Modules for Landscape Ecology

Basismodule

lök100 - Data Modelling

<table>
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<th>Data Modelling</th>
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<tr>
<td>Credit points</td>
<td>9.0 KP</td>
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<tr>
<td>Workload</td>
<td>270 h</td>
</tr>
</tbody>
</table>

Used in course of study

- Master Landschaftsökologie > Basismodule

Module responsibility

- Michael Kleyer
- Vanessa Minden

Prüfungsberechtigt

- Alle hier genannten

Module counseling

- Cord Peppler-Lisbach
- Robert Biedermann

Entry requirements

Skills to be acquired in this module

- Basic methods of explorative statistics and adequate application of statistical tests relevant to ecological data.
- To learn, interpret and apply methods of habitat modelling
- To understand the fundamentals of spatial explicit analysis of species-environment relationships as well as the fundamentals of spatial prediction of environmental requirements in species
- To adequately analyse measured and observed spatial data applying methods of spatial statistics and geostatistics, respectively
- To learn and to understand relevant methods of multivariate analysis of vegetation data
- To be able to interpret and to assess the results obtained as well as the relevant literature
- To be able to apply the treated methods independently
- To learn and to improve skills in using the statistics software R

Module contents

Part 1: Introduction to statistical analysis of ecological data NN (NN)

- Experimental design
- Explorative data analysis
- Distribution tests, data transformation
- Chi² test
- Anova, Kruskal-Wallis test
- t & U test
- Multiple comparisons, post-hoc tests

Part 2: Habitat modelling and spatial statistics (Biedermann)

- Linear (OLS) regression
- GLM (logistic regression, Poisson regression)
- Spatial explicit modelling, GIS integration
- Spatial statistics

Part 3: Multivariate analysis of vegetation ecological data (Peppler-Lisbach)

Classification:

- Cluster analysis
- Statistical degrees of fidelity

Ordination:

- Indirect procedures: PCA, CA, DCA
- Canonical procedures: RDA, CCA

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<thead>
<tr>
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<tbody>
<tr>
<td>Links</td>
<td><a href="https://www.uni-oldenburg.de/en/landeco/">https://www.uni-oldenburg.de/en/landeco/</a></td>
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<tr>
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<td>Modulart</td>
<td>Wahlpflicht</td>
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<td>Lern-Lehrform / Type of program</td>
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<td>Vorkenntnisse / Previous knowledge</td>
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<td>Prüfungszeiten</td>
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<td>Assignment</td>
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<tr>
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**lök110 - Ecology**

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<tr>
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<td>Master Landschaftsökologie &gt; Basismodule</td>
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**Ansprechpartner/-in**

- Module responsibility
  - Michael Kleyer
  - Prüfungsberechtigt
- Alle hier genannten

**Module counseling**

- Gerhard Wolfgang Zotz
- Ellen Kiel
- Maaike Bader

**Entry requirements**

Knowledge of phytosociology, zoo-ecology, pedology and ecology, comparable to the corresponding modules of BSc. Environmental Sciences

**Skills to be acquired in this module**

Qualification imparted to students:

Upon successful completion of the module the students will gain:

- a thorough knowledge of environmental conditions and biological mechanisms enabling plant species to survive in landscapes
- a thorough knowledge of the eco-physiology of plants in landscapes
- a thorough knowledge of the environmental conditions and biological mechanisms enabling animals to survive in landscapes

**Module contents**

- Ecology of plants in landscapes
- Eco-physiology of plants in landscapes
- Ecology of animals in landscapes

**Literaturempfehlungen**

- Literature will be announced during the course.

**Links**

https://www.uni-oldenburg.de/en/landeco/

**Language of instruction**

German

**Duration (semesters)**

1 Semester

**Module frequency**

jährlich

**Module capacity**

unlimited

**Modulelevel**

MM (Mastermodul)

**Modulart**

Wahlpflicht

**Lern-/Lehrform / Type of program**

**Vorkenntnisse / Previous knowledge**

**Examination**

<table>
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<td>b) Written examination (33 %)</td>
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<td>c) Written examination (33 %)</td>
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**Course type**

Lecture

**SWS**

3.00

**Frequency**

**Workload attendance**

42 h
lök120 - Pedo-Hydrological Processes

**Module label**
Pedo-Hydrological Processes

**Module code**
lök120

**Credit points**
6.0 KP

**Workload**
180 h

**Used in course of study**
- Master Landschaftsökologie > Basismodule

**Ansprechpartner/-in**
Module responsibility
- Luise Dorothee Giani
- Gudrun Massmann

Prüfungsberechtigt
- Alle hier genannten

**Entry requirements**

**Skills to be acquired in this module**
Upon successful completion of the module the students will gain:
- advanced skills in analysing a landscape unit
- a thorough knowledge of geological, pedological, hydrological, hydrogeological, and botanical relationships within an ecosystem
- a thorough knowledge of the genesis and properties of Northwest German soils
- a thorough knowledge of hydrological and hydrogeological properties of Northwest Germany
- a fundamental knowledge of national and international soil systems
- the qualification to ecologically record and assess soils (including humus form)
- the ability to perform soil ecological interpretations

**Module contents**
Landscape unit Spiekeroog (EX/E)
Special Pedology (L)
Special Hydrogeology (L)
Pedological field work (E)

**Literaturempfehlungen**
Literature will be announced during the lecture.

**Links**

**Language of instruction**
German

**Duration (semesters)**
1 Semester

**Module frequency**
jährlich

**Module capacity**
unlimited

**Modulelevel**
MM (Mastermodul / Master module)

**Modulart**
Wahlpflicht / Elective

**Lern-Lehrform / Type of program**
V/Ü/EX

**Vorkenntnisse / Previous knowledge**

**Examination**
Before the end of the module

**Course type**

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**Präsenzzzeit Modul insgesamt**
56 h
**lök130 - Environmental Planning**

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**Used in course of study**
- Master Landschaftsökologie > Basismodule
- Master Sustainability Economics and Management > Ergänzungsmodule

**Ansprechpartner/-in**
- Module responsibility
  - Michael Kleyer
- Prüfungsberechtigt
  - Alle hier genannten
- Module counseling
  - Luise Dorothee Giani
  - Ingo Mose
  - Peter Schaal
  - Sarah Witte

**Entry requirements**
Basic knowledge of environmental planning. Students who have not gained such basic knowledge during the Bachelor course please contact the persons responsible for the module in order to evaluate possibilities for catching up relevant knowledge.

**Skills to be acquired in this module**
The students will
- gain advanced knowledge into the formal and informal organization of spatial developmental processes in a combination of disciplinary and interdisciplinary concepts;
- get to know the system of privileged planning combined with cross-section planning as well as investigate and assess possible deductions for concrete decision making;
- elaborate case studies and typical planning problems in seminar papers and develop their own positions regarding the instruments;
- get to know assessment methods for all important ecosystem compartments and gain the skills to deduce ecosystem services from ecosystem functions.

**Ranking and position of the module within the course of studies:**
The module offers fundamental and advanced knowledge in the first semester on the basis of which planning exercises can be performed during the Master courses.

**Module contents**

a) Development of models and assessment of ecosystem functions for environmental planning:
Presentation of theoretical concepts and practicable methods applied to assess ecosystem functions

b) Actor-oriented planning instruments:
Presentation of aims, forms and mechanisms of formal and informal instruments of area and environmental planning considering participative forms of the actor in different frameworks

c) Special planning:
Presentation of legal grounds, organization, instruments and practical methods of planning institutions including negative or positive impacts on the environmental quality for humans and nature. Possibilities of influencing the planning results from the point of view of precautionary environmental protection

d) Conservation and Evaluation of Soils:
Presentation of legal grounds, practical methods and opportunities for soil protection and soil evaluation in regional and environmental planning.

**Literaturempfehlungen**


Additional literature will be announced during the lectures.

**Links**
- [https://www.uni-oldenburg.de/en/landeco/](https://www.uni-oldenburg.de/en/landeco/)

**Language of instruction**
German

**Duration (semesters)**
1 Semester

**Module frequency**
jährlich

**Module capacity**
unlimited

**Module level**
MM (Mastermodul)
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**Lern-/Lehrform / Type of program**

**Vorkenntnisse / Previous knowledge**

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<th>Prüfungszeiten</th>
<th>Type of examination</th>
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<td>Before the end of the module</td>
<td>Seminar paper</td>
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**Course type**

- Seminar

**SWS**

- 6.00

**Frequency**

- Workload attendance
  - 84 h
Vertiefungsmodul zweites Fachsemester

lök200 - Geo-Biology of the Coast

Module label: Geo-Biology of the Coast
Module code: lök200
Credit points: 6.0 KP
Workload: 180 h

Used in course of study:
- Master Landschaftsökologie > Vertiefungsmodul zweites Fachsemester

Ansprechpartner/-in:
Module responsibility: Holger Freund
Prüfungsberechtigt
Alle hier genannten

Entry requirements:
Basic knowledge in Geology, Geomorphology, and Botany, comparable to the respective Bachelor modules in Environmental Sciences

Skills to be acquired in this module:
Upon successful completion of the module students will gain:
- Advanced knowledge of the most important marine, semiterrestrial and terrestrial ecosystems on the North Sea coast.
- Advanced knowledge of erosion and transport processes of unconsolidated sediments as well as their sedimentation in terrestrial, coastal and marine areas.
- Advanced skills in addressing sediments and in sampling.
- Knowledge of the most important pollen types of the Northwest European flora, their chemical preparation and analysis of palynological samples as well as application of palynology in Palaeoecology, Palaeoclimatology, and as a dating method.
- Knowledge of the most important diatoms (pelagic and benthic types) of the North Sea coast, skills in the chemical preparation and analysis of diatom samples as well as in the application of diatom research in Palaeoecology and facies addressing.

Module contents:
a) "Coastal biotopes and adjacent regions" - L: Flora and fauna of the most important ecosystems on the North Sea coast (sublittoral, Zostera meadows, salt marshes, woods, mires);
b) "Clastic sediments – Transport und sedimentation" - L: Petrological cycle, weathering, transport, physical fundaments of sediment transport, aeolian, fluviatile and marine sediment transport;
c) "Biological methods of addressing facies – pollen and diatom analysis" - LC: Application of coring techniques in the field, sampling, chemical preparation for pollen and diatom analysis, palynology and spore research of higher plants, mosses and ferns, diatom research, facies research in the coastal region

Literaturempfehlungen:
Chapman & Hall.

Additional literature will be announced during the module.

Links:
Language of instruction: German
Duration (semesters): 1 Semester
Module frequency: jährlich
Module capacity: unlimited
Reference text: 6 CP / L / LC / 2nd semester (FS/WP) Freund (L = optionally MM 16 or MM 16 b)
Modulelevel: MM (Mastermodul)
Modulart: Wahlpflicht

Vorkenntnisse / Previous knowledge:

Examination Prüfungszeiten Type of examination
Final exam of module Before the end of the module Written examination (40%)
Specialized Exercise (60%)

Course type Comment SWS Frequency Workload attendance
Lecture 4.00 56 h
<table>
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<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
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<tr>
<td>Practical</td>
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<td>2.00</td>
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<td>28 h</td>
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<td>Präsenzzeit Modul insgesamt</td>
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<td>84 h</td>
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lök205 - Geo-Biology of the Coast

Module label: Geo-Biology of the Coast
Module code: lök205
Credit points: 9.0 KP
Workload: 270 h
Used in course of study: Master Landschaftsökologie > Vertiefungsmodule zweites Fachsemester

Ansprechpartner/-in
Module responsibility
- Holger Freund
Prüfungsberechtigt
- Alle hier genannten

Entry requirements
Basic knowledge in Geology, Geomorphology, and Botany, comparable to the respective Bachelor modules in Environmental Sciences

Skills to be acquired in this module
Upon successful completion of the module students will gain:
- Advanced knowledge of the most important marine, semiterrestrial and terrestrial ecosystems on the North Sea coast.
- Advanced knowledge of erosion and transport processes of unconsolidated sediments as well as their sedimentation in terrestrial, coastal and marine areas.
- Advanced skills in addressing sediments and in sampling.
- Knowledge of the most important pollen types of the Northwest European flora, their chemical preparation and analysis of palynological samples as well as application of palynology in Palaeoecology, Palaeoclimatology, and as a dating method.
- Knowledge of the most important diatoms (pelagic and benthic types) of the North Sea coast, skills in the chemical preparation and analysis of diatom samples as well as in the application of diatom research in Palaeoecology and facies addressing.

Module contents
a) "Coastal biotopes and adjacent regions" - L: Flora and fauna of the most important ecosystems on the North Sea coast (sublittoral, Zostera meadows, salt marshes, woods, mires);
b) "Clastic sediments – Transport und sedimentation" - L: Petrological cycle, weathering, transport, physical fundamentals of sediment transport, aeolian, fluviatile and marine sediment transport;
c) "Biological methods of addressing facies – pollen and diatom analysis" - LC: Application of coring techniques in the field, sampling, chemical preparation for pollen and diatom analysis, palynology and spor research of higher plants, mosses and ferns, diatom research, facies research in the coastal region

Literaturempfehlungen
Chapman & Hall.
Additional literature will be announced during the module.

Links
Language of instruction: German
Duration (semesters): 1 Semester
Module frequency: jährlich
Module capacity: unlimited
Reference text: 6 CP / L / LC / 2nd semester (FS/WP) Freund (L = optionally MM 16 or MM 16 b)
Modulelevel: MM (Mastermodul)
Modulart: Wahlpflicht
Lern-/Lehrform / Type of program: V/PR

Vorkenntnisse / Previous knowledge

Examination Prüfungszeiten Type of examination
Final exam of module: Before the end of the module Written examination (40%)
Specialized Exercise (60%)

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<td>Präsenzzzeit Modul insgesamt</td>
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<td>84 h</td>
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lök210 - Practice of Nature Conservation

Module label Practice of Nature Conservation

Module code lök210

Credit points 6.0 KP

Workload 180 h

Used in course of study
- Master Landschaftsökologie > Vertiefungsmodule zweites Fachsemester
- Master Sustainability Economics and Management > Ergänzungsmodule

Ansprechpartner/-in
Module responsibility
- Rainer Buchwald
- Ingo Mose

Prüfungsberechtigt
- Alle hier genannten

Entry requirements
Completed ecology-oriented Bachelor course

Skills to be acquired in this module
With the successful completion of the module the students will gain a general and advanced knowledge of crucial approaches and instruments of nature conservation in Germany and Europe, especially of the implementation of large protected areas (NSG, biosphere reserve, national park etc.), of maintenance/management projects and measures as well as of approaches to their integration into nature conservation and regional development strategies (via agriculture, tourism etc.) in co-operation with national park administrative authorities and other relevant actors. Additionally, the module gives basic skills in developing ecological connectivity systems (example dragonflies) as well as in developing and implementing approaches to ecological planning inside and outside the nature reserves.

Ranking/position of the module within the course of studies: The module focuses on problems, methods, results, and analyses relevant to nature conservation and refers to corresponding issues of modules in Bachelor courses as well as of basic modules in Master courses of Landscape Ecology.

Module contents
a) Seminar "Protected areas and regional development": Survey of the most important types of large protected areas in Europe as well as current concepts of integrating the purposes of conservation with the tasks of regional development especially in peripheral rural areas
b) Seminar "Practice of ecological planning": Presentation of relevant instruments used in spatial and regional planning aiming at the particular demands of ecological planning; closer inspection based on appropriate practical examples this seminar takes place in the winter term
c) Field course "Habitat connectivity": Theory of ecological connectivity including causes and impacts of fragmentation and isolation in nature-near biotopes; investigation of migration and dispersal behaviour in selected dragonfly species of ditch systems
d) Excursion "Protected areas": Presentation of a selected large protected area in Germany or Europe especially considering geographical, floristic, faunistic, historical, agricultural, and nature conservation aspects as well as aspects of landscape and economics

Literaturempfehlungen

Links
Languages of instruction German, English
Duration (semesters) 1 Semester
Module frequency jährlich
Module capacity unlimited
Modulelevel MM (Mastermodul)
Modularart Wahlpflicht

Lern-/Lehrform / Type of program

Vorkenntnisse / Previous knowledge

Examination Prüfungszeiten Type of examination
Final exam of module Before the end of the module 6 CP – Paper (in the course of a seminar) or excursion report or assignment

Course type Comment SWS Frequency Workload attendance
Lecture 1.00 14 h
Exercises 1.00 14 h
<table>
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<th>Workload attendance</th>
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<tr>
<td>Seminar</td>
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**Module label**
Practice of Nature Conservation

**Module code**
lök211

**Credit points**
9.0 KP

**Workload**
270 h

**Used in course of study**
- Master Landschaftsökologie > Vertiefungsmodul zweites Fachsemester

**Ansprechpartner/-in**
- Module responsibility
  - Rainer Buchwald
  - Ingo Mose
- Prüfungsberechtigt
  - Alle hier genannten

**Module counseling**
- Marc Reichenbach

**Entry requirements**
Completed ecology-oriented Bachelor course

**Skills to be acquired in this module**
With the successful completion of the module the students will gain a general and advanced knowledge of crucial approaches and instruments of nature conservation in Germany and Europe, especially of the implementation of large protected areas (NSG, biosphere reserve, national park etc.), of maintenance/management projects and measures as well as of approaches to their integration into nature conservation and regional development strategies (via agriculture, tourism etc.) in co-operation with national park administrative authorities and other relevant actors. Additionally, the module gives basic skills in developing ecological connectivity systems (example dragonflies) as well as in developing and implementing approaches to ecological planning inside and outside the nature reserves.

**Module contents**
- a) Seminar “Protected areas and regional development”: Survey of the most important types of large protected areas in Europe as well as current concepts of integrating the purposes of conservation with the tasks of regional development especially in peripheral rural areas
- b) Seminar “Practice of ecological planning”: Presentation of relevant instruments used in spatial and regional planning aiming at the particular demands of ecological planning; closer inspection based on appropriate practical examples **this seminar takes place in the winter term**
- c) Fieldcourse “Habitat connectivity”: Theory of ecological connectivity including causes and impacts of fragmentation and isolation in nature-near biotopes; investigation of migration and dispersal behaviour in selected dragonfly species of ditch systems
- d) Excursion “Protected areas”: Presentation of a selected large protected area in Germany or Europe especially considering geographical, floristic, faunistic, historical, agricultural, and nature conservation aspects as well as aspects of landscape and economics

**Literaturempfehlungen**

**Links**
- Languages of instruction: German, English
- Duration (semesters): 1 Semester
- Module frequency: jährlich
- Module capacity: unlimited
- Modulelevel: MM (Mastermodul)
- Modulart: Wahlpflicht

**Vorkenntnisse / Previous knowledge**
Examination Prüfungszeiten Type of examination
Final exam of module Before the end of the module 9 CP = graded oral examination (Mose/Buchwald), additionally active participation in both seminars

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<td>Exercises</td>
<td></td>
<td>1.00</td>
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<td>14 h</td>
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<tr>
<td>Seminar</td>
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<td>Study trip</td>
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<td>3.00</td>
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<td>42 h</td>
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<td>Präsenzzzeit Modul insgesamt</td>
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**lök220 - Ecology of the Soil-Water-Plant-System**

<table>
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<tr>
<td>Credit points</td>
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<td>Workload</td>
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<td>Module responsibility</td>
</tr>
<tr>
<td></td>
<td>Gudrun Massmann</td>
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<td>Alle hier genannten</td>
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<td></td>
<td>Module counseling</td>
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<tr>
<td></td>
<td>Luise Dorothee Giani</td>
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<td></td>
<td>Cord Peppler-Lisbach</td>
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</table>

**Entry requirements**

Skills to be acquired in this module

With this module students will gain technical skills and qualifications for sampling, analysing and interpreting data within the soil-water-plant system. Field studies are performed in the context of current research questions. The studies aim at predicting the impacts of environmental changes on fluxes of water and solutes in the landscape at different scales. Students are prepared for advanced research activities. The collected field data are also used for laboratory work within the scope of the present module and further modules, e.g. for modelling purposes.

Upon successful completion of the module students will gain:

- Knowledge of pedological, hydrological and vegetation oriented ecological field inventories
- Advanced skills in the analysis of soil plant and water samples
- Advanced knowledge of ecosystem processes
- Advanced knowledge into current fields of research

**Module contents**

- Physico-chemical processes in soils
- Transport of water and substances at the intersection point between soil and plant
- Transport of water and substances in the landscape
- Interdisciplinary analysis of ecosystem processes (field studies, labora

**Literaturempfehlungen**

Literature will be announced during the preparatory course and is contingent on the latest developments in the research field.

**Links**

https://www.uni-oldenburg.de/en/hydrogeology/

**Languages of instruction**

German, English

**Duration (semesters)**

1 Semester

**Module frequency**

jährlich

**Module capacity**

8

**Modulelevel**

MM (Mastermodul)

**Modulart**

Wahlpflicht

**Lern-Lehrform / Type of program**

S/Ü

**Vorkenntnisse / Previous knowledge**

**Examination**

<table>
<thead>
<tr>
<th>Final exam of module</th>
<th>Before the end of the module</th>
<th>Portfolio</th>
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</thead>
<tbody>
<tr>
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<td>Prüfungszeiten</td>
<td>Comment</td>
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<td>Exercises</td>
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</tr>
<tr>
<td>Seminar</td>
<td>2.00</td>
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<tr>
<td>Study trip</td>
<td>2.00</td>
<td>WiSe</td>
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</table>
**läk225 - Ecology of the Soil-Water-Plant-System**

<table>
<thead>
<tr>
<th>Module label</th>
<th>Ecology of the Soil-Water-Plant-System</th>
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<tr>
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<td>Credit points</td>
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<tr>
<td>Workload</td>
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<tr>
<td>Used in course of study</td>
<td>Master Landschaftsökologie &gt; Vertiefungsmodul zweites Fachsemester</td>
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</table>

**Ansprechpartner/-in**
- Module responsibility
  - Gudrun Massmann
  - Prüfungsberechtigt
  - Alle hier genannten
  - Module counseling
    - Luise Dorothee Giani
    - Gudrun Massmann

**Entry requirements**

**Skills to be acquired in this module**

**Module contents**

**Literaturempfehlungen**

**Links**

**Languages of instruction**
- German, English

**Duration (semesters)**
- 1 Semester

**Module frequency**

**Module capacity**
- 15

**Modulart**
- je nach Studiengang Pflicht oder Wahlpflicht

**Lern-/Lehrform / Type of program**

**Vorkenntnisse / Previous knowledge**

<table>
<thead>
<tr>
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<tr>
<td>Seminar</td>
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<td>2.00</td>
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**Präsenzzeit Modul insgesamt**
- 56 h
**lök229 - Ecology of the Soil-Water-Plant-System**

<table>
<thead>
<tr>
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<tr>
<td>Module code</td>
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<tr>
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<tr>
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**Used in course of study**
- Master Landschaftsökologie > Vertiefungsmodule zweites Fachsemester

**Ansprechpartner/-in**
- Module responsibility
  - Gudrun Massmann
- Prüfungsberechtigt
- Alle hier genannten
- Module counseling
  - Luise Dorothee Giani
  - Gudrun Massmann

**Entry requirements**

**Skills to be acquired in this module**

**Module contents**

**Literaturempfehlungen**

**Links**

**Languages of instruction**
- German, English

**Duration (semesters)**
- 1 Semester

**Module frequency**
- Module capacity 8

**Module level**
- ---

**Modulart**
- je nach Studiengang Pflicht oder Wahlpflicht

**Lern-/Lehrform / Type of program**

**Vorkenntnisse / Previous knowledge**

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**Präsenzzeit Modul insgesamt**
- 84 h
**lök230 - Aquatic Ecology**

<table>
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<tr>
<th>Module label</th>
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<tbody>
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<tr>
<td>Used in course of study</td>
<td>Master Landschaftsökologie &gt; Vertiefungsmodul zweites Fachsemester</td>
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</tbody>
</table>

**Ansprechpartner/-in**
- Ellen Kiel

**Entry requirements**

**Skills to be acquired in this module**
- To learn about important parameter and ecological processes of specific aquatic habitats;
- learn about threats and important disturbance factors;
- work independently on scientific question;
- learn methods and how to apply specific methods in field and in the laboratory experiments;
- start to development methods on your own;
- analyse the field and laboratory data, and apply modern statistical methods;
- start critical analysis and discussion of field and laboratory data;
- learn to develop mapping and assessment methods;
- study principles of typology and models describing selected systems;
- learn how to deal with nature conservation conflicts by referring to experimental field and laboratory data.

**Module contents**
- 3 courses:
  1. Lowland Waters (3 CP);
  2. Bioassessment (3 CP);
  3. Field Experiments (3 CP)

**Literaturempfehlungen**
Relevant literature will be made available in advance via StudIP and during the course.

**Links**

**Languages of instruction**
German, English

**Duration (semesters)**
1 Semester

**Module frequency**
jährlich

**Module capacity**
20

**Modullevel**
MM (Mastermodul)

**Modulart**
Wahlpflicht

**Vorkenntnisse / Previous knowledge**

**Examination**

<table>
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<th>Comment</th>
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<th>Workload attendance</th>
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**lök240 - Functional ecology of communities in heterogeneous landscapes**

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<td>Master Landschaftsökologie &gt; Vertiefungsmodule zweites Fachsemester</td>
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**Ansprechpartner/-in**
- Michael Kleyer
- Alle hier genannten

**Module counseling**
- Luise Dorothee Giani

**Entry requirements**
- Upon successful completion of the module students will gain:
  - Technical skills in ecological field experiments, determination of plants in the field, phytosociological records, soil inventories, biomass determination and determination of biological characteristics
  - Technical skills in laboratory work, statistics
  - Skills in mapping plants and animals, application of GIS, spatial statistics
  - Advanced knowledge of spatial ecology and the conditions of survival in heterogeneous landscapes as well as knowledge of functional ecology; assessment of academic voids between theory and empiricism
  - Skills in independently dealing with ecological literature and information, respectively

**Ranking/position of the module within the course of studies:**
The module imparts action-oriented and theoretical knowledge of the conditions of survival in plant and animal species in heterogeneous landscapes. It serves the prognosis of impacts on the biodiversity caused by environmental changes. This represents a crucial qualification for environmental planning and habitat restitution projects.

**Module contents**
- Practical training in the field and in the laboratory, practical training in statistics
- Functional ecology of communities in spatio-temporally heterogeneous landscapes: Literature analyses
- Functional plant ecology: Biological characteristics related to disturbances and soil resources (laboratory analyses, statistical analysis)

**Literaturempfehlungen**
Literature will be announced during the preparatory course and is contingent on the latest developments in the research field.

**Links**
https://www.uni-oldenburg.de/en/landeco/

**Language of instruction**
English

**Duration (semesters)**
1 Semester

**Module frequency**
jährlich

**Module capacity**
unlimited

**Modulelevel**
MM (Mastermodul)

**Modulart**
Wahlpflicht

**Lern-/Lehrform / Type of program**
S/Ü

**Vorkenntnisse / Previous knowledge**

**Final exam of module**

<table>
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<th>Type of examination</th>
<th>a) Seminar paper (weighting 20 %)</th>
<th>b) Specialized practical exercise (weighting 80 %)</th>
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<td>Frequency Workload attendance</td>
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<tr>
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<td>28 h</td>
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**Präsenzzeit Modul insgesamt**
140 h
iök250 - Functional Ecology of Plants

Module label: Functional Ecology of Plants
Module code: iök250
Credit points: 15.0 KP
Workload: 450 h

Used in course of study:
- Master Landschaftsökologie > Vertiefungsmodule zweites Fachsemester

Ansprechpartner/-in:
- Module responsibility
  - Gerhard Wolfgang Zotz

Prüfungsberechtigt:
- Alle hier genannten

Entry requirements:
- none

Skills to be acquired in this module:
Lecture: Special subjects of Functional Ecology of Plants are dealt with in detail giving the students a general idea of recent research in the field. Seminar: Giving seminar papers based on own or other people’s research allows the improvement of presentation skills. Practical work: Project work including independent planning, performance, analysis, and presentation will familiarize students with the scientific method.

Module contents:
L: "Scaling": Physiological Ecology from individual organ to ecosystem
SE: Recent studies in experimental ecology
E: Independent research project

Literature empfehlungen:

Additional literature will be announced during the module and is contingent on the latest developments in the research field.

Links:

Language of instruction:
- English

Duration (semesters):
- 1 Semester

Module frequency:
- jährlich

Module capacity:
- unlimited

Reference text:
- http://www.uni-oldenburg.de/fun_eco/

Modullevel:
- MM (Mastermodul)

Modulart:
- Wahlpflicht

Lern-/Lehrform / Type of program:
- V/S/PR

Vorkenntnisse / Previous knowledge:

Examination:

Prüfungszeiten:

Type of examination:
- Two seminar papers (30%)
- Project report (70%)

Course type:

Comment
SWS
Frequency
Workload attendance

Lecture
2.00
- 28 h

Exercises
10.00
- 140 h

Seminar
2.00
- 28 h

Präsenzzzeit Modul insgesamt
- 196 h

Workload attendance:
- 196 h
### Module: Restoration of Terrestrial Ecosystems

**Module label:** Restoration of Terrestrial Ecosystems  
**Module code:** lök260  
**Credit points:** 6.0 KP  
**Workload:** 180 h  
**Used in course of study:** Master Landschaftsökologie > Vertiefungsmodule zweites Fachsemester  
**Ansprechpartner/-in:** Module responsibility  
1. Rainer Buchwald  
2. Alle hier genannten

**Entry requirements:** Basic knowledge in Ecology, Vegetation Science, and Zoology, comparable to the respective Bachelor modules in Environmental Sciences

**Skills to be acquired in this module:** The participants will become acquainted with the possibilities and limits of renaturation and restoration projects in terrestrial ecosystems. This implies an extensive knowledge in autecology and population ecology of selected species on the one hand; on the other hand, monitoring by means of hydrological and/or pedological parameters as well as based on the vegetation and selected animal groups is crucial for evaluating such projects. In cooperation with the respective project management, student groups will contribute to the evaluation and advancement of the respective project as well as similar project(s) by performing individual records, analyses and assessments.  

**Ranking/position of the module within the course of studies:** The module is closely related to the Master modules "Practice of Nature Conservation", "Special Ecology" and "Ecology of Soil-Water-Plant Systems" and comprises questions of scientific and applied nature conservation.

**Module contents:**  
Theory and Practice of Restoration Ecology (L): The lecture deals with the fundamentals of Restoration Ecology and exemplarily with the biotope systems fen and bog, grassland and heath.  
Restoration of Terrestrial Ecosystems (LC): The participants collect data contributing to the evaluation of current restoration projects (Hudewald, mesophilic grassland, heath, oligotrophic stagnant waters).

**Literature recommendations:**  
Additional literature will be announced during the course, if necessary.

**Links:**

**Language of instruction:** English  
**Duration (semesters):** 1 Semester  
**Module frequency:** jährlich  
**Module capacity:** unlimited  
**Module level:** MM (Mastermodul)  
**Module type:** Wahlpflicht

**Vorkenntnisse / Previous knowledge:**

**Examination Prüfungszeiten Type of examination**

<table>
<thead>
<tr>
<th>Final exam of module</th>
<th>Before the end of the module</th>
<th>Seminar paper or assignment</th>
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<table>
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**Präsenzzeit Modul insgesamt:** 56 h
### lök270 - Landscape Management Support Planning

<table>
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<tr>
<th>Module label</th>
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</thead>
<tbody>
<tr>
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<tr>
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<td>Workload</td>
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<tr>
<td>Ansprechpartner/-in</td>
<td>Module responsibility</td>
</tr>
<tr>
<td></td>
<td>Michael Kleyer</td>
</tr>
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<td>Prüfungsberechtigt</td>
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<td></td>
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</table>

**Entry requirements**

**Skills to be acquired in this module**

The landscape management support plan aims at compensating for any project-related impacts on the environment. The mitigation and compensation plan is the outcome of a planning process which will be trained in this course.

Upon successful completion of the module students will gain:

- Technical skills in mapping plants and animals in landscapes: Records, sorting of records for preparing mapping keys; field mapping.
- Technical skills in landscape management support planning including GIS analysis, evaluation of the compensation of environmental impacts on selected ecosystem compartments, and planning of compensation and mitigation.

**Ranking/position of the module within the course of studies:**

This module imparts both action-oriented and theoretical knowledge required for landscape management support planning.

**Module contents**

Mapping results obtained in the field study are fed into GIS, compensation and mitigation measures are planned, and finally the impacts are balanced by the compensation measures.

**Literaturempfehlungen**

Relevant literature will be announced during the preparatory course and is contingent on the latest developments in the research field. Additionally, a script for the exercise will be handed over to the participants.

**Links**

https://www.uni-oldenburg.de/en/landeco/

**Language of instruction**

German

**Duration (semesters)**

1 Semester

**Module frequency**

jährlich

**Module capacity**

unlimited

**Modullevel**

MM (Mastermodul)

**Modulart**

Wahlpflicht

**Lern-Lehrtform / Type of program**

Ü

**Vorkenntnisse / Previous knowledge**

**Examination**

Prüfungszeiten

Type of examination

Final exam of module

Before the end of the module

Specialized practical exercise

**Course type**

Exercises

**SWS**

10.00

**Frequency**

**Workload attendance**

140 h
Iök280 - Special Vegetation Ecology

Module label: Special Vegetation Ecology

Module code: Iök280

Credit points: 6.0 KP

Workload: 180 h

Used in course of study: Master Landschaftsökologie > Vertiefungsmodul zweites Fachsemester

Ansprechpartner/-in:
- Module responsibility:
  - Rainer Buchwald
  - Cord Peppler-Lisbach
- Prüfungsberechtigt:
  - Alle hier genannten
- Module counceling:
  - Rainer Buchwald

Entry requirements:
Completed Bachelor studies with ecological orientation

Skills to be acquired in this module:
The module qualifies the participants to extend their knowledge acquired in their ecologically oriented Master studies of Landscape Ecology. This comprises advanced knowledge of the flora and vegetation types in Central Europe as well as the acquisition of additional methods in vegetation ecology.

Module contents:
In the summer term, the module (6 CP) includes a one-week field course in a selected Central European natural landscape focussing on floristic, vegetation ecological, phytosociological (syntaxonomical) aspects as well as on aspects of biocoenology and nature conservation.

Literature empfehlungen:

Language of instruction: German

Duration (semesters): 2 Semester

Module frequency: jährlich

Module capacity: unlimited

Reference text:
The field course in this module is also part of the 9CP module Iök285 "Special Vegetation Ecology". Therefore, it is not possible to register for the modules Iök280 and Iök285 simultaneously.

Modullevel: MM (Mastermodul)

Modulart: Wahlpflicht

Lern-/Lehrform / Type of program:

Vorkenntnisse / Previous knowledge:

Examination: Before the end of the module

Prüfungszeiten: Assignment

Final exam of module:

Course type: Exercises

SWS: 4.00

Frequency:

Workload attendance: 56 h
**lök285 - Special Vegetation Ecology**

<table>
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<tbody>
<tr>
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<td>lök285</td>
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<tr>
<td>Credit points</td>
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<td>270 h</td>
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<td>Master Landschaftsökologie &gt; Vertiefungsmodule zweites Fachsemester</td>
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**Ansprechpartner/-in**

- Rainer Buchwald
- Cord Peppler-Lisbach

**Prüfungsberechtigt**

- Alle hier genannten

**Module counseling**

- Rainer Buchwald

**Entry requirements**

Completed Bachelor studies with ecological orientation

**Skills to be acquired in this module**

The module qualifies the participants to extend their knowledge acquired in their ecologically oriented Master studies of Landscape Ecology. This comprises advanced knowledge of the flora and vegetation types in Central Europe as well as the acquisition of additional methods in vegetation ecology.

**Module contents**

**Exercise:**

In the summer term, the module includes, as a compulsory component (6 CP), a one-week field work in a selected Central European natural landscape focussing on floristic, vegetation ecological, phytosociological (syntaxonomical) aspects as well as on aspects of biocoenology and nature conservation.

**Lecture:**

Additionally, the lecture "Vegetation Ecology" (3 CP) is offered in the winter term, imparting the fundamentals of development, dynamics, dispersal, site conditions, floristic composition as well as protection of decisive Central European vegetation and biotope types, respectively.

**Literaturempfehlungen**


**Links**

Language of instruction: German

Duration (semesters): 2 Semester

Module frequency: jährlich

Module capacity: unlimited

Reference text:

The field work is also part of the 6 CP module lök280 "Special Vegetation Ecology". Therefore, it is not possible to register for the modules lök280 and lök285 simultaneously.

**Modullevel**: MM (Mastermodul)

Lern-Lehrform / Type of program: Wahlpﬂicht

**Vorkenntnisse / Previous knowledge**

<table>
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<tr>
<th>Examination</th>
<th>Prüfungszeiten</th>
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<tbody>
<tr>
<td>Final exam of module</td>
<td>Before the end of the module</td>
<td>Oral examination or assignment</td>
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<th>Workload attendance</th>
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<tbody>
<tr>
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<td>2.00</td>
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<td>28 h</td>
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<td>4.00</td>
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Präsenzzeit Modul insgesamt: 84 h
**lök290 - Perspectives of Bioenergy**

<table>
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<tr>
<td></td>
<td>Module responsibility</td>
</tr>
<tr>
<td></td>
<td>• Rainer Buchwald</td>
</tr>
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<td>Prüfungsberechtigt</td>
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<td></td>
<td>Module counseling</td>
</tr>
<tr>
<td></td>
<td>• Luise Dorothee Giani</td>
</tr>
<tr>
<td></td>
<td>• Thomas Klenke</td>
</tr>
<tr>
<td></td>
<td>• Michael Wark</td>
</tr>
</tbody>
</table>

**Entry requirements**
Bachelor studies of Natural Science, Environmental Science or Economics

**Skills to be acquired in this module**
The module qualifies students to deal with the different forms of bioenergy and their current perspectives. Hereby, they acquire competences in the scientific basal subjects of physics, chemistry, and biology as well as with respect to the energetic, technical, ecological, and economic aspects that have to be considered for a synoptic assessment of different forms of bioenergy.

**Module contents**

<table>
<thead>
<tr>
<th>Literatureempfehlungen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Links</td>
</tr>
<tr>
<td>Languages of instruction</td>
</tr>
<tr>
<td>Duration (semesters)</td>
</tr>
<tr>
<td>Module frequency</td>
</tr>
<tr>
<td>Module capacity</td>
</tr>
<tr>
<td>Modulelevel</td>
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<td>Modulart</td>
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**Lern-/Lehrform / Type of program**

**Vorkenntnisse / Previous knowledge**

**Examination**

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**Final exam of module**
Before the end of the module

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<th>Frequency</th>
<th>Workload attendance</th>
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<td>28 h</td>
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<tr>
<td>Seminar</td>
<td></td>
<td>2.00</td>
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**Präsenzzeit Modul insgesamt**
84 h
Vertiefungsmodul drittes Fachsemester

lök310 - Group Project: Sustainable Spatial Development

<table>
<thead>
<tr>
<th>Module label</th>
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<tr>
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<td>Workload</td>
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<td>Module counseling</td>
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<tr>
<td></td>
<td>Peter Schaal</td>
</tr>
<tr>
<td>Entry requirements</td>
<td>Participation in the module Environmental Planning</td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td>Upon successful completion of the module the students will have gained various skills in the independent use and application of planning methods to develop appropriate solutions to selected problems in spatial planning and regional development, additionally experiences will be gained in organizing group work and the successful integration of individual tasks in a wider project context</td>
</tr>
<tr>
<td>Module contents</td>
<td>Review of theoretical knowledge in spatial and environmental planning based on a specific planning task reflecting or integrating practical requirements.</td>
</tr>
<tr>
<td>Literatureempfehlungen</td>
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<td>Modulart</td>
<td>Wahlpflicht</td>
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<td>Prüfungszeiten</td>
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<td>Project group</td>
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<td>Workload attendance</td>
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</table>
### Lök320 - Sustainable Spatial Development in Europe

**Module label**: Sustainable Spatial Development in Europe  
**Module code**: lök320  
**Credit points**: 6.0 KP  
**Workload**: 180 h  
**Used in course of study**:  
- Master Landschaftsökologie > Vertiefungsmodule drittes Fachsemester  
- Master Sustainability Economics and Management > Ergänzungsmodule  

**Ansprechpartner/-in**  
- Module responsibility  
  - Ingo Mose  
- Prüfungsberechtigt  
  - Alle hier genannten  
- Module counseling  
  - Ingo Mose

**Entry requirements**: Good command of English  

**Skills to be acquired in this module**: Presentation and critical reflection of crucial demands of a sustainable spatial development in selected fields of activities especially considering rural development. Comparison of suitable case studies in a European context. Knowledge into central control instruments of structural, regional, and agricultural policy on a national as well as on a European level. Considering specific demands of spatial development in the context of political and social processes of Europeanization.

**Module contents**  
- SE/EX Multifunctionality and rural development (3 CP)  
- V Topical issues of agriculture and agricultural policy (1.5 CP)  
- SE/EX Sustainable tourism (3 CP)  
- SE/EX Renewable energy planning (3 CP)  
- V Colloquium on sustainable spatial development (1.5 CP)  
- SE Special subject job market: Job market and inequality in Europe (3 CP)  
  - This course (1.07.211 / FK I) takes place in the summer semester.

  **Multifunctionality and rural development**  
  Survey of the multifunctionality of rural areas, especially the importance of agriculture and forestry, tourism and recreational activities, habitation, and protection of nature as well as the demands on spatial planning and regional development involved under the conditions of sustainability. Illustration by means of selected examples in a European context.

  **Agriculture and agricultural policy**  
  Survey of EU agricultural policy programmes and their strategic-instrumental implementation as well as of selected topics of current developments in agriculture presented by various guest lecturers.

  **Sustainable tourism**  
  Presentation of various concepts of sustainable tourism and its realization from the viewpoint of offer and demand. Illustration by means of selected examples in a European context.

  **Renewable energy planning**  
  Survey of different forms of renewable energy and related demands on spatial development seen from a mainly planning and actor-orientated point of view. Illustration by means of selected examples in a European context.

  **Colloquium on sustainable spatial development**  
  Survey of up-to-date theoretical approaches, concepts, instruments as well as practical fields of activities in sustainable spatial development in a national and European context.

  **Special subject job market: Job market and inequality**  
  This course (1.07.211 / FK I) takes place in the summer semester. Three one-day excursions with varying emphasis will be performed in the vicinity of Oldenburg as an integral part of the module seminars.

**Literaturempfehlungen**  
Schmied, D. (ed.): Winning and losing. The changing geography of Europe’s rural areas. Additional literature will be announced in the seminars.

**Links**: [https://www.uni-oldenburg.de/en/geo/](https://www.uni-oldenburg.de/en/geo/)

**Languages of instruction**: German, English

**Duration (semesters)**: 1 Semester

**Module frequency**: jährlich

**Module capacity**: unlimited

**Modullevel**: MM (Mastermodul)

**Modulart**: Wahlpflicht
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<th>Vorkenntnisse / Previous knowledge</th>
<th>Prüfungszeiten</th>
<th>Type of examination</th>
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<td>Seminar</td>
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Präsenzzzeit Modul insgesamt 140 h
**Module label**
Sustainable Spatial Development in Europe

**Module code**
lök321

**Credit points**
9.0 KP

**Workload**
270 h

**Used in course of study**
- Master Landschaftsökologie > Vertiefungsmodule drittes Fachsemester

**Ansprechpartner/-in**
Module responsibility
- Ingo Mose
Prüfungsberechtigt
- Alle hier genannten

**Entry requirements**
Good command of English

**Skills to be acquired in this module**
Presentation and critical reflection of crucial demands of a sustainable spatial development in selected fields of activities especially considering rural development. Comparison of suitable case studies in a European context. Knowledge into central control instruments of structural, regional, and agricultural policy on a national as well as on a European level. Considering specific demands of spatial development in the context of political and social processes of Europeanization.

**Module contents**

- **Multifunctionality and rural development (3 CP)**
  Survey of the multifunctionality of rural areas, especially the importance of agriculture and forestry, tourism and recreational activities, habitation, and protection of nature as well as the demands on spatial planning and regional development involved under the conditions of sustainability. Illustration by means of selected examples in a European context.

- **Agriculture and agricultural policy (1.5 CP)**
  Survey of EU agricultural policy programmes and their strategic-instrumental implementation as well as of selected topics of current developments in agriculture presented by various guest lecturers.

- **Sustainable tourism (3 CP)**
  Presentation of various concepts of sustainable tourism and its realization from the viewpoint of offer and demand. Illustration by means of selected examples in a European context.

- **Renewable energy planning (3 CP)**
  Survey of different forms of renewable energy and related demands on spatial development seen from a mainly planning and actor-orientated point of view. Illustration by means of selected examples in a European context.

- **Colloquium on sustainable spatial development (1.5 CP)**
  Survey of up-to-date theoretical approaches, concepts, instruments as well as practical fields of activities in sustainable spatial development in a national and European context.

- **Special subject job market: Job market and inequality (3 CP)**
  This course (1.07.211 / FK I) takes place in the summer semester. Three one-day excursions with varying emphasis will be performed in the vicinity of Oldenburg as an integral part of the module seminars.

**Literaturempfehlungen**
Schmied, D. (ed.): Winning and losing. The changing geography of Europe’s rural areas. Additional literature will be announced in the seminars.

**Links**
https://www.uni-oldenburg.de/en/geo/

**Languages of instruction**
German, English

**Duration (semesters)**
1 Semester

**Module frequency**
jährlich

**Module capacity**
unlimited

**Modullevel**
MM (Mastermodul)

**Modulart**
Wahlpflicht

**Vorkenntnisse / Previous knowledge**
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<td><strong>Final exam of module</strong></td>
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<td>9 CP = Report or assignment or oral examination (extended version)</td>
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<th>Frequency</th>
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<td>Lecture</td>
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<td>28 h</td>
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<tr>
<td>Seminar</td>
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<td>84 h</td>
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<tr>
<td>Study trip</td>
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<td>2.00</td>
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**Präsenzzeit Modul insgesamt** 140 h
Module label: Sustainable Spatial Development in Europe
Module code: lök322
Credit points: 15.0 KP
Workload: 450 h

Used in course of study:
- Master Landschaftsökologie > Vertiefungsmodule drittes Fachsemester

Ansprechpartner/-in:
- Module responsibility
  - Ingo Mose
- Prüfungsberechtigt
  - Alle hier genannten

Entry requirements:
- Good command of English

Skills to be acquired in this module:
Presentation and critical reflection of crucial demands of a sustainable spatial development in selected fields of activities especially considering rural development. Comparison of suitable case studies in a European context.
Knowledge into central control instruments of structural, regional, and agricultural policy on a national as well as on a European level. Considering specific demands of spatial development in the context of political and social processes of Europeanization.

Module contents:

SE/EX Multifunctionality and rural development (3 CP)
V Topical issues of agriculture and agricultural policy (1.5 CP)
SE/EX Sustainable tourism (3 CP)
SE/EX Renewable energy planning (3 CP)
V Colloquium on sustainable spatial development (1.5 CP)
SE Special subject job market: Job market and inequality in Europe (3 CP) – This course (1.07.211 / FK I) takes place in the summer semester.

Multifunctionality and rural development
Survey of the multifunctionality of rural areas, especially the importance of agriculture and forestry, tourism and recreational activities, habitation, and protection of nature as well as the demands on spatial planning and regional development involved under the conditions of sustainability. Illustration by means of selected examples in a European context.

Agriculture and agricultural policy
Survey of EU agricultural policy programmes and their strategic-instrumental implementation as well as of selected topics of current developments in agriculture presented by various guest lecturers.

Sustainable tourism
Presentation of various concepts of sustainable tourism and its realization from the viewpoint of offer and demand. Illustration by means of selected examples in a European context.

Renewable energy planning
Survey of different forms of renewable energy and related demands on spatial development seen from a mainly planning and actor-orientated point of view. Illustration by means of selected examples in a European context.

Colloquium on sustainable spatial development
Survey of up-to-date theoretical approaches, concepts, instruments as well as practical fields of activities in sustainable spatial development in a national and European context.

Special subject job market: Job market and inequality
This course (1.07.211 / FK I) takes place in the summer semester.
Three one-day excursions with varying emphasis will be performed in the vicinity of Oldenburg as an integral part of the module seminars.

Literaturempfehlungen:
Schmied, D. (ed.): Winning and losing. The changing geography of Europe’s rural areas. Additional literature will be announced during the seminars.

Links:
Languages of instruction: German, English
Duration (semesters): 1 Semester
Module frequency: jährlich
Module capacity: unlimited
Module level: MM (Mastermodul)
Modulart: Wahlpflicht
Lern-/Lehrform / Type of program: L/S/EX

Vorkenntnisse / Previous knowledge:
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<tr>
<td>Seminar</td>
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<td>84 h</td>
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<td>Study trip</td>
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Präsenzzeit Modul insgesamt 140 h
lök330 - Geoinformatics and Remote Sensing

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<td>Credit points</td>
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<td>Workload</td>
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**Ansprechpartner/-in**

- Module responsibility
- Peter Schaal
- Prüfungsberechtigt
- Alle hier genannten
- Module counseling
- Christian Aden

**Entry requirements**

Participation in the professionalizing module Introduction to Geoinformatics (BA)

**Skills to be acquired in this module**

With this module, students of the Master course will gain qualifications for the analysis of spatial data and for modelling special landscape ecological tasks. Thus, they gain technical skills which they can use for preparing their Master thesis and also an important qualification for their future professional career.

**Module contents**

- **a) Practical work with GIS (E)**
  The students learn to compile geodatabanks as well as to use complex geographical analysis tools. Moreover, they gain knowledge into mobile application of GIS and practise data management based on map server applications.

- **b) Analysis and Models (S/E)**
  The students will gain skills in answering spatial or landscape ecological questions by means of complex GIS analysis (erosion models, route planning) as well as basic skills in spatial data modelling.

- **c) Scanning analysis (S/E)**
  Application and integration of data obtained by photogrammetry and aerial survey are practised on the basis of scientific articles and practical cases. The spectrum of the seminar covers work with digital landscape models, three-dimensional surface analysis as well as spectral analysis of aerial and satellite digital images.

**Literaturempfehlungen**


**Links**

**Language of instruction**

German

**Duration (semesters)**

1 Semester

**Module frequency**

jährlich

**Module capacity**

unlimited

**Module level**

MM (Mastermodul)

**Modulart**

Wahlpflicht

**Lern-Lehrform / Type of program**

**Vorkenntnisse / Previous knowledge**

<table>
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<td>42 h</td>
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**Präsenzzzeit Modul insgesamt**

84 h
**lök331 - Geoinformatics and Remote Sensing**

**Module label**
Geoinformatics and Remote Sensing

**Module code**
lök331

**Credit points**
9.0 KP

**Workload**
270 h

**Used in course of study**
- Master Landschaftsökologie > Vertiefungsmodul drittes Fachsemester

**Ansprechpartner/-in**
- Module responsibility
  - Peter Schaal
  - Prüfungsberechtigt
  - Alle hier genannten
- Module counseling
  - Christian Aden

**Entry requirements**
Participation in the professionalization module Introduction to Geoinformatics (BA)

**Skills to be acquired in this module**
With this module, students of the Master course will gain qualifications for the analysis of spatial data and for modelling special landscape ecological tasks. Thus, they gain technical skills which they can use for preparing their Master thesis and also an important qualification for their future professional career.

**Module contents**
a) Practical work with GIS (E)
The students learn to compile geodatabanks as well as to use complex geographical analysis tools. Moreover, they gain knowledge into mobile application of GIS and practise data management based on map server applications.
b) Analysis and Models (S/E)
The students will gain skills in answering spatial or landscape ecological questions by means of complex GIS analysis (erosion models, route planning) as well as basic skills in spatial data modelling.
c) Scanning analysis (S/E)
Application and integration of data obtained by photogrammetry and aerial survey are practised on the basis of scientific articles and practical cases. The spectrum of the seminar covers work with digital landscape models, three-dimensional surface analysis as well as spectral analysis of aerial and satellite digital images.

**Literaturempfehlungen**

**Links**

**Language of instruction**
German

**Duration (semesters)**
1 Semester

**Module frequency**
jährlich

**Module capacity**
unlimited

**Module level**
MM (Mastermodul)

**Modulart**
Wahlpflicht

**Lern-Lehrform / Type of program**

**Vorkenntnisse / Previous knowledge**

**Examination**
Prüfungszeiten
Type of examination

**Final exam of module**
Before the end of the module
Specialized exercise

<table>
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<th>Workload attendance</th>
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<tr>
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<td>Seminar</td>
<td>3.00</td>
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**Präsenzzzeit Modul insgesamt**
84 h
### lök345 - Advanced Limnology

<table>
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<th>Advanced Limnology</th>
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<td>Master Landschaftsökologie &gt; Vertiefungsmodule drittes Fachsemester</td>
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**Ansprechpartner/-in**

Module responsibility
- Rolf Niedringhaus
- Ellen Kiel

Prüfungsberechtigt
- Alle hier genannten

**Module responsibility**

- Rolf Niedringhaus

**Entry requirements**

Basic knowledge of taxonomy + determination of mainly invertebrates, basic skills in faunistic field methods, L Animal Ecology

**Skills to be acquired in this module**

Special Aquatic Ecology

The module imparts general and special knowledge of the ecology of typical floodplain water systems with special emphasis on floodplain dynamics and the resulting processes related to those water systems. Floodplain development and (faunistic) biodiversity are further main topics comprising e.g. the explanation of ecological conditions and colonisation processes and referring to questions of nature protection, examining the habitat preference of selected species and describing the population development of typical floodplain species.

E Special Aquatic Ecology

Familiarization with the course of a planning process on the basis of an exemplary project in Northwest Germany; independent development of a concept of methods for assessing the faunistic actual state and subsequent realization in the field; scientific documentation and ecologically relevant assessment of the situation in the project area using selected indicator groups (scientific determination of selected taxa); preparation of final expert opinions on the project

**Module contents**

L Special Aquatic Ecology

Ecology of typical floodplain water systems (mainly oxbow lakes bodies and temporary water bodies); description of the decisive processes in floodplain and water system dynamics as well as the expressivitiy of the (faunistic) biodiversity; description of the ecological conditions and colonisation process-es relevant to questions of nature protection, aspects of biodiversity as well as habitat preference and population development of typical floodplain species.

E Special Aquatic Ecology

Description of legal and planning procedures based on a case study; development and realization of a concept of methods for assessing the faunistic current status; scientific documentation (determination of taxa), analysis (determination and classification of species-related characteristics of the taxa rele-vant to the planning) and ecologically relevant assessment of the situation in the project area; final expert opinion on the project

**Literaturempfehlungen**

See announcements in StudIP

**Links**


**Languages of instruction**

German, English

**Duration (semesters)**

1 Semester

**Module frequency**

jährlich

**Module capacity**

unlimited

**Reference text**

The courses of this module are integrated into lök350 “Special Animal Ecology” (9 CP). Students graduating in Special Animal Ecology cannot graduate in Special Aquatic Ecology.

**Modullevel**

MM (Mastermodul)

**Modulart**

Wahlpflicht

**Vorkenntnisse / Previous knowledge**

- Examination
- Prüfungszeiten
- Type of examination

**Final exam of module**

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
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<tr>
<td>Lecture</td>
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<td>1.00</td>
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<tr>
<td>Exercises</td>
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<td>3.00</td>
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<td>42 h</td>
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Präsenzzeit Modul insgesamt

56 h
**lök350 - Advanced Animal Ecology**

<table>
<thead>
<tr>
<th>Module label</th>
<th>Advanced Animal Ecology</th>
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<tbody>
<tr>
<td>Module code</td>
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<tr>
<td>Credit points</td>
<td>9.0 KP</td>
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<td>Workload</td>
<td>270 h</td>
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<td>Used in course of study</td>
<td>Master Landschaftsökologie &gt; Vertiefungsmodule drittes Fachsemester</td>
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<tr>
<td>Ansprechpartner/-in</td>
<td>Module responsibility</td>
</tr>
<tr>
<td></td>
<td>• Rolf Niedringhaus</td>
</tr>
<tr>
<td></td>
<td>• Ellen Kiel</td>
</tr>
<tr>
<td></td>
<td>Prüfungsberechtigt</td>
</tr>
<tr>
<td></td>
<td>• Alle hier genannten</td>
</tr>
<tr>
<td>Entry requirements</td>
<td>Basic knowledge of taxonomy + determination of mainly vertebrates, basic skills in faunistic field methods, L Animal Ecology</td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td>L Special Aquatic Ecology</td>
</tr>
<tr>
<td></td>
<td>The module imparts general and special knowledge of the ecology of typical floodplain water systems with special emphasis on floodplain dynamics and the resulting processes related to those water systems. Floodplain development and (faunistic) biodiversity are further main topics comprising e.g. the explanation of ecological conditions and colonisation processes and referring to questions of nature protection, examining the habitat preference of selected species and describing the population development of typical floodplain species.</td>
</tr>
<tr>
<td></td>
<td>E Special Aquatic Ecology</td>
</tr>
<tr>
<td></td>
<td>Familiarization with the course of a planning process on the basis of an exemplary project in North-west Germany; independent development of a concept of methods for assessing the faunistic actual state and subsequent realization in the field; scientific documentation and ecologically relevant assessment of the situation in the project area using selected indicator groups (scientific determination of selected taxa); preparation of final expert opinions on the project</td>
</tr>
<tr>
<td></td>
<td>L Applied Animal Ecology</td>
</tr>
<tr>
<td></td>
<td>Qualification for preparing a professional zooecological contribution within the scope of an expert opinion; familiarization with the most important faunistic indicator groups for scientific objectives relevant to a project</td>
</tr>
<tr>
<td>Module contents</td>
<td>L Special Aquatic Ecology</td>
</tr>
<tr>
<td></td>
<td>Ecology of typical floodplain water systems (mainly old water bodies and temporary water bodies); description of the decisive processes in floodplain and water system dynamics as well as the expressivity of the (faunistic) biodiversity; description of the ecological conditions and colonisation processes relevant to questions of nature protection, aspects of biodiversity as well as habitat preference and popula-tion development of typical floodplain species.</td>
</tr>
<tr>
<td></td>
<td>E Special Aquatic Ecology</td>
</tr>
<tr>
<td></td>
<td>Description of legal and planning procedures based on a case study; development and realization of a concept of methods for assessing the faunistic current status; scientific documentation (determination of taxa), analysis (determination and classification of species-related characteristics of the taxa rele vant to the planning) and ecologically relevant assessment of the situation in the project area; final expert opinion on the project</td>
</tr>
<tr>
<td></td>
<td>L Applied Animal Ecology</td>
</tr>
<tr>
<td></td>
<td>Importance of professional zooecological contributions within the scope of ecologically relevant planning; legal and qualified arguments; regulations for the conservation of species under national and international law; faunistic indication: complex of problems related to vicarious species, well-founded selection of indicator groups; Principles of developing a concept of sampling and of performing field work; description of standard methods of sampling and analysis, essential aspects of a professional zooecological contribution for an expert opinion on a project; detailed description of the most important faunistic indicator groups for scientific objectives relevant to a project</td>
</tr>
<tr>
<td>Literaturempfehlungen</td>
<td>See announcements in StudIP</td>
</tr>
<tr>
<td>Links</td>
<td>Languages of instruction</td>
</tr>
<tr>
<td></td>
<td>Duration (semesters)</td>
</tr>
<tr>
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<td>Module frequency</td>
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<td>Module capacity</td>
</tr>
<tr>
<td>Modulelevel</td>
<td>MM (Mastermodul)</td>
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<td>Lern- / Lehrform / Type of program</td>
<td>Wahlpflicht</td>
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**Vorkenntnisse / Previous knowledge**

<table>
<thead>
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<th>Examination</th>
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<th>Type of examination</th>
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<td>Final exam of module</td>
<td>Before the end of the module</td>
<td>Special exercise or Assignment</td>
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<table>
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<td>Exercises</td>
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<td>3.00</td>
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<td>42 h</td>
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</table>

**Präsenzzeit Modul insgesamt**

84 h
### Module label
Special Abiotic Factors (Soil/Water)

### Module code
lök360

### Credit points
6.0 KP

### Workload
180 h

### Used in course of study
- Master Landschaftsökologie > Vertiefungsmodule drittes Fachsemester

### Ansprechpartner/-in

Module responsibility
- Luise Dorothee Giani
- Janek Greskowiak
- Birte Junge
- Gudrun Massmann

Prüfungsberechtigt
- Alle hier genannten

Module counseling
- Luise Dorothee Giani
- Gudrun Massmann

### Entry requirements
Basic knowledge of Soil Science, Hydrogeology and Hydrochemistry

### Skills to be acquired in this module

**E:** Applied modelling of water and solute transport in groundwater:
Impartment of knowledge into quantitative hydrogeology (hydraulics and advection-dispersion). Qualification to develop simple groundwater flow and transport models.

**E:** Hydrochemical modelling of water-rock interactions using PHREEQC:
Impartment of knowledge into quantitative hydrogeochemistry and skills in hydrogeochemical modelling.

**L:** Major Soils of the World and excursion to the World Soil Museum in Wageningen (The Netherlands):
Impartment of knowledge into distribution, properties and classification of soils of the world. Qualification to apply the World Reference Base for Soil Resources (WRB) and to identify the soils of the world.

**E:** Special soil science field and laboratory exercises:
Impartment of knowledge into specific field and laboratory methods. Qualification to select and apply specific field and laboratory methods as well as to analyse and interpret results.

### Module contents

**E:** Applied modelling of water and solute transport in groundwater:

**E:** Hydrochemical modelling of water-rock interactions using PHREEQC:

**L:** Major Soils of the World and excursion to the World Soil Museum in Wageningen (The Netherlands):
Application of the international soil classification system "WRB", step-wise familiarization with soils and their properties as well as with the related landscapes and catenas (from polar to tropical soils), study of varnished profiles of globally distributed soils.

**E:** Special soil science field and laboratory exercises:
Selection of current scientific objectives, construction of a sampling and investigation design, performance of field studies (preferably abroad) and laboratory analysis, analysis and interpretation of results.

### Literaturempfehlungen

- see also announcements in StudIP

### Links

- Languages of instruction
  - German, English

- Duration (semesters)
  - 1 Semester
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<td><strong>Module capacity</strong></td>
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<tr>
<td><strong>Reference text</strong></td>
<td>The module can be taken as a 6 CP or a 9 CP module. For the 6 CP module, 2 of the 4 courses offered must be attended, for the 9 CP module, 3 of the 4 courses</td>
</tr>
<tr>
<td><strong>Modullevel</strong></td>
<td>MM (Mastermodul)</td>
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<tr>
<td><strong>Modulart</strong></td>
<td>Wahlpflicht</td>
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</table>

<table>
<thead>
<tr>
<th><strong>Lern-Lehrform / Type of program</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vorkenntnisse / Previous knowledge</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Examination</th>
<th>Prüfungszeiten</th>
<th>Type of examination</th>
</tr>
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<tbody>
<tr>
<td>Final exam of module</td>
<td>Before the end of the module</td>
<td>Oral examination or housework</td>
</tr>
<tr>
<td><strong>Course type</strong></td>
<td><strong>Comment</strong></td>
<td><strong>SWS</strong></td>
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<tr>
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<tr>
<td>Exercises</td>
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<td>70 h</td>
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| **Präsenzzeit Modul insgesamt** | 140 h |

<table>
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<th><strong>Frequency</strong></th>
<th><strong>Workload attendance</strong></th>
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<tr>
<td>Lecture</td>
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</tr>
<tr>
<td>Exercises</td>
<td>5.00</td>
<td>70 h</td>
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</table>
lök365 - Special Abiotic Factors (Soil/Water)

Module label                          Special Abiotic Factors (Soil/Water)
Module code                            lök365
Credit points                          9.0 KP
Workload                              270 h
Used in course of study               • Master Landschaftsökologie > Vertiefungsmodule drittes Fachsemester

Ansprechpartner/-in

Module responsibility

- Luise Dorothee Giani
- Janek Greskowiak
- Birte Junge
- Gudrun Massmann

Prüfungsberechtigt

- Alle hier genannten

Module counseling

- Luise Dorothee Giani
- Gudrun Massmann

Entry requirements

Basic knowledge of Soil Science, Hydrogeology and Hydrochemistry

Skills to be acquired in this module

E: Applied modelling of water and solute transport in groundwater:

E: Hydrochemical modelling of water-rock interactions using PHREEQC:
Modelling of hydrogeochemical processes (speciation reactions and mineral reactions, pyrite oxidation, oxidation of organic matter, redox reactions, ion exchange, equilibrium reactions and reaction kinetics) using the software PHREEQC (http://wwwbrr.cr.usgs.gov/projects/GWC_coupled/phreeqc/)

L: Major Soils of the World and excursion to the World Soil Museum in Wageningen (The Netherlands):
Impartation of knowledge into distribution, properties and classification of soils of the world. Qualification to apply the World Reference Base for Soil Resources (WRB) and to identify the soils of the world.

E: Special soil science field and laboratory exercises:
Impartation of knowledge into specific field and laboratory methods. Qualification to select and apply specific field and laboratory methods as well as to analyse and interpret results.

Module contents

E: Applied modelling of water and substance transfer in ground water:

E: Hydrochemical modelling of water-rock interactions using PHREEQC:
Modelling of hydrogeochemical processes (speciation reactions and mineral reactions, pyrite oxidation, oxidation of organic substances, redox reactions, ion exchange, balance reactions and reaction kinetics) using the software PHREEQC (http://wwwbrr.cr.usgs.gov/projects/GWC_coupled/phreeqc/)

L: Major Soils of the World and excursion to the World Soil Museum in Wageningen (The Netherlands):
Application of the international soil classification system "WRB", step-wise familiarization with soils and their properties as well as with the related landscapes and catenas (from polar to tropical soils), study of varnished profiles of globally distributed soils.

E: Special soil science field and laboratory exercises:
Selection of current scientific objectives, construction of a sampling and investigation design, performance of field studies (preferably abroad) and laboratory analysis, analysis and interpretation of results.

Literaturnempfehlungen


International soil classification system for naming soils and creating legends for soil maps.
World Soil Resources Reports No. 106. FAO, Rom; www.fao.org/3/a-i3794e.pdf

Links

- see also announcements in StudIP.
<table>
<thead>
<tr>
<th>Languages of instruction</th>
<th>German, English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration (semesters)</td>
<td>1 Semester</td>
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<tr>
<td>Module frequency</td>
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<td>Module capacity</td>
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<td>Reference text</td>
<td>The module can be taken as a 6 CP or a 9 CP module. For the 6 CP module, 2 of the 4 courses offered must be attended, for the 9 CP module, 3 of the 4 courses.</td>
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<tr>
<td>Modullevel</td>
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<td>Wahlpflicht</td>
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### Lern-Lehrform / Type of program

#### Vorkenntnisse / Previous knowledge

<table>
<thead>
<tr>
<th>Examination</th>
<th>Prüfungszeiten</th>
<th>Type of examination</th>
</tr>
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<tbody>
<tr>
<td>Final exam of module</td>
<td>Before the end of the module</td>
<td>Oral examination or housework</td>
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<table>
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<tr>
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<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
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<td>5.00</td>
<td></td>
<td>70 h</td>
</tr>
<tr>
<td>Exercises</td>
<td></td>
<td>5.00</td>
<td></td>
<td>70 h</td>
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</table>

Präsenzzeit Modul insgesamt 140 h
lök390 - Experimental designs in ecological field studies

Module label
Experimental designs in ecological field studies

Module code
lök390

Credit points
6.0 KP

Workload
180 h

Used in course of study
- Master Landschaftsökologie > Vertiefungsstufen drittes Fachsemester

Ansprechpartner/-in
Module responsibility
- Ellen Kiel
- Ines Wölpmann

Prüfungsberechtigt
- Alle hier genannten

Module counseling
- Ellen Kiel

Entry requirements
- Basic courses of Ecology (1st and 2nd semesters LÖK)
- Skills in determining aquatic organisms, e.g. via Bachelor modules
  - Knowledge of forms
  - Running water ecology
  - Aquatic habitats
  - Master course in the module “Aquatic Ecology”
  - Comparable courses at other universities

Skills to be acquired in this module
- Qualification to independently plan field experiments suitable for answering current ecological questions (individuals, populations, communities)
- Methodological competence/independence in performing field experiments
- Qualification to independently analyse the experiments in the laboratory guided by hypotheses and using adequate methods, materials and statistical methods
- Competence in presenting results on a scientific level (scientific report presenting and discussing the method; scientific publication; both in English)
- Impartment of manifold methodological skills in the field of aquatic ecology, experimental field research (autecological, population-ecological and synecological research approaches)
- Impartment of extended expertise in planning experiments in general and their analysis in the field of animal ecology (application and linking of acquired skills; generalisable knowledge)
- Practical experience in analysing field experiments in general (comprising laboratory phases, access to literature and databases, preparation of scientific publications)
- Preparation of Master and Ph.D. theses requiring skills in experimental field research

Module contents
1st course phase (theoretical preparation and planning)
- Picking up current ecological research topics related to aquatic habitats, e.g. in streams and ditches (the respective system is selected prior to the start of the course and should change)
- Specification of questions and frame conditions by the course lecturer concerning current research questions in the fields of autecology, population ecology, and synecology
- Instructions for literature research and the respective analysis by students
- Summary and presentation of the current standard of knowledge (structured brief reviews presented to the course participants by students and commented by the lecturer as well as preparation of a synopsis as part of the term paper or the oral examination (see below))
- Concrete formulation of questions and working hypotheses based on literature research

2nd course phase (practical preparation and planning; laboratory and field work)
- Preparatory inspection of the investigation area accompanied by the lecturer
- Independent development of a concept of methods (advised by the lecturer)
- Presentation of the planned experiment and of the analysis (treatment of samples, data processing etc.)
- Independent practical preparation of experiments (calibrate equipment, prepare solutions, prepare trapping jars, determine aquatic data etc.), analysis steps (e.g. prepare laboratory equipment), and logistics (transportation, entry permissions etc.)
- Description of methods for all working steps in writing
- Independent realization of planning (advised by lecturer)
- Report on all procedures including reflection

3rd course phase (further development and application of acquired knowledge; theoretical phase)
- Common discussion about the possibilities of and limits to applying the procedure to concrete questions concerning other habitats, other animal associations etc.

Literaturempfehlungen
Methods in Ecology and Evolution (British Ecological Society):
http://www.methodsinecologyandevolution.org/view/0/index.html
TIEE: http://www.esa.org/tiee/misc/about.html

Additional scientific publications and materials with examples of relevant research work will be made available via StudIP as an E-reserve of reference literature prior to the start of the course.
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Language of instruction</td>
<td>English</td>
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<tr>
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<tr>
<td>Reference text</td>
<td>Independent literature research on specific questions and methods by students.</td>
</tr>
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<td>Modullevel</td>
<td>MM (Mastermodul)</td>
</tr>
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<td>Modulart</td>
<td>Wahlpflicht</td>
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### Lern-Lehrform / Type of program

### Vorkenntnisse / Previous knowledge

<table>
<thead>
<tr>
<th>Examination</th>
<th>Prüfungszeiten</th>
<th>Type of examination</th>
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<tbody>
<tr>
<td>Final exam of module</td>
<td>as agreed</td>
<td>Oral examination or housework</td>
</tr>
</tbody>
</table>

#### Course type

| Lecture | 1.00 | 14 h |
| Exercises | 3.00 | 42 h |

**Präsenzzeit Modul insgesamt** | 56 h
Abschlussmodul

mam - Master’s Degree Module

<table>
<thead>
<tr>
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<th>Master’s Degree Module</th>
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<tbody>
<tr>
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<td>Module responsibility</td>
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<tr>
<td></td>
<td>Lehrende der Landschaftsökologie</td>
</tr>
</tbody>
</table>

Entry requirements

Skills to be acquired in this module

After successfully having completed the Master module, students will be able to treat a problem in the field of Landscape Ecology within a fixed period according to scientific methods.

Module contents

E: Preparing the Master thesis
SE: Active participation in the seminar of the research group, where the Master thesis is to be prepared.

Literaturempfehlungen

Introductory literature will be made available by the respective supervisor. In the further course of the work, independent literature research is expected of the students.

Links

Languages of instruction

Duration (semesters) 1 Semester
Module frequency halbjährlich
Module capacity unlimited
Modullevel Abschlussmodul (Abschlussmodul)
Modulart Pflicht

Vorkenntnisse / Previous knowledge

Examination Prüfungszeiten Type of examination
Final exam of module Master Thesis (80%)
Oral examination (20%)

Course type Seminar

SWS 2.00

Frequency

Workload attendance 28 h