Basismodule

lök100 - Data Modelling

<table>
<thead>
<tr>
<th>Module name</th>
<th>Data Modelling</th>
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</thead>
<tbody>
<tr>
<td>Module code</td>
<td>lök100</td>
</tr>
<tr>
<td>ECTS credit points</td>
<td>9.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>270 h</td>
</tr>
<tr>
<td>Used in degree programmes</td>
<td>Master Landschaftsökologie &gt; Basismodule</td>
</tr>
</tbody>
</table>

Contact person

- module responsibility
  - Michael Kleyer
  - Vanessa Minden
- authorized examiners
  - Alle hier genannten
- Module counseling
  - Cord Peppler-Lisbach
  - Robert Biedermann

Prerequisites

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

<table>
<thead>
<tr>
<th>Recommended reading</th>
<th>Crawley, M.J. (2007): The R Book. 942 S. Wiley &amp; Sons, Chichester. Additional literature will be announced during the course.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Links</td>
<td><a href="https://www.uni-oldenburg.de/en/landeco/">https://www.uni-oldenburg.de/en/landeco/</a></td>
</tr>
<tr>
<td>Language of instruction</td>
<td>German</td>
</tr>
<tr>
<td>Duration (semesters)</td>
<td>1 semester</td>
</tr>
<tr>
<td>Module frequency</td>
<td>jährlich</td>
</tr>
<tr>
<td>Module capacity</td>
<td>unlimited</td>
</tr>
<tr>
<td>Modullevel</td>
<td>MM (Mastermodul)</td>
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<tr>
<td>Modulart</td>
<td>Wahlpflicht</td>
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</table>

<table>
<thead>
<tr>
<th>Lern-/Lehrform / Type of program</th>
<th>Vorkenntnisse / Previous knowledge</th>
<th>Examination</th>
<th>examination periods</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Final exam of module</td>
<td>Before the end of the course</td>
<td>Assignment</td>
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</table>
Module name: Ecology
Module code: lök110
ECTS credit points: 6.0 KP
Workload: 180 h
Used in degree programmes: Master Landschaftsökologie > Basismodule

Contact person:
- module responsibility: Michael Kleyer
- authorized examiners: Gerhard Wolfgang Zott, Ellen Kiel, Maaike Bader

Prerequisites:
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

Ranking/position of the module within the course of studies:
In the initial phase of the Master programme, this module imparts theories and models of the conditions of survival in plant and animals species as well as of the abiotic/biotic interdependencies in heterogenous landscapes. In combination with other compulsory modules it serves to give students a survey of the special field of Landscape Ecology and to enable them to competently select advanced modules in the following semesters.

Module contents:
Ecology of plants in landscapes
Eco-physiology of plants in landscapes
Ecology of animals in landscapes

Recommended reading:
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
Modullevel: MM (Mastermodul)
Modulart: Wahlpflicht

Lern-Lehrform / Type of program:

Vorkenntnisse / Previous knowledge:

Examination examination periods Type of examination
Final exam of module Before the end of the module a) Written examination (33 %)
                        b) Written examination (33 %)
                        c) Written examination (33 %)
**Module: Pedo-Hydrological Processes**

**Module code:** lök120  
**ECTS credit points:** 6.0 KP  
**Workload:** 180 h

**Used in degree programmes:**  
- Master Landschaftsökologie > Basismodule

**Contact person:**  
- module responsibility
  - Luise Dorothee Giani  
  - Gudrun Massmann

**Authorized examiners:** Alle hier genannten

**Prerequisites**

**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 systematics
- 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)

**Recommended reading**

Literature will be announced during the lecture.

**Language of instruction:** German  
**Duration (semesters):** 1 semester  
**Module frequency:** jährlich  
**Module capacity:** unlimited  
**Modulart:** Wahlpflicht / Elective

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

**Vorkenntnisse / Previous knowledge**

**Examination**  
**examination periods:** Before the end of the module  
**Type of examination:** Written examination

**Final exam of module**  
**Course type**  
- Lecture: 2 SWS  
- Exercises (mit Exkursion): 2 WinSem

**Workload attendance**

- **Lecture:** 28 h
- **Exercises (mit Exkursion):** 28 h

**Total attendance time of module:** 56 h
### lök130 - Environmental Planning

<table>
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<tr>
<th>Module name</th>
<th>Environmental Planning</th>
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<tbody>
<tr>
<td>Module code</td>
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<tr>
<td>ECTS credit points</td>
<td>9.0 KP</td>
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<tr>
<td>Workload</td>
<td>270 h</td>
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<td>Used in degree programmes</td>
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</tr>
<tr>
<td></td>
<td>Master Landschaftsökologie &gt; Basismodule</td>
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<tr>
<td></td>
<td>Master Sustainability Economics and Management &gt; Ergänzungsmodule</td>
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<td>Contact person</td>
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<td></td>
<td>module responsibility</td>
</tr>
<tr>
<td></td>
<td>» Michael Kleyer</td>
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<td>authorized examiners</td>
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<td></td>
<td>» Alle hier genannten</td>
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<td></td>
<td>Module counseling</td>
</tr>
<tr>
<td></td>
<td>» Luise Dorothee Giani</td>
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<td></td>
<td>» Ingo Mose</td>
</tr>
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<td></td>
<td>» Peter Schaal</td>
</tr>
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<td></td>
<td>» Sarah Witte</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>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.</td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td>The students will</td>
</tr>
<tr>
<td></td>
<td>» gain advanced knowledge into the formal and informal organization of spatial developmental processes in a combination of disciplinary and interdisciplinary concepts;</td>
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<td></td>
<td>» 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;</td>
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<td></td>
<td>» elaborate case studies and typical planning problems in seminar papers and develop their own positions regarding the instruments;</td>
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<td></td>
<td>» get to know assessment methods for all important ecosystem compartments and gain the skills to deduce ecosystem services from ecosystem functions.</td>
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</table>

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.

<table>
<thead>
<tr>
<th>Module contents</th>
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</thead>
<tbody>
<tr>
<td>a) Development of models and assessment of ecosystem functions for environmental planning:</td>
</tr>
<tr>
<td>Presentation of theoretical concepts and practicable methods applied to assess ecosystem functions</td>
</tr>
<tr>
<td>b) Actor-oriented planning instruments:</td>
</tr>
<tr>
<td>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</td>
</tr>
<tr>
<td>c) Special planning:</td>
</tr>
<tr>
<td>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</td>
</tr>
<tr>
<td>d) Conservation and Evaluation of Soils:</td>
</tr>
<tr>
<td>Presentation of legal grounds, practical methods and opportunities for soil protection and soil evaluation in regional and environmental planning.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Recommended reading</th>
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<tbody>
<tr>
<td>Additional literature will be announced during the lectures.</td>
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<table>
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<tbody>
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<td>German</td>
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<table>
<thead>
<tr>
<th>Duration (semesters)</th>
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<tr>
<td>1 semester</td>
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<table>
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<th>Module frequency</th>
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<table>
<thead>
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<th>Module capacity</th>
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<td>unlimited</td>
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<table>
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<th>Modulelevel</th>
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<tr>
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<tr>
<td>Modulart</td>
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<tr>
<td>----------------</td>
</tr>
<tr>
<td>Lern-/Lehrform / Type of program</td>
</tr>
<tr>
<td>Vorkenntnisse / Previous knowledge</td>
</tr>
<tr>
<td>Examination / examination periods / Type of examination</td>
</tr>
<tr>
<td>Final exam of module</td>
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</table>
Vertiefungsmodul zweites Fachsemester

lök200 - Geo-Biology of the Coast

<table>
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<th>Module name</th>
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<tr>
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<td>ECTS credit points</td>
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<td>Workload</td>
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<tr>
<td>Used in degree programmes</td>
<td>Master Landschaftsökologie &gt; Vertiefungsmodul zweites Fachsemester</td>
</tr>
<tr>
<td>Contact person</td>
<td>module responsibility</td>
</tr>
<tr>
<td></td>
<td>‣ Holger Freund</td>
</tr>
<tr>
<td></td>
<td>‣ Alle hier genannten</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>Basic knowledge in Geology, Geomorphology, and Botany, comparable to the respective Bachelor modules in Environmental Sciences</td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td>Upon successful completion of the module students will gain:</td>
</tr>
<tr>
<td></td>
<td>Advanced knowledge of the most important marine, semiterrestrial and terrestrial ecosystems on the North Sea coast.</td>
</tr>
<tr>
<td></td>
<td>Advanced knowledge of erosion and transport processes of unconsolidated sediments as well as their sedimentation in terrestrial, coastal and marine areas.</td>
</tr>
<tr>
<td></td>
<td>Advanced skills in addressing sediments and in sampling.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>Module contents</td>
<td>a) &quot;Coastal biotopes and adjacent regions&quot; - L: Flora and fauna of the most important ecosystems on the North Sea coast (sublittoral, Zostera meadows, salt marshes, woods, mires);</td>
</tr>
<tr>
<td></td>
<td>b) &quot;Clastic sediments&quot; - Transport und sedimentation; L: Petrological cycle, weathering, transport, physical fundamentals of sediment transport, aeolian, fluvial and marine sediment transport;</td>
</tr>
<tr>
<td></td>
<td>c) Biological methods of addressing facies; L: 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</td>
</tr>
<tr>
<td>Additional literature will be announced during the module.</td>
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</tr>
</tbody>
</table>

Links

Language of instruction  German

Duration (semesters) 1 semester

Module frequency jährlich

Module capacity unlimited

Information 6 CP / L / LC / 2nd semester (FS/WP) Freund (L = optionally MM 16 or MM 16 b)

Modullevel MM (Mastermodul)

Modulart Wahlplicht

Lern-/Lehrform / Type of program V/PR

Vorkenntnisse / Previous knowledge

Examination examination periods Type of examination

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

Course type Comment SWS Offer rhythm Workload attendance

Lecture 4 56 h
<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Offer rhythm</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical</td>
<td></td>
<td>2</td>
<td></td>
<td>28 h</td>
</tr>
<tr>
<td><strong>Total attendance time of module</strong></td>
<td></td>
<td></td>
<td></td>
<td>84 h</td>
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lök205 - Geo-Biology of the Coast

Module name: Geo-Biology of the Coast
Module code: lök205
ECTS credit points: 9.0 KP
Workload: 270 h

Used in degree programmes:
- Master Landschaftsökologie > Vertiefungsmodule zweites Fachsemester

Contact person:
- Module responsibility
  - Holger Freund
- Authorized examiners
  - Alle hier genannten

Prerequisites:
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) \#147: 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) \#147: Clastic sediments \#150: Transport und sedimentation\#147; - L: Petrological cycle, weathering, transport, physical fundaments of sediment transport, aeolian, fluviatile and marine sediment transport;
- c) \#147: Biological methods of addressing facies \#150: pollen and diatom analysis\#147; - 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

Recommended reading:
- Additional literature will be announced during the module.

Links:
Language of instruction: German
Duration (semesters): 1 semester
Module frequency: jährlich
Module capacity: unlimited

Information:
- 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:
- Examination periods: Before the end of the module
- Type of examination: Written examination (40%) Specialized Exercise (60%)

Course type:

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Offer rhythm</th>
<th>Workload attendance</th>
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<tbody>
<tr>
<td>Lecture</td>
<td>4</td>
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<tr>
<td>Practical</td>
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<td>28 h</td>
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Total attendance time of module: 84 h
Module name: Practice of Nature Conservation
Module code: lök210
ECTS credit points: 6.0 KP
Workload: 180 h

Used in degree programmes:
- Master Landschaftsökologie > Vertiefungsmodul zweites Fachsemester
- Master Sustainability Economics and Management > Ergänzungsmodul

Contact person:
- Module responsibility:
  - Rainer Buchwald
  - Ingo Mose
- Authorized examiners:
  - Alle hier genannten

Prerequisites:
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

Recommended reading:

Links:
Languages of instruction: German, English
Duration (semesters): 1 semester
Module frequency: jährlich
Module capacity: unlimited
Module level: MM (Mastermodul)
Modulart: Wahlpflicht

Examination:
- Final exam of module: Before the end of the module
- Examination periods: 6 CP = Paper (in the course of a seminar) or excursion report or assignment
  - Lecture: 1 SWS
  - Exercises: 1 SWS
  - Offer rhythm: 14 h
  - Workload attendance: 14 h
<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Offer rhythm</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar</td>
<td>2</td>
<td></td>
<td></td>
<td>28 h</td>
</tr>
<tr>
<td>Study trip</td>
<td>3</td>
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<td>42 h</td>
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<tr>
<td><strong>Total attendance time of module</strong></td>
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<td></td>
<td></td>
<td>98 h</td>
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lök211 - Practice of Nature Conservation

Module name  Practice of Nature Conservation
Module code  lök211
ECTS credit points  9.0 KP
Workload  270 h

Used in degree programmes  
- Master Landschaftsökologie > Vertiefungsmodule zweites Fachsemester

Contact person
- module responsibility
  - Rainer Buchwald
  - Ingo Mose
- authorized examiners
  - Alle hier genannten

Prerequisites  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) 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

Recommended reading

Links
Languages of instruction  German, English
Duration (semesters)  1 semester
Module frequency  jährlich
Module capacity  unlimited
Module level  MM (Mastermodul)
Module type  Wahlpflicht

Vorkenntnisse / Previous knowledge

<table>
<thead>
<tr>
<th>Examination</th>
<th>examination periods</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final exam of module</td>
<td>Before the end of the module</td>
<td>9 CP = graded oral examination (Mose/Buchwald), additionally active participation in both seminars</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Offer rhythm</th>
<th>Workload attendance</th>
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<td>1</td>
<td></td>
<td>14 h</td>
</tr>
<tr>
<td>Course type</td>
<td>Comment</td>
<td>SWS</td>
<td>Offer rhythm</td>
<td>Workload attendance</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------</td>
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</tr>
<tr>
<td>Exercises</td>
<td></td>
<td>1</td>
<td></td>
<td>14 h</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td>2</td>
<td></td>
<td>28 h</td>
</tr>
<tr>
<td>Study trip</td>
<td></td>
<td>3</td>
<td></td>
<td>42 h</td>
</tr>
<tr>
<td><strong>Total attendance time of module</strong></td>
<td></td>
<td></td>
<td></td>
<td>98 h</td>
</tr>
</tbody>
</table>
**lök220 - Ecology of the Soil-Water-Plant-System**

<table>
<thead>
<tr>
<th>Module name</th>
<th>Ecology of the Soil-Water-Plant-System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>lök220</td>
</tr>
<tr>
<td>ECTS credit points</td>
<td>15.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>450 h</td>
</tr>
</tbody>
</table>

**Used in degree programmes**
- Master Landschaftsökologie > Vertiefungsmodule zweites Fachsemester

**Contact person**
- module responsibility
  - Gudrun Massmann
- authorized examiners
  - Alle hier genannten
- Module counseling
  - Luise Dorothee Giani
  - Cord Peppler-Lisbach

**Prerequisites**

**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

**Recommended reading**

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

**Modullevel**

MM (Mastermodul)

**Modulart**

Wahlpflicht

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

S/Ü

**Vorkenntnisse / Previous knowledge**

**Examination**

<table>
<thead>
<tr>
<th>Examination</th>
<th>examination periods</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Portfolio</td>
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**Course type**

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Offer rhythm</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercises</td>
<td>8</td>
<td></td>
<td></td>
<td>112 h</td>
</tr>
<tr>
<td>Seminar</td>
<td>2</td>
<td></td>
<td></td>
<td>28 h</td>
</tr>
<tr>
<td>Study trip</td>
<td>2</td>
<td></td>
<td>WinSem</td>
<td>28 h</td>
</tr>
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</table>

**Total attendance time of module**

168 h
### lök225 - Ecology of the Soil-Water-Plant-System

<table>
<thead>
<tr>
<th><strong>Module name</strong></th>
<th>Ecology of the Soil-Water-Plant-System</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Module code</strong></td>
<td>lök225</td>
</tr>
<tr>
<td><strong>ECTS credit points</strong></td>
<td>6.0 KP</td>
</tr>
<tr>
<td><strong>Workload</strong></td>
<td>180 h</td>
</tr>
<tr>
<td><strong>Used in degree programmes</strong></td>
<td>Master Landschaftsökologie &gt; Vertiefungsmodule zweites Fachsemester</td>
</tr>
</tbody>
</table>

**Contact person**

- **module responsibility**
  - Gudrun Massmann
- **authorized examiners**
  - Alle hier genannten
- **Module counseling**
  - Luise Dorothee Giani
  - Gudrun Massmann

**Prerequisites**

**Skills to be acquired in this module**

**Module contents**

**Recommended reading**

**Links**

**Languages of instruction**

- German, English

**Duration (semesters)**

- 1 semester

**Module frequency**

**Module capacity**

- 15

**Modullevel**

**Modulart**

- je nach Studiengang Pflicht oder Wahlpflicht

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

**Vorkenntnisse / Previous knowledge**

**Examination**

**examination periods**

- **Type of examination**

**Final exam of module**

<table>
<thead>
<tr>
<th><strong>Course type</strong></th>
<th><strong>Comment</strong></th>
<th><strong>SWS</strong></th>
<th><strong>Offer rhythm</strong></th>
<th><strong>Workload attendance</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar</td>
<td></td>
<td>2</td>
<td>SumSem and WinSem</td>
<td>28 h</td>
</tr>
<tr>
<td>Study trip</td>
<td></td>
<td>2</td>
<td>SumSem and WinSem</td>
<td>28 h</td>
</tr>
</tbody>
</table>

**Total attendance time of module**

- 56 h

**Languages of instruction**

- German, English

**Duration (semesters)**

- 1 semester

**Module frequency**

**Module capacity**

- 15

**Modullevel**

**Modulart**

- je nach Studiengang Pflicht oder Wahlpflicht

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

**Vorkenntnisse / Previous knowledge**

**Examination**

**examination periods**

- **Type of examination**

**Final exam of module**

<table>
<thead>
<tr>
<th><strong>Course type</strong></th>
<th><strong>Comment</strong></th>
<th><strong>SWS</strong></th>
<th><strong>Offer rhythm</strong></th>
<th><strong>Workload attendance</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar</td>
<td></td>
<td>2</td>
<td>SumSem and WinSem</td>
<td>28 h</td>
</tr>
<tr>
<td>Study trip</td>
<td></td>
<td>2</td>
<td>SumSem and WinSem</td>
<td>28 h</td>
</tr>
</tbody>
</table>

**Total attendance time of module**

- 56 h
### Prerequisites

**Skills to be acquired in this module**

**Recommended reading**

**Module contents**

**Links**

**Languages of instruction** German, English

**Duration (semesters)** 1 semester

**Module frequency**

**Module capacity** 8

**Modullevel** ---

**Modulart** je nach Studiengang Pflicht oder Wahlpflicht

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

**Vorkenntnisse / Previous knowledge**

**Examination**

<table>
<thead>
<tr>
<th>Final exam of module</th>
<th>examination periods</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar</td>
<td>Comment</td>
<td>SWS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Exercises</td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

**Total attendance time of module** 84 h

---

### Contact person

- **module responsibility**
- **authorized examiners**
- **Alle hier genannten**
- **Luise Dorothee Giani**
- **Gudrun Massmann**

---

### Ecology of the Soil-Water-Plant-System

**Module name** Ecology of the Soil-Water-Plant-System

**Module code** lök229

**ECTS credit points** 9.0 KP

**Workload** 270 h

**Used in degree programmes**
- Master Landschaftsökologie > Vertiefungsmodul zweites Fachsemester

---

**Examination periods**

- **Type of examination**
  - HA

---

**Course type**

- **Seminar**
  - Comment: 
  - SWS: 4
  - Offer rhythm: SunSem and WinSem
  - Workload: 56 h

- **Exercises**
  - Comment: 
  - SWS: 2
  - Offer rhythm: SunSem and WinSem
  - Workload: 28 h
Module name: Aquatic Ecology
Module code: lök230
ECTS credit points: 9.0 KP
Workload: 270 h

Used in degree programmes:
- Master Landschaftsökologie > Vertiefungsmodule zweites Fachsemester

Contact person:
- module responsibility: Ellen Kiel
- authorized examiners: Ellen Kiel

Prerequisites:
The prior goals and themes of this module are:
- 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 learn 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)

Recommended reading:
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

Module level:
MM (Mastermodul)

Modulart:
Wahlpflicht

Vorkenntnisse / Previous knowledge:

Examination

<table>
<thead>
<tr>
<th>Examination</th>
<th>examination periods</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final exam of module</td>
<td>Before the end of the module</td>
<td>1 assignment (English, publication form)</td>
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Course type

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Offer rhythm</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>2</td>
<td></td>
<td>WinSem</td>
<td>28 h</td>
</tr>
<tr>
<td>Exercises</td>
<td>2</td>
<td></td>
<td></td>
<td>28 h</td>
</tr>
<tr>
<td>Seminar</td>
<td>2</td>
<td></td>
<td></td>
<td>28 h</td>
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</table>

Total attendance time of module:
84 h
# lök240 - Functional ecology of communities in heterogeneous landscapes

<table>
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<tbody>
<tr>
<td>Module code</td>
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<tr>
<td>ECTS credit points</td>
<td>15.0 KP</td>
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<tr>
<td>Workload</td>
<td>450 h</td>
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<tr>
<td>Used in degree programmes</td>
<td>Master Landschaftsökologie &gt; Vertiefungsmodule zweites Fachsemester</td>
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<tr>
<td>Contact person</td>
<td>module responsibility</td>
</tr>
<tr>
<td></td>
<td>- Michael Kleyer</td>
</tr>
<tr>
<td></td>
<td>- Alle hier genannten</td>
</tr>
<tr>
<td></td>
<td>Module counseling</td>
</tr>
<tr>
<td></td>
<td>- Luise Dorothee Giani</td>
</tr>
</tbody>
</table>

## Prerequisites

Skills to be acquired in this module

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)

## Recommended reading

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

## Module level

MM (Mastermodul)

## Moduleart

Wahlpflicht

## Lern-/Lehrform / Type of program

S/Ü

## Vorkenntnisse / Previous knowledge

## Examination

**Course type**

<table>
<thead>
<tr>
<th>Type of examination</th>
<th>Examination periods</th>
<th>Final exam of module</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Seminar paper (weighting 20 %)</td>
<td></td>
<td>a) Seminar paper (weighting 20 %)</td>
</tr>
<tr>
<td>b) Specialized practical exercise (weighting 80 %)</td>
<td></td>
<td>b) Specialized practical exercise (weighting 80 %)</td>
</tr>
</tbody>
</table>

### Workload attendance

| Exercises | 8 | 112 h |
| Seminar   | 2 | 28 h  |
| **Total attendance time of module** | | 140 h |
### Module: Functional Ecology of Plants

<table>
<thead>
<tr>
<th>Module code</th>
<th>lök250</th>
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<tbody>
<tr>
<td>ECTS credit points</td>
<td>15.0 KP</td>
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<tr>
<td>Workload</td>
<td>450 h</td>
</tr>
<tr>
<td>Used in degree programmes</td>
<td>Master Landschaftsökologie &gt; Vertiefungsmodule zweites Fachsemester</td>
</tr>
</tbody>
</table>

**Contact person**
- module responsibility
  - Gerhard Wolfgang Zotz
- authorized examiners
  - Alle hier genannten

**Prerequisites**
- 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

**Recommended reading**

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

**Language of instruction**
- English

**Duration (semesters)**
- 1 semester

**Module frequency**
- jährlich

**Module capacity**
- unlimited

**Information**
- http://www.uni-oldenburg.de/fun_eco/

**Module level**
- MM (Mastermodul)

**Module type**
- Wahlpflicht

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

**Vorkenntnisse / Previous knowledge**

**Examination**

<table>
<thead>
<tr>
<th>Examination</th>
<th>examination periods</th>
<th>Type of examination</th>
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<tbody>
<tr>
<td>Final exam of module</td>
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<td>Two seminar papers (30%) Project report (70%)</td>
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**Course type**

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Offer rhythm</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td></td>
<td>2</td>
<td></td>
<td>28 h</td>
</tr>
<tr>
<td>Exercises</td>
<td></td>
<td>10</td>
<td></td>
<td>140 h</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td>2</td>
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<td>28 h</td>
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<tr>
<td>Total attendance time of module</td>
<td></td>
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<td>196 h</td>
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</table>
**Module name**
Restoration of Terrestrial Ecosystems

**Module code**
lök260

**ECTS credit points**
6.0 KP

**Workload**
180 h

**Used in degree programmes**
- Master Landschaftsökologie > Vertiefungsmodule zweites Fachsemester

**Contact person**
- module responsibility
  - Rainer Buchwald
- authorized examiners
  - Alle hier genannten

**Prerequisites**
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.

**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).

**Recommended reading**
- 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)

**Modulart**
Wahlpflicht

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

**Vorkenntnisse / Previous knowledge**

**Examination**

<table>
<thead>
<tr>
<th>Examination</th>
<th>examination periods</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final exam of module</td>
<td>Before the end of the module</td>
<td>Seminar paper or assignment</td>
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</tbody>
</table>

**Course type**

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Offer rhythm</th>
<th>Workload attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>2</td>
<td>28 h</td>
<td></td>
<td></td>
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<tr>
<td>Exercises</td>
<td>2</td>
<td>28 h</td>
<td></td>
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</tr>
<tr>
<td>Seminar</td>
<td>0</td>
<td>0 h</td>
<td></td>
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</tbody>
</table>

**Total attendance time of module**
56 h
Lök270 - Landscape Management Support Planning

Module name: Landscape Management Support Planning

Module code: lök270

ECTS credit points: 15.0 KP

Workload: 450 h

Used in degree programmes:
- Master Landschaftsökologie > Vertiefungsmodule zweites Fachsemester

Contact person:
- module responsibility
  - Michael Kleyer
- authorized examiners
  - Alle hier genannten

Prerequisites:

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.

Recommended reading:
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-/Lehrform / Type of program: Ü

Vorkenntnisse / Previous knowledge:

Examination:

examination periods:

Type of examination:

Final exam of module:

Before the end of the module

Specialized practical exercise
### lök280 - Special Vegetation Ecology

<table>
<thead>
<tr>
<th><strong>Module name</strong></th>
<th>Special Vegetation Ecology</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Module code</strong></td>
<td>lök280</td>
</tr>
<tr>
<td><strong>ECTS credit points</strong></td>
<td>6.0 KP</td>
</tr>
<tr>
<td><strong>Workload</strong></td>
<td>180 h</td>
</tr>
<tr>
<td><strong>Used in degree programmes</strong></td>
<td>Master Landschaftsökologie &gt; Vertiefungsmodule zweites Fachsemester</td>
</tr>
</tbody>
</table>

**Contact person**
- module responsibility
  - Rainer Buchwald
  - Cord Peppler-Lisbach
- authorized examiners
  - Alle hier genannten
- Module counselling
  - Rainer Buchwald

**Prerequisites**
- Completed Bachelor studies with ecological orien-tation

**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 biocеноology and nature conservation.

**Recommended reading**

**Links**
- Language of instruction: German
- Duration (semesters): 2 semester
- Module frequency: jährlich
- Module capacity: unlimited
- Information: The field course in this module is also part of the 9CP module lök285 "Special Vegetation Ecology". Therefore, it is not possible to register for the modules lök280 and lök285 simultaneously.
- Modullevel: MM (Mastermodul)
- Modulart: Wahlpflicht

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

**Vorkenntnisse / Previous knowledge**

**Examination**

<table>
<thead>
<tr>
<th>examination periods</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before the end of the module</td>
<td>Assignment</td>
</tr>
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</table>
Module name: Special Vegetation Ecology
Module code: lök285
ECTS credit points: 9.0 KP
Workload: 270 h
Used in degree programmes: Master Landschaftsökologie > Vertiefungsmodule zweites Fachsemester

Contact person:
- module responsibility: Rainer Buchwald, Cord Peppler-Lisbach
- authorized examiners: Alle hier genannten
- Module counseling: Rainer Buchwald

Prerequisites: 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.

Recommended reading:

Links

Language of instruction: German
Duration (semesters): 2 semester
Module frequency: jährlich
Module capacity: unlimited
Information: 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)
Modulart: Wahlpflicht

Lern-/Lehrform / Type of program

Vorkenntnisse / Previous knowledge

Examination

<table>
<thead>
<tr>
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<th>Type of examination</th>
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<tr>
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<tr>
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<tr>
<td>Exercises</td>
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<td>Workload attendance 28 h</td>
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Total attendance time of module: 84 h
**lök290 - Perspectives of Bioenergy**

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<tr>
<td>Module code</td>
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<tr>
<td>ECTS credit points</td>
<td>6.0 KP</td>
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<td>Workload</td>
<td>180 h</td>
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<td>Master Landschaftsökologie &gt; Vertiefungsmodule zweites Fachsemester</td>
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<tr>
<td>Contact person</td>
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<tr>
<td>module responsibility</td>
<td></td>
</tr>
<tr>
<td>Rainer Buchwald</td>
<td></td>
</tr>
<tr>
<td>authorized examiners</td>
<td></td>
</tr>
<tr>
<td>Alle hier genannten</td>
<td></td>
</tr>
<tr>
<td>Module counseling</td>
<td></td>
</tr>
<tr>
<td>Luise Dorothee Giani</td>
<td></td>
</tr>
<tr>
<td>Thomas Klenke</td>
<td></td>
</tr>
<tr>
<td>Michael Wark</td>
<td></td>
</tr>
<tr>
<td>Prerequisites</td>
<td>Bachelor studies of Natural Science, Environmental Science or Economics</td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td>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.</td>
</tr>
<tr>
<td>Module contents</td>
<td></td>
</tr>
<tr>
<td>Recommended reading</td>
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</tr>
<tr>
<td>Languages of instruction</td>
<td>German, English</td>
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<tr>
<td>Duration (semesters)</td>
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<td>Module frequency</td>
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<td>Module capacity</td>
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<td>Modulelevel</td>
<td>MM (Mastermodul)</td>
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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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<tr>
<td>examination periods</td>
<td>Before the end of the module</td>
</tr>
<tr>
<td>Type of examination</td>
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<td>SWS</td>
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<td>Offer rhythm</td>
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<td>Workload attendance</td>
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<td>Lecture</td>
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<td>Exercises</td>
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<td>Seminar</td>
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</table>
Vertiefungsmodule drittes Fachsemester

lök310 - Group Project: Sustainable Spatial Development

<table>
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<th>Module name</th>
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<tr>
<td>Module code</td>
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<td>ECTS credit points</td>
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<td>Workload</td>
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<td>Used in degree programmes</td>
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<tr>
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<td></td>
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<tr>
<td>module responsibility</td>
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</tr>
<tr>
<td>- Ingo Mose</td>
<td></td>
</tr>
<tr>
<td>authorized examiners</td>
<td></td>
</tr>
<tr>
<td>- Alle hier genannnten</td>
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<tr>
<td>Module counseling</td>
<td></td>
</tr>
<tr>
<td>- Peter Schaal</td>
<td></td>
</tr>
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</table>

Prerequisites Participation in the module Environmental Planning

Skills to be acquired in this module

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

Module contents Review of theoretical knowledge in spatial and environmental planning based on a specific planning task reflecting or integrating practical requirements.

Recommended reading Literature will be announced during the lectures.

Links

Language of instruction German
Duration (semesters) 1 semester
Module frequency jährlich
Module capacity unlimited
Modulelevel MM (Mastermodul)
Modulart Wahlplicht
Lern-/Lehrform / Type of program P

<table>
<thead>
<tr>
<th>Vorkenntnisse / Previous knowledge</th>
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</thead>
<tbody>
<tr>
<td>Examination</td>
</tr>
</tbody>
</table>

Examination periods

Final exam of module

Type of examination

Before the end of the module

Project paper including presentation
**Module name**: Sustainable Spatial Development in Europe

**Module code**: lök320

**ECTS credit points**: 6.0 KP

**Workload**: 180 h

**Used in degree programmes**:
- Master Landschaftsökologie > Vertiefungsmodul drittes Fachsemester
- Master Sustainability Economics and Management > Ergänzungsmodul

**Contact person**
- Module responsibility: Ingo Mose
- Authorized examiners: Alle hier genannten
- Module counseling: Ingo Mose

**Prerequisites**: 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.

**Recommended reading**
- 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

**Module level**: MM (Mastermodul)

**Modularart**: Wahlpflicht
### Lern-/Lehrform / Type of program

<table>
<thead>
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<th>Examination</th>
<th>examination periods</th>
<th>Type of examination</th>
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<tr>
<td>Final exam of module</td>
<td>Before the end of the module</td>
<td>6 CP = Report or assignment</td>
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<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Offer rhythm</th>
<th>Workload attendance</th>
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<tr>
<td>Lecture</td>
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<td>28 h</td>
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<td>28 h</td>
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<tr>
<td>Seminar</td>
<td>6</td>
<td>84 h</td>
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<td>84 h</td>
</tr>
<tr>
<td>Study trip</td>
<td>2</td>
<td>28 h</td>
<td></td>
<td>28 h</td>
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</table>

| Total attendance time of module   | 140 h |


lök321 - Sustainable Spatial Development in Europe

Module name | Sustainable Spatial Development in Europe
---|---
Module code | lök321
ECTS credit points | 9.0 KP
Workload | 270 h
Used in degree programmes | Master Landschaftsökologie > Vertiefungsmodule drittes Fachsemester
Contact person | module responsibility
Ingo Mose
authorized examiners
Alle hier genannten

Prerequisites
- 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.

Recommended reading
- 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
Modulelevel | MM (Mastermodul)
Modulart | Wahlpflicht
Lern-/Lehrform / Type of program
Vorkenntnisse / Previous knowledge

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<table>
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<th>Type of examination</th>
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<td>9 CP = Report or assignment or oral examination (extended version)</td>
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<th>Offer rhythm</th>
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<td>Lecture</td>
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<td></td>
<td>28 h</td>
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<tr>
<td>Seminar</td>
<td></td>
<td>6</td>
<td></td>
<td>84 h</td>
</tr>
<tr>
<td>Study trip</td>
<td></td>
<td>2</td>
<td></td>
<td>28 h</td>
</tr>
<tr>
<td><strong>Total attendance time of module</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>140 h</strong></td>
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**Module name**  
Sustainable Spatial Development in Europe

**Module code**  
lök322

**ECTS credit points**  
15.0 KP

**Workload**  
450 h

**Used in degree programmes**  
- Master Landschaftsökologie > Vertiefungsmodul drittes Fachsemester

**Contact person**  
module responsibility
- Ingo Mose

authorized examiners
- Alle hier genannten

**Prerequisites**  
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**  

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Points</th>
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<tr>
<td>Multifunctionality and rural development</td>
<td>3 CP</td>
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<tr>
<td>Topical issues of agriculture and agricultural policy</td>
<td>1.5 CP</td>
</tr>
<tr>
<td>Sustainable tourism</td>
<td>3 CP</td>
</tr>
<tr>
<td>Renewable energy planning</td>
<td>3 CP</td>
</tr>
<tr>
<td>Colloquium on sustainable spatial development</td>
<td>1.5 CP</td>
</tr>
<tr>
<td>Special subject job market</td>
<td>3 CP</td>
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- **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.

**Recommended reading**  
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 capacity**  
unlimited

**Modulelevel**  
MM (Mastermodul)

**Modulart**  
Wahlpflicht

**Lern-/Lehrform / Type of program**  
L/S/EX

**Vorkenntnisse / Previous knowledge**  

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<table>
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<th>Type of examination</th>
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<td>Lecture</td>
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<td>28 h</td>
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<td>Seminar</td>
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<td>84 h</td>
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<td>Study trip</td>
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<td>28 h</td>
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<tr>
<td>Total attendance time of module</td>
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<td>140 h</td>
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</table>
lök330 - Geoinformatics and Remote Sensing

Module name
Geoinformatics and Remote Sensing

Module code
lök330

ECTS credit points
6.0 KP

Workload
180 h

Used in degree programmes
- Master Landschaftsökologie > Vertiefungsmodule drittes Fachsemester

Contact person
module responsibility
- Peter Schaal

authorized examiners
- Alle hier genannten

Module counseling
- Christian Aden

Prerequisites
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.

Recommended reading

Links

Language of instruction
German

Duration (semesters)
1 semester

Module frequency
jährlich

Module capacity
unlimited

Modullevel
MM (Mastermodul)

Modulart
Wahlpflicht

Lern-/Lehrform / Type of program

Vorkenntnisse / Previous knowledge

Examination examination periods Type of examination
Final exam of module Before the end of the module Specialized exercise

Course type Comment SWS Offer rhythm Workload attendance
Exercises 3 42 h
Seminar 3 42 h

Total attendance time of module 84 h
Module name | Geoinformatics and Remote Sensing  
--- | ---  
Module code | lök331  
ECTS credit points | 9.0 KP  
Workload | 270 h  
Used in degree programmes | Master Landschaftsökologie > Vertiefungsmodul drittes Fachsemester  
Contact person | module responsibility  
- Peter Schaal  
authorized examiners  
- Alle hier genannten  
Module counseling | Christian Aden  
Prerequisites | 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 geodatabases 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.  
Links |  
Language of instruction | German  
Duration (semesters) | 1 semester  
Module frequency | jährlich  
Module capacity | unlimited  
Modullevel | MM (Mastermodul)  
Modulart | Wahlpflicht  
Lern-/Lehrform / Type of program |  
Vorkenntnisse / Previous knowledge |  
Examination | examination periods | Type of examination  
Final exam of module | Before the end of the module | Specialized exercise  
Course type | Comment | SWS | Offer rhythm | Workload attendance  
Exercises | 3 | | | 42 h  
Seminar | 3 | | | 42 h  
Total attendance time of module | 84 h
**lök345 - Advanced Limnology**

### Module name
Advanced Limnology

### Module code
lök345

### ECTS credit points
6.0 KP

### Workload
180 h

### Used in degree programmes
- Master Landschaftsökologie > Vertiefungsmodule drittes Fachsemester

### Contact person
- module responsibility
  - Rolf Niedringhaus
  - Ellen Kiel
- authorized examiners
  - Alle hier genannten
- Module counseling
  - Rolf Niedringhaus

### Prerequisites
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 express-sivity 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 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

### Recommended reading
See announcements in StudIP

### Links

### Languages of instruction
German, English

### Duration (semesters)
1 semester

### Module frequency
jährlich

### Module capacity
unlimited

### Information
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

<table>
<thead>
<tr>
<th>Examination</th>
<th>examination periods</th>
<th>Type of examination</th>
<th>Workload attendance</th>
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<td>Special exercise or Assignment</td>
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<tr>
<td>Exercises</td>
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Für den Abschluss der "Master Landschaftsökologie" sind die Module "Vertiefungskurse" in drittem Fachsemester erforderlich.

**Module name**: Advanced Animal Ecology

**Module code**: lök350

**ECTS credit points**: 9.0 KP

**Workload**: 270 h

**Used in degree programmes**:
- Master Landschaftsökologie > Vertiefungsmodule drittes Fachsemester

**Contact person**
- module responsibility
  - Rolf Niedringhaus
  - Ellen Kiel
- authorized examiners
  - Alle hier genannten

**Prerequisites**
- Basic knowledge of taxonomy + determination of mainly vertebrates, basic skills in faunistic field methods, L Animal Ecology

**Skills to be acquired in this module**

**L 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 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

**L Applied Animal Ecology**
- 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

**Module contents**

**L Special Aquatic Ecology**
- 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 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 relevant to the planning) and ecologically relevant assessment of the situation in the project area; final expert opinion on the project

**L Applied Animal Ecology**
- 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

**Recommended reading**
- See announcements in StudIP

**Languages of instruction**
- German, English

**Duration (semesters)**
- 1 semester

**Module frequency**
- jährlich (annually)

**Module capacity**
- unlimited

**Information**
- Special Animal Ecology (9 CP) integrates the courses of the module Special Aquatic Ecology (6 CP), Students graduating in Special Animal Ecology cannot graduate in Special Aquatic Ecology.

**Modullevel**
- MM (Mastermodul)
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<th>Modulart/Type of program</th>
<th>Wahlpflicht</th>
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### Lern-/Lehrform / Type of program

### Vorkenntnisse / Previous knowledge

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**Total attendance time of module**: 84 h
### Special Abiotic Factors (Soil/Water)

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<th><strong>Contact person</strong></th>
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<tr>
<td>module responsibility</td>
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<tr>
<td>Luise Dorothee Giani</td>
</tr>
<tr>
<td>Janek Greskowiak</td>
</tr>
<tr>
<td>Birte Junge</td>
</tr>
<tr>
<td>Gudrun Massmann</td>
</tr>
<tr>
<td>authorized examiners</td>
</tr>
<tr>
<td>Alle hier genannten</td>
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<tr>
<td>Module counseling</td>
</tr>
<tr>
<td>Luise Dorothee Giani</td>
</tr>
<tr>
<td>Gudrun Massmann</td>
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**Prerequisites**
- 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:
- Performance of a sandbox experiment.
- Numerical modelling of groundwater flow and solute transport using PMWIN ([http://www.simcore.com](http://www.simcore.com)).
- Model setup, parameterization and numerical solution of the groundwater flow and advection-dispersion equations.

**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.

**Recommended reading**


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](http://www.fao.org/3/a-i3794e.pdf)

- see also announcements in StudIP

**Links**

**Languages of instruction**
- German, English

**Duration (semesters)**
- 1 semester

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<table>
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<tr>
<th><strong>Module frequency</strong></th>
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<table>
<thead>
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<table>
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<th><strong>Comment</strong></th>
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lök365 - Special Abiotic Factors (Soil/Water)

Module name  
Special Abiotic Factors (Soil/Water)

Module code  
lök365

ECTS credit points  
9.0 KP

Workload  
270 h

Used in degree programmes  
- Master Landschaftsökologie > Vertiefungsmodule drittes Fachsemester

Contact person  
module responsibility
  - Luise Dorothee Giani
  - Janek Greskowiak
  - Birte Junge
  - Gudrun Massmann

authorized examiners
  - Alle hier genannten

Module counseling
  - Luise Dorothee Giani
  - Gudrun Massmann

Prerequisites  
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):
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 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.

Recommended reading  
    Borntraeger Berlin.

    Heidelberg, Berlin


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

-see also announcements in StudIP.

Links

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<table>
<thead>
<tr>
<th>Languages of instruction</th>
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**Lern-/Lehrform / Type of program**

**Vorkenntnisse / Previous knowledge**

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<td>Oral examination or housework</td>
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<tr>
<td>Lecture</td>
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lök390 - Experimental designs in ecological field studies

Module name Experimental designs in ecological field studies
Module code lök390
ECTS credit points 6.0 KP
Workload 180 h

Used in degree programmes
- Master Landschaftsökologie > Vertiefungsmodule drittes Fachsemester

Contact person

module responsibility
- Ellen Kiel
- Ines Wolpmann

authorized examiners

- Alle hier genannten

Module counseling
- Ellen Kiel

Prerequisites
- 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 &#147;Aquatic Ecology&#147;
- 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.

Recommended reading
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.
### Links

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### Lern-/Lehrform / Type of program

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### Examination

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<th>examination periods</th>
<th>Type of examination</th>
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| Final exam of module         | as agreed           | Oral examination or housework  
|                              |                     | 1) oral or written presentation of the method design |
|                              |                      | 2) documentation of experimental procedure, data analysis and data processing |
|                              |                      | 3) oral or written subject-specific analysis of the planning in respect of the relevant questions and elaborated hypotheses |
|                              |                      | 4) interdisciplinary analysis of the experiments (oral or in writing) |

### Course type

<table>
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<tr>
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<th>Comment</th>
<th>SWS</th>
<th>Offer rhythm</th>
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### Total attendance time of module
56 h
**Abschlussmodul**

**mam - Master`s Degree Module**

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<td>module responsibility</td>
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- Lehrende der Landschaftsökologie

**Prerequisites**

**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.

**Recommended reading**

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**

1 semester

**Module frequency**

halbjährlich

**Module capacity**

unlimited

**Modulelevel**

Abschlussmodul (Abschlussmodul)

**Modulart**

Pflicht

**Vorkenntnisse / Previous knowledge**

**Examination**

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