a sustainability assessment (focus: social or economic dimension) will be prepared, which is then to be explained, analyzed and discussed within the framework of a case study incl. a short written elaboration. Ideally in cooperation with a practice partner.

### Exam duration and scope

Case Study, written: ca. 13-15 pages

## Requirements for participation

### Recommended prior knowledge

Basic knowledge of social and economic sciences is recommended in this model and helpful for working through the case studies.

## Competency-based learning outcomes

### Knowledge Broadening

- Students know the methods and concepts of social and/or economical life cycle assessment for the analysis and evaluation of products and services.
- Students know the advantages and disadvantages of those assessment methods and can evaluate them.

### Knowledge deepening

- Students create extensive sensitivity analyses and scenarios based on their own case study in order to analyze and characterize the most important leverage effects.
- Students create a criteria catalog for the improvement of social / economical impact based on their own case study.

### Application and Transfer

- Students will work in multi-disciplinary teams and will collect (if possible) primary data for their case studies
- Within the case study problems addressed to the students by the practice will be evaluated (it is also possible that the students also conduct their own case studies)
- Therefore presentation and discussion techniques will be practiced

### Communication and Cooperation

- Students will be able to identify and close their own knowledge gaps, critically reflect on their work results and approach.
- The students will be empowered to communicate the module contents in appropriate technical language (in technical english), to transfer the application of the taught methods to the selected case studies.
- Cooperative working will also be further practiced within the framework of the module.
- Students will be able to independently coordinate their work and time allocation within the framework of the case study and bring it to a successful conclusion on their own responsibility.
- Students present their results in a plenary session as part of peer feedback.
- Students will present their case study results and there sensitivity analysis and improvement within workshops with practice (ideally).

### Academic Self-Conception / Professionalism

- Students are empowered to research and prepare scientific facts and integrate them into their own case study work.
- Through case study work, existing data sets can be verified and expanded or new data sets can be empirically collected.
- Further due to discussions with practice, the projects will interact with real modeling problems and further develop their case studies.

### Literature

de Adelhart Toorop, R., Yates, J., Watkins, M. et al. Methodologies for true cost accounting in the food sector. Nat Food 2, 655–663 (2021). <https://doi.org/10.1038/s43016-021-00364-z>

Subramanian Senthilkannan Muthu (2015) (Eds.): Social Life Cycle Assessment: An Insight -> <https://link.springer.com/book/10.1007/978-981-287-296-8>

LCA Compendium – The Complete World of Life Cycle Assessment -> see: <https://www.springerprofessional.de/lca-compendium-the-complete-world-of-life-cycle-assessment/4832100>

## **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)

## **People involved in the module**

### **Person responsible for the module**

- Speck, Melanie

### **Teachers**

- Speck, Melanie

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# SUSTAINABLE TRANSFORMATION

## Sustainable Transformation

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0566 (Version 1) of 10.03.2026. Approval status: approved

<b>Module identifier</b>	44M0566
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only winter term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

This course addresses the main trends and crises in the Anthropocene and overviews transformation strategies for sustainable land use. Important governance structures from local to global scale will be presented. Lectures will be accompanied by group work and discussions.

## Teaching and learning outcomes

### 1 The Anthropocene

#### 1.1 Climate Crisis

#### 1.2 Biodiversity Crisis

#### 1.3 Nutrition Crisis

### 2 Transformation strategies

#### 2.1 Water retention in cities and landscapes

#### 2.2 Trees in rural and urban landscapes

#### 2.3 Sustainable farming and biodiversity management

#### 2.4 Sustainable supply chains and artificial intelligence

#### 2.5 Regeneration of wetlands and landscape planning

#### 2.6 Environmental modelling and resource management

### 3 Governance of transformation

#### 3.1 Governance structures from local to global scales

#### 3.2 Transformation and learning

## Workload, teaching and learning methods

### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

### Teaching and learning methods

#### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
30	Lecture		-
30	Seminar		-

#### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
30	Preparation/follow-up for course work		-
45	Creation of examinations		-
15	Work in small groups		-

## Requirements for the award of ECTS credit points

### Graded examination

- Presentation

### **Exam duration and scope**

Poster presentation: 10 minutes

### **Requirements for participation**

### **Competency-based learning outcomes**

#### **Knowledge Broadening**

Students learn about the development of the Anthropocene and understand what factors are driving it. They have an overview of different strategies for the conversion of land use to sustainable management and are familiar with the relevant governance structures and instruments.

#### **Knowledge deepening**

Students are able to describe potential solutions to sustainable land use transformation and critically reflect the obstacles in their path as they explore individual aspects of each issue.

#### **Knowledge Understanding**

Students are able to contrast the various demands on land use and weigh the respective benefits and drawbacks of different transformation strategies.

#### **Application and Transfer**

Students are able to research and present individual aspects of sustainable land use transformation.

#### **Academic Innovation**

Students are able to evaluate the information gained from independent literature research in light of the current state of research and their specific research question.

#### **Communication and Cooperation**

Students are able to present and communicate the results of their research in a clear and engaging manner.

#### **Academic Self-Conception / Professionalism**

Students develop a critical approach to scientific perspectives and a self-understanding of responsible communication.

### **Literature**

To be specified by lecturers.

### **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)

### **People involved in the module**

#### **Person responsible for the module**

- Deiglmayr, Kathrin

## Teachers

- Straka, Dorothee
- Speck, Melanie
- Deiglmayr, Kathrin
- Rath, Thomas
- Taeger, Stefan
- Schultz, Henrik
- Kiehl, Kathrin
- Hinrichs, Birgit
- Hanusch, Marie Luise
- Naz, Ali Ahmad
- Meseth, Nicolas
- Krieger-Güss, Stephanie
- Bouillon, Jürgen
- Hoy, Stephanie

## Further lecturer(s)

N.N. (Professur MLT)

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# TRANSDISCIPLINARY PROJECT A - B - C

## Transdisciplinary Project A - B - C

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0562 (Version 2) of 09.03.2026. Approval status: approved

<b>Module identifier</b>	44M0562
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	15.0
<b>Module frequency</b>	winter and summer term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Special features of the module

Students of M.Sc. Land Use Transformation are required to complete three transdisciplinary projects.

### Module contents

#### Brief description

Students work on complex tasks from the fields of nature conservation, land use and landscape development in interdisciplinary groups of various semesters on the basis of current, regularly changing topics and within concrete projects. The transdisciplinary projects enable students to develop questions in the context of a concrete project task, to identify and implement suitable processes and methods for dealing with these questions, and to reflect on and present the results to different target groups. The projects are always supervised by a tandem of lecturers from the fields of agricultural sciences and landscape architecture. Students of M.Sc. Sustainable Land Use Transformation are required to complete three transdisciplinary projects. Students in their first semester receive additional foundational instruction in project management and communication skills.

#### Teaching and learning outcomes

The contents relate in the broadest sense to processes of transformation towards sustainable land use and landscape development. The concrete project topics, i.e. the application case and location, are determined anew each year. Examples include: developing strategies for more resilient landscapes by evaluating various forms of land use, assessing the life cycle efficiency and environmental impact of products and/or value chains, addressing the communication challenges at the interface of digital landscape planning and land use.

### Workload, teaching and learning methods

## Overall workload

The total workload for the module is 450 hours (see also "ECTS credit points and grading").

## Teaching and learning methods

### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
30	Learning in groups / Coaching of groups		-
20	Individual coaching		-

### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
250	Work in small groups		-
100	Other		-
50	Exam preparation		-

## Further explanations

Students in their first semester of M.Sc. Land Use Transformation are required to complete the offered additional course contents on project management and communication skills as a part of this module.

## Requirements for the award of ECTS credit points

### Graded examination

- Project Report, written or
- Project Report, medial or
- Project Report, oral

### Ungraded exam

- Presentation

### Remark on the assessment methods

The standard form of examination is a written project report; any deviation from this will be announced within four weeks of the start of the module.

In the case of the project report, each student will be evaluated by two examiners.

### Exam duration and scope

Presentation: 20-30-minute group poster presentation

Written project report: a coordinated group report (ca. 8-10 pages per person)

## Requirements for participation

### Recommended prior knowledge

none

## Competency-based learning outcomes

### Knowledge Broadening

Students will learn procedures for developing land use and landscape concepts for urban or rural areas.

### Knowledge deepening

The students are able to combine the individual steps of typical project management and planning processes in a problem- and goal-oriented manner. They become familiar with methods by applying them to a specific use case and reflecting on their results.

### Knowledge Understanding

Students learn to learn by regularly reflecting critically on their process of knowledge generation.

### Application and Transfer

The students learn to classify the knowledge generated in the concrete application case within current scientific discussions and to transfer it to other spatial contexts.

### Academic Innovation

Students learn both to understand and identify methodological and professional innovations in the context of current research findings.

### Communication and Cooperation

Students learn to work together in diverse project groups in a goal-oriented and respectful manner. They learn to present and reflect on arguments, information and ideas.

### Academic Self-Conception / Professionalism

Students learn about the tasks involved in complex process of land use transformation and reflect on their role in planning processes in shaping key tasks for the future.

## Literature

is selected depending on the specific project topic

## Applicability in study programs

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)

## People involved in the module

### Person responsible for the module

- Oßenbrink, Jan Ole



## Teachers

- Schultz, Henrik
- Deiglmayr, Kathrin
- Rath, Thomas
- Speck, Melanie
- Kiehl, Kathrin
- Taeger, Stefan

## Further lecturer(s)

N.N. (Professur MLT), N.N.

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# TRANSFORMATIVE LEARNING

## Transformative Learning

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0583 (Version 1) of 23.02.2026. Approval status: approved

<b>Module identifier</b>	44M0583
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only winter term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

The module "Transformative Learning" addresses central questions around designing the transition to sustainable land use: What challenges do transformations in the field of landscape design pose on a local, regional and global level? How can all stakeholders involved in processes of transformation towards sustainable land use learn from each other? How can carefully designed processes grow our understanding of actors' diverse needs, motives, and goals? The focus lies particularly on practices of transformative learning, in addition to theories and concepts.

## Teaching and learning outcomes

### Challenges of the Sustainable Land Transition, Society, Transformation

- Transformation, Society, Landscape
- Transdisciplinarity and Actors
- Participants and New Entanglements, Cohabitation
- The Terrestrial (Latour)

### Theories and Concepts of Transformative Learning

- Transformative Learning (TL) (as the transformation of individual meaning perspectives and as a collective process of awareness and emancipation)
- Deep Ecology (according to Andreas Schelakovsky)
- Pedagogical Approach "Nature Awareness", Experience of Nature as Basis and Precondition for a Pro-Sustainability Attitude (according to Norbert Jung)
- The Tragedy of the Commons
- Happiness and Sustainability (Material Prosperity vs. Subjective Well-Being), an Approach toward The Good Life and Resource Work: What sustains? What fulfills?

### Practices of Transformative Learning: Theater Work, Performance, Intervention

- Introduction to Artistic, Performative, Aesthetic Research (according to Helga Kämpf-Jansen), Design Research
- Transition Theater
- Biographical Theater
- Augusto Boal's Theater of the Oppressed
- Improvisational Theater Basics
- Theoretical and Practical Introduction to Performative Theater Forms
- Performance, Social Space Staging and Action Art
- Spatial Interventions as Occasions for Transformative Learning

## Workload, teaching and learning methods

### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

## Teaching and learning methods

### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
40	Seminar	Presence or online	-
20	Practice	Presence or online	-

### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
40	Work in small groups		-
20	Presentation preparation		-
20	Preparation/follow-up for course work		-
10	Study of literature		-

### Further explanations

Seminar with concurrent practical exercises and the realization of a performance

## Requirements for the award of ECTS credit points

### Graded examination

- Portfolio exam

### Remark on the assessment methods

The portfolio examination comprises an experimental work (EA) in the form of e.g. planning and realisation of an artistic-aesthetic performance (50%) and a term paper, which reflects the EA (HA = 50%).

### Exam duration and scope

experimental work: development and realisation of an artistic-aesthetic performance over a 3-month period

term paper: 10-15 pages

## Requirements for participation

### Recommended prior knowledge

none

## Competency-based learning outcomes

### Knowledge Broadening

Students expand their instrumental knowledge about processes of mutual understanding in the context of a sustainable land transition and reflect on frameworks and attitudes for dealing with complex processes of spatial change and constellations of actors.

### **Knowledge deepening**

Students enhance their competence in creatively shaping processes of mutual understanding around sustainable land use, using a variety of methods including theater work, performances, and interventions.

### **Knowledge Understanding**

Students reflect on different types of knowledge as they deal analytically and creatively with complexity and the diversity of perspectives in processes of landscape change. Central to this process is their work with knowledge categories according to Davoudi (Planning as practice of knowing, 2015).

### **Application and Transfer**

Students develop an inventive-analytical understanding for the handling of complex developments in landscape and the actors involved, and they reflect upon their insights while independently applying them to similar problems.

### **Academic Innovation**

Students develop research questions and learn research-based design as a central method of knowledge generation.

### **Communication and Cooperation**

Students learn about communicating process elements and process results in text, images, and conversation. They develop their own approaches to applying methods of communication.

### **Academic Self-Conception / Professionalism**

Students reflect on the opportunities and limiting factors in the professional and transdisciplinary design of landscape change. They understand the variety of possibilities available for sculpting a vocational self-image at professional intersections.

## **Literature**

assigned during seminar sessions

## **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)

## **People involved in the module**

### **Person responsible for the module**

- Hoy, Stephanie

### **Teachers**

- Schultz, Henrik

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# TURFGRASS CULTURE

## Turfgrass Culture

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0529 (Version 1) of 08.09.2025. Approval status: approved

<b>Module identifier</b>	44M0529
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only winter term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

Historically, the emergence of lawns is linked to the history of human settlement and social development. From tree-lined lawns in ancient times to the landscaping of pleasure gardens in the Middle Ages, lawn elements have acquired aesthetic and functional significance. In modern times, turf has acquired a multifaceted significance both in the social environment in terms of recreation, leisure and sport (recreational to professional sport), as well as ecologically in terms of landscape and environment (ecosystem services). From this point of view, this module deals with the various types of turf and the requirements of the different areas of application in terms of sustainable use and conservation of resources. Knowledge of turf grasses and their characteristics plays a special role in the selection of seed mixture compositions. Fundamentally, quality requirements in accordance with the regulations of the Seed Marketing Act and the standard seed mixtures (RSM) must be observed when placing seed on the market.

## Teaching and learning outcomes

- Historical review of the emergence and development of lawns
- Importance and scope of lawn culture in the social environment
- Lawn types, lawn plants (grasses and herbs) and lawn communities for a wide range of applications such as ornamental lawns, utility lawns, hard-wearing lawns and landscape lawns
- Characteristics and distinguishing features of lawn grasses in a non-flowering state, requirements for growth factors
- Requirements for grass seed with assessment criteria such as TKM and quality requirements such as purity and germination capacity according to RSM and the Seed Marketing Act, identification characteristics of grass fruits
- Suitability of grass species and grass mixtures for various areas of application according to RSM requirements, taking into account site conditions and weather influences
- Grass stock management and options for conserving resources

## Workload, teaching and learning methods

### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

### Teaching and learning methods

#### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
15	Lecture		-
15	Practice		-

#### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
90	Preparation/follow-up for course work		-
30	Exam preparation		-

## Requirements for the award of ECTS credit points

### Graded examination

- oral exam or
- Homework / Assignment or
- Written examination

### Remark on the assessment methods

Standard examination: Oral examination

An alternative examination form to be selected by the examiner if necessary and announced at the beginning of the course.

### **Exam duration and scope**

The standard examination is an oral examination: ca. 20-30 Minutes per Student

One potential alternative is a 3-hour written examination.

### **Requirements for participation**

#### **Recommended prior knowledge**

Students can prepare for the module with the help of the literature listed in the section “Contents and qualification objectives” of this module description.

### **Competency-based learning outcomes**

#### **Knowledge Broadening**

Students at Osnabrück University of Applied Sciences who have successfully completed this module can define the importance and scope of turf culture in the social environment.

#### **Knowledge deepening**

Students at Osnabrück University of Applied Sciences who have successfully completed this module can describe the origin and development of lawns and differentiate lawn types, lawn plants and lawn communities for a wide range of applications such as ornamental lawns, utility lawns, hard-wearing lawns and landscape lawns.

#### **Knowledge Understanding**

Students at Osnabrück University of Applied Sciences who have successfully completed this module use a range of methods to categorize and compare the characteristics of turf grasses and turf herbs, grass seeds and to obtain and process suitable mixture compositions according to the guidelines of the RSM requirements.

#### **Application and Transfer**

Students can independently integrate new knowledge into existing knowledge and make scientifically sound decisions in order to carry out application-oriented projects on future challenges in turf management.

#### **Academic Innovation**

Students who have successfully completed this module will be able to initiate research processes on the topic of turf by identifying research deficits on the basis of international specialist literature and deriving suitable projects for dealing with them.

#### **Communication and Cooperation**

Students who have successfully completed this module are able to communicate highly complex ideas in a well-structured and coherent manner and to discuss solutions to problems with representatives of various academic and non-academic institutions in a relevant and professional manner.

## Academic Self-Conception / Professionalism

Students who have successfully completed this module will have mastered common job-related skills, abilities and techniques in order to use materials and methods professionally. They will be able to assess future challenges in the field of all types of turf and their requirements from an ecological and economic point of view.

## Literature

aid infodienst, 2013: Rasen anlegen und pflegen. aid infodienst Ernährung, Landwirtschaft, Verbraucherschutz e.V., Bonn, 68 S.

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ANONYMUS, 2005: Biotopmanagement auf Golfanlagen. Bundesamt für Naturschutz BfN und Deutscher Golfverband DGV, Albrecht Golf Verlag, Gräfelfing, 229 S.

ANONYMUS, 2006: Rasen – Der natürliche Sportplatzbelag. <http://www.rasengesellschaft.de/download/Broschuere-Sportrasenbelag.pdf>

ANONYMUS, 2008: Richtlinie für den Bau von Golfplätzen – Golfplatzbaurichtlinie. Forschungsgesellschaft Landschaftsentwicklung Landschaftsbau e.V. FLL, 4. Ausgabe, Bonn.

ANONYMUS, 2009: Beschreibendes Düngemittelverzeichnis für den Landschafts- und Sportplatzbau – Düngemittelverzeichnis. Forschungsgesellschaft Landschaftsentwicklung Landschaftsbau e.V. FLL, 2. Auflage, Bonn, 495. S. <http://duengemittel.fll.de/>

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BEARD, J.B., 2002: Turf Management for Golf Courses. 2. Edit, Ann Arbor Press, Chelsea, Mi., 793 S.

BSA Bundessortenamt, 2023: Beschreibende Sortenliste Rasengräser 2023 [http://www.bundessortenamt.de/internet30/fileadmin/Files/PDF/bsl\\_rasengraeser\\_2023.pdf](http://www.bundessortenamt.de/internet30/fileadmin/Files/PDF/bsl_rasengraeser_2023.pdf)

CASLER, M.D. and DUNCAN, R.R., 2003: Turfgrass Biology, Genetics and Breeding. John Wiley & Sons, Inc., Hoboken, New Jersey, USA; 384 S.

CHRISTIANS, N., 2004: Fundamentals of Turfgrass Management. 2. Edit., John Wiley & Sons, New Jersey, 359 S.

DFB, 2011: Sportplatzbau und -Erhaltung [http://www.dfb.de/uploads/media/Sportplatzbau\\_gesamt\\_01.pdf](http://www.dfb.de/uploads/media/Sportplatzbau_gesamt_01.pdf)

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GANDERT K.-D. und F. BURES, 1991: Handbuch Rasen. Deutscher Landwirtschaftsverlag Berlin; ISBN 3-331-00502-9.

GROSSER, W. und P. HIMMELHUBER, 1997: Rasen Zierrasen, Spielrasen, Blumenwiese. Ulmer Verlag, Stuttgart, 216 S.; ISBN 3-8001-6609-7.

HOPE, F. und H. SCHULZ, 1983: Rasen. Ulmer Verlag, Stuttgart, 216 S.; ISBN 3-8001-5038-7.

KAUTER, D., 2002: Entwicklung der Rasenkultur in Mitteleuropa – Ein Überblick vom Mittelalter bis ins angehende 19. Jahrhundert. Sonderdruck Köllen Druck und Verlag, Bonn.

KLAPP, E. und W. OPITZ VON BOBERFELD, 2004: Gräserbestimmungsschlüssel für die häufigsten Grünland- und Rasengräser. 5. Auflage, Ulmer Verl.; 84 S; ISBN 3-8001-4498-0.

KLAPP, E. und W. OPITZ VON BOBERFELD, 2013: Taschenbuch der Gräser. 14. Auflage, Ulmer Verl.; 264 S.; ISBN 978-38001-7984-8

SKIRDE, W, W.BÜRING, H. PÄTZOLD, H.TIETZ, K. TROJAHN, F. MÜLLER und A. NIESEL, 1980: Erhaltung von Sportplätzen. Schriftenreihe Landschafts- und Sportplatzbau 2, Patzer Verlag, Berlin, 208 S.

THIEME-HACK, M. (Hrsg.), 2018 (neu 2024): Handbuch Rasen. 1. Aufl., Eugen Ulmer KG, Stuttgart, 352 S.

TURGEON, A.J., 2012: Turfgrass Management. 9th Ed. Prentice Hall, Upper Saddle River, New Jersey; 389 S.

USGA, 2010: USGA Recommendations for a method of putting green constructions. USGA Green Section Record. [http://www.usga.org/course\\_care/articles/construction/greens/USGA-Recommendations-For-A-Method-Of-Putting-Green-Construction\(2\)/](http://www.usga.org/course_care/articles/construction/greens/USGA-Recommendations-For-A-Method-Of-Putting-Green-Construction(2)/)

WEIDENWEBER, C., 2013: Rasen im grünen Bereich. avBuch im Cadmos Verlag; 80 S.; ISBN 978-3-8404-7518-4

WOHLSCLAGER, J., 1996: Rasen und Blumenwiesen. 3. Auflage, Ulmer Verlag, 128 S.; ISBN 3-8001-6853-7

## Applicability in study programs

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)
- Building – Environment – Management
  - Building – Environment – Management M.Eng. (01.09.2025)
- Applied Plant Sciences M.Sc. (01.09.2025)
  - Applied Plant Sciences M.Sc. (01.09.2025)

## People involved in the module

### Person responsible for the module

- Thieme-Hack, Martin

### Further lecturer(s)

Lehrauftrag

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# URBAN FORESTRY

## Urban Forestry

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0560 (Version 1) of 13.08.2025. Approval status: approved

<b>Module identifier</b>	44M0560
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only winter term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

More than half the world's population now lives in cities. Creating sustainable, healthy and aesthetic urban environments is therefore a major policy goal and research agenda. This module provides an overview of the state of the art and science of urban trees and urban forestry and provides information for decision-making.

The topics explored include the multiple roles and benefits of urban green areas in general and the specific role of trees, including for issues such as air quality, human well-being and stormwater management (Eco System Services). This module reviews the various stresses experienced by trees in cities and tolerance mechanisms, as well as cultural techniques for either pre-conditioning or alleviating stress after planting. It sets out sound planning, design, species selection, establishment, management and preservation of urban trees. Close interactions with the local urban communities and policymakers who benefit from trees are key to success.

## **Teaching and learning outcomes**

### 1 Ecosystem Services of Urban Forests and Urban Trees

#### 1.1 Social and economic Aspects of Urban Forestry

#### 1.2 Impacts of Urban Forests on Physical and Mental Health and Wellbeing

#### 1.3 Biodiversity

### 2 Strategic Perspectives on Planning Urban Forest Landscapes

#### 2.1 The 3-30-300 rule

#### 2.2 The City as a Forest

#### 2.3 Tiny Forests

### 3 Trees in the Urban Environment

#### 3.1 Urban Tree Physiology

#### 3.2 Abiotic Stress

#### 3.3 Biotic Factors: Pests and Diseases

#### 3.4 Constraints to Urban Trees and their Remedies in the Built Environment

#### 3.5 Design Options to Integrate Urban Tree Root Zones and Pavement Support within a Shared Soil Volume

### 4 Selection of Planting Material, Planting Techniques and Establishment

#### 4.1 Criteria in the Selection of Urban Trees for Temperate and Sub Tropical Urban Environments

#### 4.2 Planting Techniques

#### 4.3 Navigating the Establishment Period: A Critical Period for New Trees

### 5 Managing Urban Forests and Urban Trees

#### 5.1 Irrigation of Urban Trees

#### 5.2 Tree Biomechanics and Tree Risk Assessment

#### 5.3 Sonic Tomography and Static Load Tests

#### 5.3 Management and Conservation of Ancient and Other Veteran Trees

## **Workload, teaching and learning methods**

### **Overall workload**

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

## Teaching and learning methods

### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
10	Lecture		-
30	Seminar		-

### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
60	Preparation/follow-up for course work		-
25	Presentation preparation		-
25	Creation of examinations		-

## Requirements for the award of ECTS credit points

### Graded examination

- Oral presentation, with written elaboration or
- Homework / Assignment or
- oral exam or
- Project Report, written

### Remark on the assessment methods

The standard form of examination is an oral report, meaning a presentation with a written analysis. Deviations from the standard form of examination will be announced within four weeks of the start of lectures.

### Exam duration and scope

Oral report: circa 20-30 minute presentation plus a 5-10 page written analysis

or a term paper ca. 10-15 pages, or oral exam ca. 20-30 minutes, or written project report ca. 15-20 pages excluding any appendix.

## Requirements for participation

### Recommended prior knowledge

Sustainable Transformation, Open Space Management

## Competency-based learning outcomes

### Knowledge Broadening

Students have a broad knowledge of ecosystem services provided by urban trees.

### Knowledge deepening

Students are able to identify specific influences on urban trees and derive measures to improve the site conditions.

### **Knowledge Understanding**

Students are able to select suitable woody plants for urban environments in different climate zones and create forest-like plant communities.

### **Application and Transfer**

Students can apply methods for biomechanic static analysis of trees and assess risks.

### **Academic Innovation**

Students can develop new strategies for the compatibility of green, grey and blue infrastructure in cities.

### **Communication and Cooperation**

Students can present the advantages of green infrastructure to political policymakers.

### **Academic Self-Conception / Professionalism**

Students can question traditional urban planning strategies and develop new solutions for greener and more sustainable cities.

## **Literature**

Dunnett, Nigel; Hitchmough, James (Hg.) (2004): *The Dynamic Landscape: Design Ecology and Management of Naturalistic Urban Planting*. London, New York: Spon Press.

Ferrini, Francesco; Konijnendijk van den Bosch, Cecil C.; Fini, Alessio (Ed.) (2017): *Routledge Handbook of Urban Forestry*. London; New York: Routledge Taylor & Francis Group.

Greene, Brent; Walls, Wendy (2023): *Wood for the trees: Design and policymaking of urban forests in Berlin and Melbourne*. In: *Journal of Landscape Architecture* 18 (1), S. 94–103.

Gustavsson, Roland (2009): *The touch of the world: dynamic vegetation studies and embodied knowledge*. In: *Journal of Landscape Architecture* 4 (1), S. 42–55.

Hirons, Andrew D.; Sjöman, Henrik (2019): *Tree Species Selection for Green Infrastructure. A Guide for Specifiers*.

Klemm, Wiebke; Lenzholzer, Sanda; van den Brink, Adri (2017): *Developing green infrastructure design guidelines for urban climate adaptation*. In: *Journal of Landscape Architecture* 12 (3), S. 60–71.

Konijnendijk, Cecil; Devkota, Dikshya; Mansourian, Stephanie; Wildburger, Christoph (Hg.) (2023): *Forests and TreTrees for Human Health: Pathways, Impacts, Challenges and Response Options. A Global Assessment Report*. IUFRO World Series, Vol. 41.

Kowarik, Ingo; Körner, Stefan (Hg.) (2005): *Wild Urban Woodlands*. Berlin, Heidelberg: Springer.

Krämer, Roland (2023): *Ecosystem Services of Urban Green Spaces under Global Change*. Dissertation. Humboldt-Universität. Berlin.

Rust, Steffen; Detter, Andreas (2024): *Do Sonic Tomography and Static Load Tests Yield Comparable Values of Load-Bearing Capacity?* In: *Forests* 15 (5), S. 768.

Trees & Design Action Group (2023): *Trees, Planning and Development. A Guide for Delivery*.

## **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)
- Building – Environment – Management
  - Building – Environment – Management M.Eng. (01.09.2025)
- Landscape Architecture
  - Landscape Architecture M.Eng. (01.09.2025)

## **People involved in the module**

### **Person responsible for the module**

- Bouillon, Jürgen

### **Teachers**

- Bouillon, Jürgen

### **Further lecturer(s)**

Lehraufträge

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# WATER IN SUSTAINABLE LANDSCAPE TRANSFORMATION

## Water in Sustainable Landscape Transformation

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0584 (Version 1) of 04.03.2026. Approval status: approved

<b>Module identifier</b>	44M0584
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only summer term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

Water forms landscapes and is essential for life on earth as well as for the type of land use. Today, groundwater and surface water bodies with their catchments, but also terrestrial land, are strongly affected by climate change and anthropogenic changes of hydrological regimes. The course starts with foundations and principles of hydrology and the role of water in natural, rural and urban landscapes. It focuses on possibilities and strategies of climate change adaptation concerning water management in different types of landscapes and for different types of land use.

#### Teaching and learning outcomes

- Hydrological cycle and principles of hydrology
- Groundwater, surface waters and catchments in natural, rural and urban landscapes
- Effects of climate change on water availability and water cycle
- Sustainable landscape transformation and land-use adaptation
- Climate change adaptation in agricultural and in urban landscapes
- Nature-based solutions

### Workload, teaching and learning methods

#### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

## Teaching and learning methods

### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
10	Lecture		-
4	Excursion		-
16	Seminar		-

### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
30	Study of literature		-
30	Preparation/follow-up for course work		-
30	Creation of examinations		-
30	Presentation preparation		-

## Requirements for the award of ECTS credit points

### Graded examination

- Homework / Assignment or
- Oral presentation, with written elaboration or
- oral exam

### Remark on the assessment methods

The standard form of examination is a term paper. Any deviation from this will be announced within the first four weeks of the module.

### Exam duration and scope

term paper: ca. 10-15 pages

## Requirements for participation

### Recommended prior knowledge

Basic knowledge about hydrology and the role of water in landscapes.

## Competency-based learning outcomes

### Knowledge Broadening

Students, who have completed the module successfully, know about the role of water and climate-change effects in different types of landscapes. They understand hydrological processes relevant for land-use transformation and the sustainable use of water.

### Knowledge deepening

Students have knowledge about groundwater, surface waters and catchments in natural, rural and urban landscapes. They understand and are able to evaluate effects of climate change on water availability and water cycle. They know strategies for sustainable landscape transformation and land-use adaptation.

### **Knowledge Understanding**

The students are able to explain different strategies for the sustainable management of groundwater and surface water bodies and to reflect them critically taking into account land-use effects. They are able to compare effects of different measures of water management on ecosystem components and processes.

### **Application and Transfer**

Students can use their knowledge to analyse and evaluate the current water management in project areas and to develop solutions for climate-change induced problems concerning the sustainable development of rural and/or urban landscapes.

### **Academic Innovation**

Students are able to draw their own innovative scientific conclusions based on information from the actual scientific literature and own findings.

### **Communication and Cooperation**

Students are able to communicate and to cooperate both, within the scientific community and with stakeholders from water management practice.

### **Academic Self-Conception / Professionalism**

Students who have finished this course successfully have learned to act professionally within the field of water resource management. They reflect their actions based on their methodological, theoretical and practical knowledge and competences about sustainable landscape transformation.

## **Literature**

Brutsaert W. (2023) Hydrology: An Introduction. 2nd. Ed. Cambridge University Press, Cambridge.

Davie T. & Quinn N.W. (2019): Fundamentals of Hydrology (Routledge Fundamentals of Physical Geography), 3rd Ed. Routledge, Boca Raton.

FAO – Food and Agriculture Organization of the United Nations (2022): The State of the World's Land and Water Resources for Food and Agriculture – Systems at breaking point. Main report. Rome.  
<https://doi.org/10.4060/cb9910en>

France R. L., ed. (2020): Handbook of Water Sensitive Planning and Design (Intergrative Studies in Water Management and Land Development). 2nd. Ed. Taylor & Francis, Boca Raton.

## **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)

## **People involved in the module**

### **Person responsible for the module**

- Kiehl, Kathrin

**Teachers**

- Wertebach, Tim-Martin

**Further lecturer(s)**

N.N. Prof. Blau-Graue Infrastruktur

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# WORLDWIDE URBANIZATION

## Worldwide Urbanization

### General information about the module

Faculty of Agricultural Science and Landscape Architecture

Module 44M0585 (Version 1) of 22.08.2025. Approval status: approved

<b>Module identifier</b>	44M0585
<b>Module level</b>	Master
<b>Language of instruction</b>	English
<b>ECTS credit points and grading</b>	5.0
<b>Module frequency</b>	only summer term
<b>More information on frequency</b>	-
<b>Duration</b>	1 semester

### Module contents

#### Brief description

This module deals with worldwide urbanization processes and their consequences for urban growth, urban expansion into the periphery and several land use conflicts, e.g. between agriculture and housing. It examines the challenges arising from migration, urban growth in terms of space and the use of natural resources, as well as the unequal distribution of natural resources. We discuss planning strategies, such as green and blue infrastructure, in their dependence on climatic and social conditions and critically reflect these.

#### Teaching and learning outcomes

- Overview: Urbanization and asynchronicity (of shrinkage and growth) in different regions of the world
- Overview: Urbanization and migration (global and intrastate migration processes)
- Overview: Urbanization and planning: densification strategies / public infrastructure / green infrastructure / housing / land management
- Focus: Peri-urban areas under development pressure and strategies for sustainable land management
- Focus: Urban agriculture in metropolitan areas
- Focus: Blue-green infrastructures
- Focus: Projects aiming at climate-resilience
- Focus: Climate adaptation and mitigation measures and social and economic justice
- Special topics depending on the interest/research of the lecturer: e.g. urbanization and water balance, land management, resilient urban development

## Workload, teaching and learning methods

### Overall workload

The total workload for the module is 150 hours (see also "ECTS credit points and grading").

### Teaching and learning methods

#### Lecturer based learning

Workload hours	Type of teaching	Media implementation	Concretization
30	Seminar		-

#### Lecturer independent learning

Workload hours	Type of teaching	Media implementation	Concretization
45	Preparation/follow-up for course work		-
75	Creation of examinations		-

## Requirements for the award of ECTS credit points

### Graded examination

- Homework / Assignment or
- Portfolio exam or
- oral exam

### Remark on the assessment methods

The standard examination form is a term paper; deviations from this will be announced in the first four weeks after the start of lectures.

### Exam duration and scope

The standard form of examination is a term paper (Hausarbeit): ca. 10-15 pages

## Requirements for participation

### Recommended prior knowledge

Basic knowledge of the subject is helpful but not required.

## Competency-based learning outcomes

### Knowledge Broadening

Students expand their factual and targeted knowledge of global urbanization processes and their instrumental knowledge of planning strategies for managing sustainable spatial development.

### Knowledge deepening

Students deepen their understanding of complex growth and contraction processes and their regional and global interdependencies.

### **Knowledge Understanding**

In addition to targeted and factual knowledge, students also acquire instrumental transformation knowledge regarding the complex processes of sustainable global spatial development.

### **Application and Transfer**

Students develop a planning-analytical understanding for dealing with complex urbanization processes and reflect on their findings by independently transferring them between project areas.

### **Academic Innovation**

Through inquiry-based learning, students develop research questions and learn to synthesize spatially independent strategies for integrative, sustainable spatial development with context-dependent developments.

### **Communication and Cooperation**

Students learn to communicate processes and planning strategies in text, image, and conversation. They develop their own approaches in applying communication methods.

### **Academic Self-Conception / Professionalism**

Students reflect on the interfaces between disciplines such as spatial planning and regional development as potential fields of activity for their professional work.

## **Literature**

as assigned by lecturer

## **Applicability in study programs**

- Land Use Transformation
  - Land Use Transformation M.Sc. (01.03.2026)

## **People involved in the module**

### **Person responsible for the module**

- Schultz, Henrik

### **Further lecturer(s)**

N.N.

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