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**Basismodule**

lök100 - Data Modelling

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<th>Data Modelling</th>
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<tr>
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**Applicability of the module**
- Master's Programme Landscape Ecology (Master) > Basismodule

**Responsible persons**
- Peppler-Lisbach, Cord (module responsibility)
- Peppler-Lisbach, Cord (Module counselling)
- Peppler-Lisbach, Cord (Prüfungsberechtigt)
- Greskowski, Janek (Prüfungsberechtigt)

**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

**Recommended reading**

Additional literature will be announced during the course.
<table>
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<tr>
<th>Links</th>
<th><a href="https://www.uni-oldenburg.de/en/landeco/">https://www.uni-oldenburg.de/en/landeco/</a></th>
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Iök110 - Ecology

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**Applicability of the module**
- Master’s Programme Landscape Ecology (Master) > Basismodule

**Responsible persons**
- Kleyer, Michael (module responsibility)
- Kleyer, Michael (Module counselling)
- Kiel, Ellen (Module counselling)
- Zotz, Gerhard (Module counselling)
- Kleyer, Michael (Prüfungsberechtigt)
- Kiel, Ellen (Prüfungsberechtigt)
- Albach, Dirk Carl (Prüfungsberechtigt)
- Zotz, Gerhard (Prüfungsberechtigt)

**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

**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 capacity**
unlimited

**Module level**

**Type of module**

**Teaching/Learning method**

**Previous knowledge**

**Examination**

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**Type of course**
Lecture

**SWS**
3

**Frequency**

**Workload Präsenzzeit**
42 h
Module label: Geoecological Processes
Module abbreviation: lök120
Credit points: 6.0 KP
Workload: 180 h

Applicability of the module:
- Master's Programme Landscape Ecology (Master) > Basismodule

Responsible persons:
- Massmann, Gudrun (module responsibility)
- Massmann, Gudrun (Module counselling)
- Freund, Holger (Prüfungsberechtigt)
- Kalinina, Olga (Prüfungsberechtigt)
- Massmann, Gudrun (Prüfungsberechtigt)
- Maurischat, Philipp (Prüfungsberechtigt)

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.

Links:
https://uol.de/ibu

Language of instruction:
German

Duration (semesters):
1 Semester

Module frequency:
jährlich

Module capacity:
30

Module level:

Type of module:

Teaching/Learning method:

Previous knowledge:

Examination
Examination times
Type of examination
Final exam of module
Before the end of the module
Written examination

Type of course
Comment
SWS
Frequency
Workload of compulsory attendance

Type of course
Lecture
2

Exercises (mit Exkursion)
2
WiSe
28

Total module attendance time
56 h
lök130 - Environmental Planning

Module label: Environmental Planning
Module abbreviation: lök130
Credit points: 9.0 KP
Workload: 270 h

Applicability of the module:
- Master's Programme Landscape Ecology (Master) > Basismodule

Responsible persons:
- Schaal, Peter (module responsibility)
- Schaal, Peter (Module counselling)
- Kalinina, Olga (Prüfungsberechtigt)
- Lecke-Lopatta, Thomas (Prüfungsberechtigt)
- Schaal, Peter (Prüfungsberechtigt)
- Prinz, Markus (Prüfungsberechtigt)
- Hübbota, Lisa (Prüfungsberechtigt)

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

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

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

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

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

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

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

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

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

Language of instruction: German
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**Previous knowledge**

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**Type of course**

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**SWS**

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**Frequency**

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### Module Contents

**Module contents**

#### a) Praktisches Arbeiten mit GIS (Ü)

The students will learn the development of Geo-data banks and the use of complex geographic analysis tools in the field of vector and raster analysis.

#### b) Analysen und Modelle (Se/Ü)

The students will be enabled to answer spatially complex GIS analysis questions (erosion models, route planning) and to integrate spatial modeling.

### Recommended reading

**Recommended reading**

- Law, Michael; Collins, Amy: Getting to Know ArcGIS (Englisch), 2015.
- Berkhoff, K.; GIS-basierte Modellierung der Grundwasserempfindlichkeit in...
<table>
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**Module label**
Geographical Information Systems - Data Management and Geostatistical Analysis

**Module abbreviation**
lök145

**Credit points**
6.0 KP

**Workload**
180 h

**Applicability of the module**
- Master's Programme Landscape Ecology (Master) > Basismodule

**Responsible persons**
- Schaal, Peter (module responsibility)
- Aden, Christian (Prüfungsberechtigt)
- Schaal, Peter (Prüfungsberechtigt)

**Prerequisites**
Wer in seinem Bachelorstudium keine vertiefenden GIS-Kenntnisse erworben hat, sollte das vorlaufende Modul „GIS-Anwendungen in der Landschaftsökologie“ absolviert haben.

**Skills to be acquired in this module**

**Vermittelte Qualifikation:**
- Basiswissen über die Ziele und Nutzen von Geodateninfrastrukturen und internationalen Standards für Geodaten und Geodatendienste
- Implementieren und Anwenden von Standards für die Publikation von Geodaten und Geodatendiensten (WMS, WPS, CSW)
- Einsatz von Geodatenbanken für das Management von Geodaten und deren Analyse
- Verwendung geostatistischer Verfahren und GIS-Analysen mittels GIS und Statistik-Software
- Stellenwert/Verortung Modul im Studiengang

++ An aktuellen Forschungsfragen orientierte sowie theoriegestützte Vertiefung von Grundlagenwissen sowie Aneignung von Detailwissen in den Einzeldisziplinen der Landschaftsökologie
++ Erkennen und analysieren komplexer ökologischer Interdependenzen und Zusammenhänge im Rahmen eines landschaftsökologischen Systemverständnisses
++ Befähigung zum Transfer, d.h. Übertragen, Anpassen und Erweitern von erlerntem Wissen auf neue Problemstellungen und Kompetenz zur Problemlösung
++ Erlernen und selbständiges, zielgerichtetes Anwenden von Methodenkenntnissen in wissenschaftlichen Forschungsarbeiten: Erfassungs-, Mess-, Auswertungs-, Modellierungs-, Bewertungs- und Planungsmethoden
++ Befähigung zur (auch englischsprachigen) fachlichen und fachübergreifenden Präsentation und Kommunikation von Arbeitsergebnissen gegenüber unterschiedlichen Adressatengruppen
++ Soziale und interkulturelle Kompetenz zur Zusammenarbeit in Teams unterschiedlicher Zusammensetzung
++ Verantwortungsvolles Anwenden der erlerneten Kompetenzen, Fähigkeiten und Fertigkeiten in verschiedenen Feldern der landschaftsökologischen Berufspraxis

**Module contents**

a) WebGIS und Datenmanagement (Ü)
- Einführung in Geodateninfrastrukturen, Web Mapping, WebGIS und internationale Standards
- Arbeiten mit (Geo-)Datenbanken für Vektor- und Rasterdaten
- Aufbereitung, Integration und Vorhaltung von Geodaten in verschiedenen Formaten und Geodatenbanken
- Gezielte Abfragen von Vektor- und Rasterdaten
- Gezielte Abfragen von Vektor- und Rasterdaten mit der Structured Query Language (SQL) und PostGIS-Funktionen
- Einsetzen von MapClients in Webseiten, Erfassen von Geodaten mit Hilfe von Formularen und digitalen Karten sowie Speicherung der Daten in Geodatenbanken
- Herstellen und Abbilden von Karten in MapClients und interoperablen GIS auf
Basis von Standards des Open Geospatial Consortiums (OGC), einschl. Symbologie, Labels, Charts, Datenabfragen, ...

b) Rasteranalysen und Geostatistik (Se/Ü)

Geostatistische Verfahren und Herstellung von Rasterdaten

Rastermanagement (Aufbereitung, Integration und Vorhaltung in Geodatenbanken, Export von Rasterformaten)

Verarbeitung und Analyse von Rasterdaten mit Hilfe von
- PostGIS (Rasterstatistiken und Manipulation)
- GRASS GIS (Surface-Analysen und Interpolationen analog zu ArcGIS)
- R for Statistics (Integration von Rasterdaten, Reklassifizieren, Clip/Mask, zonale Statistiken, Habitatmodellierung)
- Web Processing Services (Einbindung von Funktionen aus R und GRASS GIS in Python-Skripte, webbasierte Ansprachen von Funktionen unter Beachtung von Standards des Open Geospatial Consortiums (OGC))

Recommended reading

Links
Language of instruction German
Duration (semesters) 1 Semester
Module frequency
Module capacity 30
Module level
Type of module
Teaching/Learning method
Previous knowledge
Examination Examination times Type of examination
Final exam of module Veranstaltungsende Ü
Type of course Exercises
SWS 4
Frequency SoSe oder WiSe
Workload Präsenzzeit 56 h
bio675 - Molecular Ecology

Module label: Molecular Ecology
Module abbreviation: bio675
Credit points: 12.0 KP
Workload: 360 h

Applicability of the module:
- Master's Programme Biology (Master) > Background Modules
- Master's Programme Landscape Ecology (Master) > Basismodule

Responsible persons:
- Nolte, Arne (module responsibility)
- Gerlach, Gabriele (Module counselling)
- Nolte, Arne (Prüfungsberechtigt)
- Gerlach, Gabriele (Prüfungsberechtigt)
- Dennenmoser, Stefan (Prüfungsberechtigt)

Prerequisites:
- B.Sc. (Biologie, Umweltwissenschaften) M.Sc. (Biologie, Marine Umweltwissenschaften, Landschaftsökologie)

Skills to be acquired in this module:
The field of molecular ecology strives to identify relationships between species genotypes, phenotypes and ecological factors. It addresses questions about how organisms adapt and explains patterns of distribution and biodiversity. During the course, participants will get to know the biological background to design an experiment in the field of molecular ecology. We will discuss the state of the art according to literature. Participants will perform sampling and conduct steps of the analysis. The course will cover field methods (sampling) and lab methods (behavior experiments, genetic analyses, phenotypic analyses) as well as computer based analyses.

++ deepened biological expertise
++ deepened knowledge of biological working methods
++ data analysis skills
+ interdisciplinary thinking
+ critical and analytical thinking
+ independent searching and knowledge of scientific literature
++ ability to perform independent biological research
++ data presentation and discussion (E) (written and spoken)
+ statistics & scientific programming

Module contents:
Lecture: AN/GG - Molecular ecology background of specific study systems. The lectures will introduce a study system that will be analyzed during the course (study systems may vary from year to year). It is the goal of the lecture to provide students with background information to develop an experimental design of a field study during the practical. Exercise: AN/GG - Mixed course with laboratory and field exercises. Samples will be collected in the field. One goal of the course is to apply modern analyses to understand how organisms are distributed. Another aspect is the application of molecular markers to analyze behavioral experiments.

Recommended reading:
will be announced during the course

Links:

Languages of instruction: German, English
Duration (semesters): 1 Semester
Module frequency: summer term
Module capacity: 15
Reference text: associated with bio890 Current Topics of Biology (Seminar)
Module level: MM (Mastermodul / Master module)
Type of module: Wahlpflicht / Elective
Teaching/Learning method: Lecture, Exercise
Previous knowledge: Reading English literature and presenting seminar topics in English. Basic knowledge of working in a gene laboratory and with a computer.

Examination:
- Examination times
- Type of examination
  - Presentations (50%), Portfolio (50%). Regular participation is a prerequisite to pass in the module.

Final exam of module:
- during the module
  - Type of course: Comment
  - SWS
  - Frequency
  - Workload of compulsory attendance
    - Lecture: 2
      - SoSe 28
    - Exercises: 6
      - SoSe 84


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## bio770 - Field Methods in Organismal Biology

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### Applicability of the module
- Master's Programme Biology (Master) > Background Modules
- Master's Programme Biology (Master) > Background Modules
- Master's Programme Landscape Ecology (Master) > Basismodule

### Responsible persons
- Zotz, Gerhard (module responsibility)
- Gerlach, Gabriele (Module counselling)
- Albach, Dirk Carl (Module counselling)
- von Hagen, Klaus Bernhard (Module counselling)
- Mouritsen, Henrik (Module counselling)
- Nolte, Arne (Module counselling)
- Zotz, Gerhard (Prüfungsberechtigt)
- Gerlach, Gabriele (Prüfungsberechtigt)
- Albach, Dirk Carl (Prüfungsberechtigt)
- Will, Maria (Prüfungsberechtigt)
- von Hagen, Klaus Bernhard (Prüfungsberechtigt)
- Mouritsen, Henrik (Prüfungsberechtigt)
- Nolte, Arne (Prüfungsberechtigt)
- Khan, Gulzar (Prüfungsberechtigt)

### Prerequisites
++ deepened biological expertise
++ deepened knowledge of biological working methods
++ data analysis skills
+ interdisciplinary thinking
++ critical and analytical thinking
++ independent searching and knowledge of scientific literature
++ ability to perform independent biological research
+ data presentation and discussion (E) (written and spoken)
++ project and time management
++ statistics & scientific programming

The module aims at enabling students to apply theoretical knowledge to practical, hypothesis-based field studies within the scope of a seminar. The data derived from the individual projects performed are then to be documented and discussed in the form of a written laboratory course report oriented by a scientific publication and to be written in English. Several teachers cooperate to enable interdisciplinary approaches (e.g. botanical-zoological approaches).

### Module contents
**S:** Biogeographic and ecological classification and characterization of a biome (e.g. Mediterranean region, moist tropics, boreal zone), independent identification and treatment of scientific questions, presentation of scientific results in a "mini symposium" subsequent to the field studies. **E:** Planning and performing a field study project, data analysis, written report in the form of a scientific publication

### Recommended reading
Varies with topic and field locality

### Links
[www.uni-oldenburg.de/fun_eco/](http://www.uni-oldenburg.de/fun_eco/)

### Languages of instruction
German, English

### Duration (semesters)
1 Semester

### Module frequency
jährlich

### Module capacity
21

### Module level
je nach Studiengang Pflicht oder Wahlpflicht

### Teaching/Learning method

### Previous knowledge

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Total module attendance time 168 h
**Skills to be acquired in this module**

Die Studierenden verstehen die geologischen, sedimentologischen und landschaftsprägenden Transport- und Ablagerungsprozesse im nordwestdeutschen Tiefland (fluviatiler, äolischer, mariner und glazigener Transport) sowie die Verknüpfung dieser Prozesse mit den wichtigsten Vegetationstypen (Wälder, Moore, Trockenlebensräume, Küstenlebensräume) dieser Region.

**Module contents**

**VL Nordwestdeutsches Küstenholozän – Geologie, Vegetation und Biostratigraphie**


**PR/Ü Biologische Methoden der Faziesansprache von Küstenablagerungen – Pollen- und Diatomeenanalyse**


**Recommended reading**


Weitere Literatur wird in den Veranstaltungen angegeben.

**Links**

Language of instruction: German

Duration (semesters): 1 Semester

Module frequency: jährlich

Module capacity: 20
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<td>Type of examination</td>
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<td>Abgabe des Berichts bis Ende des Semesters</td>
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<td>Frequency</td>
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<td>SoSe</td>
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<td>SoSe</td>
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mar458 - Aquatic Ecology

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<td>Workload</td>
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**Applicability of the module**
- Master's Programme Environmental Modelling (Master) > Mastermodule
- Master's Programme Landscape Ecology (Master) > Basismodule
- Master's Programme Marine Environmental Sciences (Master) > Mastermodule

**Responsible persons**
- Brinkhoff, Thorsten Henning (module responsibility)
- Garcia, Sarahi Lorena (Module counselling)

**Prerequisites**
- Keine

**Skills to be acquired in this module**

Studierende können nach erfolgreichem Besuch der Veranstaltungen die Bedeutung von Schwebstoffen für die Ökologie und Biogeochemie und die Gefährdung von Gewässern einschätzen und beurteilen, da sie sich vertieftes Wissen über folgende Gebiete angeeignet haben:

**VL Grundlagen des Gewässerschutzes:**
Störungen und Gefährdung natürlicher Gewässer, Eutrophierung, Phosphor- und Stickstoffbelastung natürlicher Gewässer, Saprobiensysteme, Gewässerversauerung, hygienische Belastung, Trinkwasseraufbereitung, Abwasserklärung, hormonell wirksame Substanzen

**VL Biologische Bedeutung von Schwebstoffen**

**Module contents**

**VL Grundlagen des Gewässerschutzes**
Allgemeine Grundlagen zum Verständnis von Gewässern (Seen, Flüsse, Grundwasser, Ästuare, Küstenmeere) für deren Gefährdungspotenzial.

Eutrophierung und Sanierung von Gewässern, Bedeutung von Phosphor- und Stickstoffverbindungen für die Nährstoffbelastung von Gewässern, chemische und biologische Charakterisierung und Klassifizierung von Gewässern, Ursachen und Folgen der Gewässerversauerung, hygienische Belastung, Trinkwasserversorgung und -aufbereitung, mechanische, biologische und chemische Abwasserklärung, hormonell wirksame Substanzen

**VL Biologische Bedeutung von Schwebstoffen**

**Recommended reading**

**VL Grundlagen des Gewässerschutzes**
- Skript vorhanden, wird auf Stud.IP hochgeladen.


Gunkel, G., Renaturierung kleiner Fließgewässer, Gustav Fischer Verlag, Jena 1996.

Lozan, J.L. et al., Warnsignale aus der Nordsee, Paul Parey Verlag, Hamburg 1990.

Lozan, J.L. et al., Warnsignale aus der Ostsee, Paul Parey Verlag, Hamburg 1996.


Schulze, E., Hygienisch-mikrobiologische Wasseruntersuchungen, Gustav Fischer Verlag, Jena 1996.


VL Biologische Bedeutung von Schwebstoffen

Skrift vorhanden, wird auf Stud.IP hochgeladen.

Weitere Literatur wird zu Beginn der VL bereitgestellt.

Links
Languages of instruction  German, English
Duration (semesters)  2 Semester
Module frequency  jährlich
Module capacity  unlimited
Module level
Type of module
Teaching/Learning method
Previous knowledge
Examination
Examination times  Nach Ende der Vorlesungszeit
Type of examination  KL
Final exam of module
Type of course  Lecture
SWS  4
Frequency  SoSe und WiSe
Workload Präsenzzzeit  56 h
mar246 - Coastal Hydrogeology and Biogeochemistry

Module label: Coastal Hydrogeology and Biogeochemistry
Module abbreviation: mar246
Credit points: 6.0 KP
Workload: 180 h

Applicability of the module:
- Master's Programme Landscape Ecology (Master) > Basismodule
- Master's Programme Marine Environmental Sciences (Master) > Mastermodule

Responsible persons:
- Waska, Hannelore (module responsibility)
- Massmann, Gudrun (Module counselling)

Prerequisites:
Skills to be acquired in this module: Wird zum SoSe 2024 bereit gestellt

Module contents

Recommended reading

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

Module level

Type of module

Teaching/Learning method

Previous knowledge

Examination
Examination times
Type of examination
Final exam of module
Klausur oder mündliche Prüfung oder Präsentation oder Hausarbeit

Type of course
VA-Auswahl (1VL, 1 Ü oder 1 VL, 1 SE oder 1 SE, 1 Ü)

SWS
Frequency: SoSe
Workload Präsenzzeit: 0 h
## Module: Basic Concepts in Plant Sciences

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<tbody>
<tr>
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<tr>
<td>Credit points</td>
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<td>Workload</td>
<td>360 h</td>
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| Applicability of the module | Master's Programme Biology (Master) > Background Modules  
Master's Programme Landscape Ecology (Master) > Basismodule |
| Responsible persons | Zotz, Gerhard (module responsibility)  
Albach, Dirk Carl (Module counselling)  
von Hagen, Klaus Bernhard (Module counselling)  
Zotz, Gerhard (Prüfungsbeauftragter)  
Albach, Dirk Carl (Prüfungsbeauftragter)  
von Hagen, Klaus Bernhard (Prüfungsbeauftragter)  
Will, Maria (Prüfungsbeauftragter) |
| Prerequisites | |
| Skills to be acquired in this module | Communicating deeper knowledge in ecology, phylogeny, evolution and genetics of plants  
Communicating scale- and method-overarching thinking  
Communicating deeper theoretic concepts of ecology, evolution and genetics of plants.  
++ deepened biological expertise  
+ deepened knowledge of biological working methods  
+ data analysis skills  
+ interdisciplinary thinking  
++ critical and analytical thinking  
++ independent searching and knowledge of scientific literature  
+ ability to perform independent biological research  
++ data presentation and discussion in English (written and spoken)  
+ teamwork  
++ ethics and professional behaviour |
| Module contents | V: Biodiversity of plants (2 SWS)  
V: Resource acquisition and use by plants (1 SWS)  
V: Gene expression in plants (1 SWS)  
S: Phylogeny of plants (2 SWS)  
S: Interactions of plants with environmental parameters (2 SWS) |
| Links | |
| Languages of instruction | German, English |
| Duration (semesters) | 1 Semester |
| Module frequency | winter term |
| Module capacity | 12 |
| Reference text | associated with bio765 (Current Methods in Plant Science) (recommended) |
| Module level | MM (Mastermodul / Master module) |
| Type of module | Wahlpflicht / Elective |
| Teaching/Learning method | Lecture, seminar |
| Previous knowledge | Ecology, flora, genetics |
| Examination | Examination times  
Type of examination |
| Final exam of module | 1 Portfolio |
| Type of course | Comment  
SWS | Frequency | Workload of compulsory attendance |
| Lecture | 4 | WiSe | 56 |
| Seminar | 4 | WiSe | 56 |
| Total module attendance time | 112 h |
### Module label
Current Methods in Plant Sciences - Ecology, Phylogeny and Molecular Biology

### Module abbreviation
bio765

### Credit points
12.0 KP

### Workload
360 h

### Applicability of the module
- Master's Programme Biology (Master) > Background Modules
- Master's Programme Biology (Master) > Background Modules
- Master's Programme Landscape Ecology (Master) > Basismodule

### Responsible persons
- Albach, Dirk Carl (module responsibility)
- Zotz, Gerhard (Module counselling)
- Will, Maria (Module counselling)
- Khan, Gutzar (Module counselling)
- von Hagen, Klaus Bernhard (Module counselling)
- Will, Maria (Prüfungsberechtigt)
- Albach, Dirk Carl (Prüfungsberechtigt)
- Zotz, Gerhard (Prüfungsberechtigt)
- Khan, Gutzar (Prüfungsberechtigt)
- von Hagen, Klaus Bernhard (Prüfungsberechtigt)

### Prerequisites

### Skills to be acquired in this module
- Acquaintance and practicing ecological, phylogenetic and molecular methods
- Communication of scale- and method-overarching thinking and project planning
- Knowledge of current methods and questions in plant science
- Capacity for teamwork, project- and time management
- ++ deepened biological expertise
- ++ deepened knowledge of biological working methods
- ++ data analysis skills
- ++ interdisciplinary thinking
- + critical and analytical thinking
- + independent searching and knowledge of scientific literature
- + ability to perform independent biological research
- + data presentation and discussion (written and spoken)
- + teamwork
- + statistics & scientific programming

### Module contents
Ü: Current Methods in Plant Science (8 SWS)

### Recommended reading

### Links

### Languages of instruction
German, English

### Duration (semesters)
1 Semester

### Module frequency

### Module capacity
12

### Reference text
associated with bio703 (Basic Concepts in Plant Sciences) (recommended)

### Module level

### Type of module

### Teaching/Learning method

### Previous knowledge

<table>
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<th>Type of examination</th>
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<td>Portfolio</td>
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### Type of course
- Exercises

### SWS
8

### Frequency
WiSe

### Workload Präsenzzzeit
112 h
Iök810 - Landscape Ecology External Research Project

Module label: Landscape Ecology External Research Project

Module abbreviation: Iök810

Credit points: 15.0 KP

Workload: 450 h

Applicability of the module:
- Master's Programme Landscape Ecology (Master) > Basismodule
- Master's Programme Landscape Ecology (Master) > Vertiefungsmodul drittes Fachsemester

Responsible persons:
- Schmaljohann, Heiko (module responsibility)
- Schmaljohann, Heiko (Module counselling)
- der Landschaftsökologie, Lehrende (Prüfungsberechtigt)

Prerequisites:

Skills to be acquired in this module:
- ++ deepened expertise in landscape ecology
- ++ deepened knowledge of working methods in the field of landscape ecology
- ++ data analysis skills
- ++ critical and analytical thinking
- ++ independent searching and knowledge of scientific literature
- ++ ability to perform independent landscape ecology research
- ++ data presentation and discussion in German or English (written and spoken)
- + teamwork
- ++ project and time management
- ++ statistics & scientific programming
- ++ experience of working in a new scientific environment

Students perform individual research projects to learn:
- planning and organization of a research project in a group outside of the University of Oldenburg
- formulating a scientific hypothesis
- planning, performing and analyzing experiments or correlative studies
- working with scientific literature on the specific context of the project
- oral presentation and discussion of backgrounds and results in the lab seminar
- writing a scientific report in publication format
- or presenting a scientific poster

Module contents:

Students are introduced to independent research in a specific area of landscape ecology by a working group of the regular IBU Biology faculty at the University of Oldenburg.

Course work should cover all parts of a scientific project, i.e. developing hypotheses, data collection, data analysis and the presentation of the results. Irrespective of the particular venue (universities, research institutes) the student has to report to a professor in Oldenburg in form of a written scientific report (or scientific poster) and an oral presentation, both in English or German.

Note:
- all Professors and fulltime lecturers in Landscape Ecology fat the IBU can act
as supervisor, students should contact appropriate supervisors individually and in time (e.g. 2-3 months in advance)

**Recommended reading**

**Links**

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<tr>
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**Module level**

**Teaching/Learning method**

**Previous knowledge**

**Examination**

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**Type of course**

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<td>SoSe oder WiSe</td>
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<tr>
<td>Seminar</td>
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<td>SoSe oder WiSe</td>
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**Total module attendance time**

0 h
# Iök900 - Landscape Ecology Internal Research Module

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<td>Master's Programme Landscape Ecology (Master) &gt; Vertiefungsmodule drittes Fachsemester</td>
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<td>Responsible persons</td>
<td>Schmaljohann, Heiko (module responsibility)</td>
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<td>Schmaljohann, Heiko (Module counselling)</td>
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<td>der Landschaftsoekologie, Lehrende (Prüfungsberechtigt)</td>
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### Prerequisites

**Skills to be acquired in this module**

- ++ deepened expertise in landscape ecology
- ++ deepened knowledge of working methods in the field of landscape ecology
- ++ data analysis skills
- ++ critical and analytical thinking
- ++ independent searching and knowledge of scientific literature
- ++ ability to perform independent landscape ecology research
- ++ data presentation and discussion in German or English (written and spoken)
- + teamwork
- ++ project and time management
- ++ statistics & scientific programming
- ++ experience of working in a new scientific environment

Students perform individual research projects to learn:

- planning and organization of a research project in a group outside of the University of Oldenburg
- formulating a scientific hypothesis
- planning, performing and analyzing experiments or correlative studies
- working with scientific literature on the specific context of the project
- oral presentation and discussion of backgrounds and results in the lab seminar
- writing a scientific report in publication format
- or presenting a scientific poster

### Module contents

Students are introduced to independent research in a specific area of landscape ecology by a working group of the regular IBU Biology faculty at the University of Oldenburg.

Course work should cover all parts of a scientific project, i.e. developing hypotheses, data collection, data analysis and the presentation of the results. Irrespective of the particular venue (universities, research institutes) the student has to report to a professor in Oldenburg in form of a written scientific report (or scientific poster) and an oral presentation, both in English or German.
Note:

- all Professors and fulltime lecturers in Landscape Ecology at the IBU can act as supervisor, students should contact appropriate supervisors individually and in time (e.g. 2-3 months in advance)

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<tr>
<th>Recommended reading</th>
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<td>SoSe oder WiSe</td>
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28 / 73
Vertiefungsmodule zweites Fachsemester

lök210 - Practice of Nature Conservation

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Applicability of the module
- Master's Programme Landscape Ecology (Master) > Vertiefungsmodule zweites Fachsemester
- Master's Programme Sustainability Economics and Management (Master) > Additional Modules
- Master's Programme Water and Coastal Management (Master) > Science

Responsible persons
- Buchwald, Rainer (module responsibility)
- Mose, Ingo (module responsibility)
- Buchwald, Rainer (Module counselling)
- Mose, Ingo (Module counselling)
- Buchwald, Rainer (Prüfungsberechtigt)
- Dörfler, Inken (Prüfungsberechtigt)
- Mose, Ingo (Prüfungsberechtigt)
- Fartmann, Thomas (Prüfungsberechtigt)
- Janßen, Hans-Joachim, Dipl.-Ing. (Prüfungsberechtigt)

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 "Introduction to the German Nature Conservation Law": This course deals with some parts of the Nature Conservation Law of Germany and Lower Saxony and discusses their relevance to the actual Nature Conservation policy in Northwest-Germany. 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
https://www.uni-oldenburg.de/vegetationskunde/
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<th>German, English</th>
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<tr>
<td>Teaching/Learning method</td>
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<td>Previous knowledge</td>
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<tr>
<td>Examination</td>
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<td>Before the end of the module</td>
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**Total module attendance time**

98 h
### lök211 - Practice of Nature Conservation

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<td>Workload</td>
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### Applicability of the module
- Master's Programme Landscape Ecology (Master) > Vertiefungsmodule zweites Fachsemester

### Responsible persons
- Buchwald, Rainer (module responsibility)
- Mose, Ingo (module responsibility)
- Buchwald, Rainer (Module counselling)
- Mose, Ingo (Module counselling)
- Buchwald, Rainer (Prüfungsberechtigt)
- Dörfler, Inken (Prüfungsberechtigt)
- Fartmann, Thomas (Prüfungsberechtigt)
- Mose, Ingo (Prüfungsberechtigt)
- Janßen, Hans-Joachim, Dipl.-Ing. (Prüfungsberechtigt)

### 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.

### 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 "Introduction to the German Nature Conservation Law": This course deals with some parts of the Nature Conservation Law of Germany and Lower Saxony and discusses their relevance to the actual Nature Conservation policy in Northwest-Germany. 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
- https://www.uni-oldenburg.de/vegetationskunde/

### Languages of instruction
- German, English

### Duration (semesters)
- 1 Semester

### Module frequency
- jährlich

### Module capacity
- 35

### Module level

### Type of module
### Teaching/Learning method

#### Previous knowledge

<table>
<thead>
<tr>
<th>Examination</th>
<th>Examination times</th>
<th>Type of examination</th>
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</thead>
<tbody>
<tr>
<td><strong>Final exam of module</strong></td>
<td>Before the end of the module</td>
<td>9 CP – graded oral examination (Mose/Buchwald), additionally active participation in both seminars</td>
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<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload of compulsory attendance</th>
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<tr>
<td>Lecture</td>
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<td>1</td>
<td>14</td>
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</tr>
<tr>
<td>Seminar</td>
<td>2</td>
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<tr>
<td>Study trip</td>
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**Total module attendance time**: 98 h
# lök225 - Peatland Ecology

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<tr>
<td>Responsible persons</td>
<td>Massmann, Gudrun (module responsibility) Massmann, Gudrun (Module counselling) Caspers, Gerfried (Prüfungsberechtigt) Massmann, Gudrun (Prüfungsberechtigt) Peppler-Lisbach, Cord (Prüfungsberechtigt) Maurischat, Philipp, Dr. (Prüfungsberechtigt)</td>
</tr>
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</table>

## Skills to be acquired in this module


## Module contents

- *Applied Peat Ecology (Ex)*
- *Ecology of Peatlands (S)*

## Recommended reading

Literatur wird je nach Entwicklung des Forschungsfeldes im Rahmen der Vorbereitung zum Seminar bekannt gegeben.

## Languages of instruction

German, English

## Duration (semesters)

1 Semester

## Module frequency

jährlich

## Module capacity

24

## Module level

Type of module

### Teaching/Learning method

### Previous knowledge

<table>
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<tr>
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<th>Type of examination</th>
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<tbody>
<tr>
<td>Seminar</td>
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<td>2</td>
<td>SoSe und WiSe</td>
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<td>Study trip</td>
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<td>SoSe und WiSe</td>
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| Total module attendance time | 56 h |
Iök229 - Soil Ecology and Soil Landscapes

<table>
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<th>Soil Ecology and Soil Landscapes</th>
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<tbody>
<tr>
<td>Module abbreviation</td>
<td>Iök229</td>
</tr>
<tr>
<td>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>Applicability of the module</td>
<td>• Master's Programme Landscape Ecology (Master) &gt; Vertiefungsmodule zweites Fachsemester</td>
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<tr>
<td>Responsible persons</td>
<td>• Kalinina, Olga (module responsibility)</td>
</tr>
<tr>
<td></td>
<td>• Kalinina, Olga (Module counselling)</td>
</tr>
<tr>
<td></td>
<td>• Massmann, Gudrun (Module counselling)</td>
</tr>
<tr>
<td></td>
<td>• Kalinina, Olga (Prüfungsberechtigt)</td>
</tr>
</tbody>
</table>

Prerequisites

Skills to be acquired in this module

The objectives of the module:
- to learn the field and laboratory methods of soil investigation in relation to the scientific objectives;
- to analyse the field and laboratory data and to apply modern statistical methods;
- to learn the soil evaluation on the basis of field and laboratory data
- to apply the field and laboratory data for the landscape analyse;
- to analyse ecological processes in the soil-plant-system;
- to analyse the ecological interrelation within an landscape;
- to work on scientific questions on your own;
- to communicate in team to solve a problem.

Module contents

Field exercises: soil investigation in the context of landscape and soil simpling in relation to a focus of study; humus form as indication a dynamics of the ecosystem

Laboratory exercises: Analytical procedures for soil characterization in relation to a focus of study, calculation of laboratory data.

Seminar: Analyse the field and laboratory data; apply modern statistical methods; critical discussion of the field and laboratory data, evaluation of landscape and ecosystem using the field and laboratory data.

Recommended reading

Schlichting, Blume, Stahr (1995); Bodenkundliches Praktikum, Blackwell.
NIBIS Kartenserver
see StudIP.

Links

https://nibis.lbeg.de/cardomap3/#

Language of instruction

German

Duration (semesters)

2 Semester

Module frequency

WiSe and SoSe
Reference text

associated with the following modules:
lök120: Geoeocological Processes
lök280/lök285: Special Vegetation Ecology

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<tr>
<td></td>
<td>3 hrs/w exercise WiSe</td>
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<tr>
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<td>1 hrs/w seminar Wise</td>
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<table>
<thead>
<tr>
<th>Reference text</th>
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Module level

| Type of module | MM (Mastermodul / Master module) |

Type of module

<table>
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<th>Teaching/Learning method</th>
<th>2 hrs/w Übung/exercise</th>
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<tbody>
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<td></td>
<td>3 hrs/w Übung/exercise</td>
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<tr>
<td></td>
<td>1 hrs/w Seminar/seminar</td>
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</table>

Previous knowledge

| Vegetation Ecology, geology, chemistry, ecology, soil science |

Examination

<table>
<thead>
<tr>
<th>Examination</th>
<th>Examination times</th>
<th>Type of examination</th>
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Final exam of module

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<tbody>
<tr>
<td>Seminar</td>
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<td>SoSe und WiSe</td>
<td>56</td>
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<tr>
<td>Exercises</td>
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<td>SoSe und WiSe</td>
<td>28</td>
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</tbody>
</table>

Total module attendance time

| 84 h |

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Iök230 - Aquatic Ecology

Module label: Aquatic Ecology
Module abbreviation: Iök230
Credit points: 9.0 KP
Workload: 270 h

Applicability of the module:
- Master's Programme Landscape Ecology (Master) > Vertiefungsmodule zweites Fachsemester

Responsible persons:
- Kiel, Ellen (module responsibility)
- Kiel, Ellen (Module counselling)
- Kiel, Ellen (Prüfungsberechtigt)

Prerequisites:
Gewässerökologische Grundkenntnisse (entsprechend den Angeboten B.Sc. UWI)

Skills to be acquired in this module:
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:

Type of module:

Teaching/Learning method:

Previous knowledge:

Examination Examination times Type of examination
Final exam of module Before the end of the module 1 assignment (English, publication form)

Type of course Comment SWS Frequency Workload of compulsory attendance
Lecture 2 SoSe 28
Exercises 2 SoSe 28
Seminar 2 SoSe 28

Total module attendance time 84 h
### Module Information

**Module label:** Functional ecology of communities in heterogeneous landscapes

**Module abbreviation:** lök240

**Credit points:** 15.0 KP

**Workload:** 450 h

**Applicability of the module:**
- Master's Programme Landscape Ecology (Master) > Vertiefungsmodule zweites Fachsemester

**Responsible persons:**
- Kleyer, Michael (module responsibility)
- Kleyer, Michael (Module counselling)
- Kleyer, Michael (Prüfungsberechtigt)

### Prerequisites

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

### Type of module

**Module level:**

**Teaching/Learning method:**

**Previous knowledge:**

**Examination**

**Examination times**

**Type of examination**

a) Seminar paper (weighting 20 %)
b) Specialized practical exercise (weighting 80 %)

**Type of course**

**Comment**

**SWS**

**Frequency**

**Workload of compulsory attendance**

**Exercises**

<table>
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<tr>
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# lök250 - Functional Ecology of Plants

<table>
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<tr>
<td>Workload</td>
<td>450 h</td>
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### Applicability of the module
- Master's Programme Landscape Ecology (Master) > Vertiefungsmodule zweites Fachsemester

### Responsible persons
- Zotz, Gerhard (module responsibility)
- Zotz, Gerhard (Module counselling)
- Einzmann, Helena (Prüfungsberechtigt)
- Zotz, Gerhard (Prüfungsberechtigt)
- Hoeber, Vincent (Prüfungsberechtigt)
- Will, Maria (Prüfungsberechtigt)

### 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.

### Links

### Language of instruction
- English

### Duration (semesters)
- 1 Semester

### Module frequency
- jährlich

### Module capacity
- unlimited

### Reference text
- [http://www.uni-oldenburg.de/fun_eco/](http://www.uni-oldenburg.de/fun_eco/)

### Module level
- Type of module

### Teaching/Learning method

### Previous knowledge

### Examination

### Examination times

### Type of examination

### Final exam of module

### Two seminar papers (30%)

### Project report (70%)

### Type of course

### Comment

### SWS

### Frequency

### Workload of compulsory attendance

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### Total module attendance time
- 196 h
Iök260 - Restoration of terrestrial Ecosystems

Module label: Restoration of terrestrial Ecosystems
Module abbreviation: Iök260
Credit points: 6.0 KP
Workload: 180 h

Applicability of the module:
- Master's Programme Landscape Ecology (Master) > Vertiefungsmodule zweites Fachsemester

Responsible persons:
- Buchwald, Rainer (module responsibility)
- Buchwald, Rainer (Prüfungsberechtigt)
- Buchwald, Rainer (Module counselling)

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.

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

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

Recommended reading:

Additional literature will be announced during the course, if necessary.

Links:
- https://www.uni-oldenburg.de/vegetationskunde/

Language of instruction: English
Duration (semesters): 1 Semester
Module frequency: jährlich
Module capacity: unlimited
Module level: Type of module
Teaching/Learning method

Previous knowledge:

Examination
Examination times
Type of examination

Final exam of module
Before the end of the module
Seminar paper or assignment

Type of course
Comment
SWS
Frequency
Workload of compulsory attendance

Lecture
2
28

Exercises
2
28

Seminar

Total module attendance time: 56 h
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.

**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

**Reference text**

**Module level**

**Type of module**

**Teaching/Learning method**

**Previous knowledge**

**Examination**

**Examination times**

**Type of examination**

**Final exam of module**

**Before the end of the module**

**Specialized practical exercise**

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<tr>
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<td><strong>154 h</strong></td>
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</table>
Iök280 - Special Vegetation Ecology

Module label: Special Vegetation Ecology
Module abbreviation: Iök280
Credit points: 6.0 KP
Workload: 180 h

Applicability of the module:
- Master's Programme Landscape Ecology (Master) > Vertiefungsmodul zweites Fachsemester

Responsible persons:
- Buchwald, Rainer (module responsibility)
- Peppler-Lisbach, Cord (module responsibility)
- Buchwald, Rainer (Module counselling)
- Buchwald, Rainer (Prüfungsberechtigt)
- Dörfler, Inken (Prüfungsberechtigt)
- Peppler-Lisbach, Cord (Prüfungsberechtigt)

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

Recommended reading:

Links:
https://www.uni-oldenburg.de/vegetationskunde/

Language of instruction:
German

Duration (semesters):
2 Semester

Module frequency:
jährlich

Module capacity:
unlimited

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

Module level:

Type of module:

Teaching/Learning method:

Previous knowledge:

Examination:
- Examination times
- Type of examination

Final exam of module:
- Before the end of the module
- Assignment

Type of course:
Exercises

SWS:
4

Frequency:

Workload Präsenzzeit:
56 h
## Iök285 - Special Vegetation Ecology

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<tbody>
<tr>
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<tr>
<td>Credit points</td>
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<tr>
<td>Workload</td>
<td>270 h</td>
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<tr>
<td>Applicability of the module</td>
<td>Master's Programme Landscape Ecology (Master) &gt; Vertiefungsmodule zweites Fachsemester</td>
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</table>
| Responsible persons | Buchwald, Rainer (module responsibility)  
Peppler-Lisbach, Cord (module responsibility)  
Buchwald, Rainer (Module counselling)  
Buchwald, Rainer (Prüfungsberechtigt)  
Peppler-Lisbach, Cord (Prüfungsberechtigt) |
| 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. |
| Links | https://www.uni-oldenburg.de/vegetationskunde/ |
| Language of instruction | German |
| Duration (semesters) | 2 Semester |
| Module frequency | jährlich |
| Module capacity | unlimited |
| Reference text | The field work is also part of the 6 CP module lök280 "Special Vegetation Ecology". Therefore, it is not possible to register for the modules lök280 and lök285 simultaneously. |
| Module level |  |
| Type of module |  |
| Teaching/Learning method |  |
| Previous knowledge |  |
| Examination | Examination times | Type of examination |
| Final exam of module | Before the end of the module | Oral examination or assignment |
| Type of course | Comment | SWS | Frequency | Workload of compulsory attendance |
| Lecture | 2 | 28 |
| Exercises | 4 | 56 |
| Total module attendance time | 84 h |
lök290 - Perspectives of Bioenergy

Module label
Perspectives of Bioenergy

Module abbreviation
lök290

Credit points
6.0 KP

Workload
180 h

Applicability of the module
- Master's Programme Landscape Ecology (Master) > Vertiefungsmodule zweites Fachsemester
- Master's Programme Water and Coastal Management (Master) > Science

Responsible persons
- Buchwald, Rainer (module responsibility)
- Buchwald, Rainer (Module counselling)
- Klenke, Thomas (Module counselling)
- Wark, Michael (Module counselling)
- Buchwald, Rainer (Prüfungsberechtigt)
- Klenke, Thomas (Prüfungsberechtigt)
- Pehlken, Alexandra (Prüfungsberechtigt)
- Wark, Michael (Prüfungsberechtigt)

Prerequisites
Bachelor studies of Natural Science, Environmental Science or Economics

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

Module contents
Das Wahlpflichtmodul gibt einen Einblick in die historische Entstehung und Entwicklung, die naturwissenschaftlichen, verfahrenstechnischen, energetischen, ökologischen (incl. naturschutzfachlichen) und ökonomischen Grundlagen der Bioenergie. Besonderes Augenmerk wird auf die Perspektiven verschiedener Formen der Bioenergie, gelegt, damit gleichermaßen auf ihre Möglichkeiten und Grenzen.

a) Vorlesung "Perspektiven der Bioenergie" (Pflichtteil)
b) Seminar "Formen und Beispiele der Bioenergie" (wahlweise zu c)
c) Übung "Praktische Bioenergie" (wahlweise zu b)

Recommended reading
http://www.uni-oldenburg.de/vegetationskunde/

Languages of instruction
German, English

Duration (semesters)
1 Semester

Module frequency
jährlich

Module capacity
unlimited

Module level
Type of module
Teaching/Learning method

Previous knowledge
Examination Examination times Type of examination

Final exam of module Before the end of the module Assignment (for the seminar or for the exercise, alternatively) and presentation of 30 min. for a) not marked

Type of course Comment SWS Frequency Workload of compulsory attendance

Lecture 2 28
Exercises 2 28
Seminar 2 28

Total module attendance time 84 h
### Module Description

**Module label**: Ornithological population estimates

**Module abbreviation**: lök215

**Credit points**: 6.0 KP

**Workload**: 180 h

**Applicability of the module**:
- Master's Programme Landscape Ecology (Master) > Vertiefungsmodule zweites Fachsemester

**Responsible persons**:
- Schmaljohann, Heiko (module responsibility)
- Schmaljohann, Heiko (Module counselling)
- Schmaljohann, Heiko (Prüfungsberechtigt)

**Prerequisites**:
- Skills to be acquired in this module
- Module contents
- Recommended reading
- Links

**Language of instruction**: German

**Duration (semesters)**: 1 Semester

**Module frequency**: unlimited

**Module level**:

**Type of module**: Teaching/Learning method

**Previous knowledge**:

**Examination**

**Examination times**

**Type of examination**
- Final exam of module
  - 2 Prüfungsleistungen:
    - Hausarbeit (70%)
    - Referat (30%)

**Type of course**: VA-Auswahl

**SWS**: 4

**Frequency**: SoSe oder WiSe

**Workload Präsenzzeit**: 56 h
## Vertiefungsmodul drittes Fachsemester

### lök310 - Group Project: Sustainable Spatial Development

<table>
<thead>
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<th>Module label</th>
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<tbody>
<tr>
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<td>Workload</td>
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### Applicability of the module
- Master's Programme Landscape Ecology (Master) > Vertiefungsmodule drittes Fachsemester

### Responsible persons
- Mose, Ingo (module responsibility)
- Mose, Ingo (Module counselling)
- Schaal, Peter (Module counselling)
- Mose, Ingo (Prüfungsberechtigt)
- Schaal, Peter (Prüfungsberechtigt)

### 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.

### Language of instruction
- German

### Duration (semesters)
- 1 Semester

### Module frequency
- jährlich

### Module capacity
- unlimited

### Module level

### Type of module
- Teaching/Learning method

### Previous knowledge

<table>
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<th>Examination times</th>
<th>Type of examination</th>
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<td>Before the end of the module</td>
<td>Special exercise (70%) und presentation (30%)</td>
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</table>

### Type of course
- Project group

### SWS
- 6

### Frequency

| Workload Präsenzeit | 84 h |
Module label: Sustainable Spatial Development in Europe
Module abbreviation: lök320
Credit points: 6.0 KP
Workload: 180 h

Applicability of the module:
- Master's Programme Landscape Ecology (Master) > Vertiefungsmodule drittes Fachsemester
- Master's Programme Sustainability Economics and Management (Master) > Additional Modules
- Master's Programme Water and Coastal Management (Master) > Planning

Responsible persons:
- Mose, Ingo (module responsibility)
- Mose, Ingo (Module counselling)
- Mose, Ingo (Prüfungsberechtigt)
- Klenke, Thomas (Prüfungsberechtigt)
- Kramer, Nadine (Prüfungsberechtigt)
- Schaal, Peter (Prüfungsberechtigt)

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 nutrition (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

Type of module

Teaching/Learning method

Previous knowledge

Examination
Examination times
Type of examination

Final exam of module
Before the end of the module
6 CP – Report or assignment

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Iök321 - Sustainable Spatial Development in Europe

Module label
Sustainable Spatial Development in Europe

Module abbreviation
Iök321

Credit points
9.0 KP

Workload
270 h

Applicability of the module
- Master's Programme Landscape Ecology (Master) > Vertiefungsmodule drittes Fachsemester

Responsible persons
- Mose, Ingo (module responsibility)
- Mose, Ingo (Module counselling)
- Klenke, Thomas (Prüfungsberechtigt)
- Kramer, Nadine (Prüfungsberechtigt)
- Mose, Ingo (Prüfungsberechtigt)
- Schaal, Peter (Prüfungsberechtigt)

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.

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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
<table>
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<th><strong>Module frequency</strong></th>
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<td><strong>Teaching/Learning method</strong></td>
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**Previous knowledge**

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<td>9 CP = Report or assignment or oral examination (extended version)</td>
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<th><strong>Frequency</strong></th>
<th><strong>Workload of compulsory attendance</strong></th>
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**Total module attendance time**

140 h
Iök345 - Advanced Limnology

Module label Advanced Limnology
Module abbreviation Iök345
Credit points 6.0 KP
Workload 180 h

Applicability of the module
- Master's Programme Landscape Ecology (Master) > Vertiefungsmodule drittes Fachsemester

Responsible persons
- Kiel, Ellen (module responsibility)
- Niedringhaus, Rolf (module responsibility)
- Kiel, Ellen (Module counselling)
- Niedringhaus, Rolf (Module counselling)
- Kiel, Ellen (Prüfungsberechtigt)
- Niedringhaus, Rolf (Prüfungsberechtigt)

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 habitual 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 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 habitual 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

Recommended reading
See announcements in StudIP

Links

Languages of instruction
German, English

Duration (semesters)
1 Semester

Module frequency jährlich

Module capacity unlimited

Reference text
The courses of this module are integrated into Iök350 "Special Animal Ecology" (9 CP). Students graduating in Special Animal Ecology cannot graduate in Special Aquatic Ecology.

Module level

Type of module

Teaching/Learning method

Previous knowledge

Examination Examination times Type of examination
Final exam of module Before the end of the module. Special exercise or Assignment

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<table>
<thead>
<tr>
<th>Type of course</th>
<th>Comment</th>
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<th>Frequency</th>
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</table>
Iök350 - Advanced Animal Ecology

Module label | Advanced Animal Ecology
---|---
Module abbreviation | Iök350
Credit points | 9.0 KP
Workload | 270 h

Applicability of the module
- Master's Programme Landscape Ecology (Master) > Vertiefungsmodule drittes Fachsemester

Responsible persons
- Niedringhaus, Rolf (module responsibility)
- Kiel, Ellen (module responsibility)
- Kiel, Ellen (Prüfungsberechtigt)
- Niedringhaus, Rolf (Prüfungsberechtigt)
- Kiel, Ellen (Module counselling)
- Niedringhaus, Rolf (Module counselling)

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
Qualification for preparing a professional zooecological contribution within the scope of an expert opinion; familiarization with the most important faunistic indicator groups for scientific objectives relevant to a project

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
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

Recommended reading
See announcements in StudIP

Links

Languages of instruction
- German, English

Duration (semesters)
- 1 Semester

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<table>
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<tr>
<th>Module frequency</th>
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### Module level

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<th>Type of examination</th>
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<tbody>
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<td>Before the end of the module</td>
<td>Special exercise or Assignment</td>
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<td>Exercises</td>
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| Total module attendance time | 84 h   |
### lök360 - Special Abiotic Factors (Soil/Water)

<table>
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<th><strong>Module label</strong></th>
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<tr>
<td><strong>Credit points</strong></td>
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**Applicability of the module**
- Master's Programme Landscape Ecology (Master) > Vertiefungsmodule drittes Fachsemester

**Responsible persons**
- Greskowiak, Janek (module responsibility)
- Greskowiak, Janek (Module counselling)
- Kalinina, Olga (Module counselling)
- Massmann, Gudrun (Module counselling)
- Greskowiak, Janek (Prüfungsberechtigt)
- Kalinina, Olga (Prüfungsberechtigt)
- Massmann, Gudrun (Prüfungsberechtigt)
- Maurischat, Philipp (Prüfungsberechtigt)

**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.
  - 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:
  - 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/)
  - 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 vanished profiles of globally distributed soils.
  - 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.
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<tr>
<td>Reference text</td>
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<tr>
<td>The module can be taken as a 6 CP or a 9 CP module. For the 6 CP module, 2 of the 4 courses offered must be attended, for the 9 CP module, 3 of the 4 courses</td>
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<table>
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<tbody>
<tr>
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| Total module attendance time | 56 h |
Module label: Special Abiotic Factors (Soil/Water)
Module abbreviation: lök365
Credit points: 9.0 KP
Workload: 270 h
Applicability of the module: Master's Programme Landscape Ecology (Master) > Vertiefungsmodule drittes Fachsemester
Responsible persons:
- Greskowiak, Janek (module responsibility)
- Greskowiak, Janek (Module counselling)
- Kalinina, Olga (Module counselling)
- Massmann, Gudrun (Module counselling)
- Greskowiak, Janek (Prüfungsberechtigt)
- Kalinina, Olga (Prüfungsberechtigt)
- Massmann, Gudrun (Prüfungsberechtigt)
- Maurischat, Philipp (Prüfungsberechtigt)
Prerequisites:
Basic knowledge of Soil Science, Hydrogeology and Hydrochemistry
Skills to be acquired in this module:
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:
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:

- IUSS Working Group WRB. 2014. World Reference Base for Soil
Resources 2014.

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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Reference text

The module can be taken as a 6 CP or a 9 CP module. For the 6 CP module, 2 of the 4 courses offered must be attended, for the 9 CP module, 3 of the 4 courses.

Module level

Type of module

Teaching/Learning method

Previous knowledge

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Type of course | Comment | SWS | Frequency | Workload of compulsory attendance |
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Total module attendance time 84 h
The module imparts advanced knowledge on different aspects of ornithology. The students acquire:

- An extended knowledge of morphological and physiological fundamentals and the resulting ecological and behaviour-biological consequences in birds
- Knowledge, presentation and discussion of relevant English literature from various fields of ornithology
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Module label: Ornithology in Practice
Module abbreviation: lök375
Credit points: 6.0 KP
Workload: 180 h

Applicability of the module:
- Master's Programme Landscape Ecology (Master) > Vertiefungsmodule drittes Fachsemester

Responsible persons:
- Liedvogel, Miriam (module responsibility)
- Klump, Georg Martin (Module counselling)
- Bouwhuis, Sandra (Prüfungsberechtigt)
- Klump, Georg Martin (Prüfungsberechtigt)
- Langemann, Ulrike (Prüfungsberechtigt)
- Liedvogel, Miriam (Prüfungsberechtigt)
- Schmaljohann, Heiko (Prüfungsberechtigt)
- Vedder, Oscar Herman (Prüfungsberechtigt)

Prerequisites:
- Broad and in-depth biological expertise
- In-depth knowledge of biological working methods
- Data analysis skills
- Interdisciplinary thinking
- Critical and analytical thinking
- Independent searching and knowledge of scientific literature
- Data presentation and discussion in German and English (written and spoken)
- Teamwork
- Project and time management
- Statistics and scientific programming

Skills to be acquired in this module:
- Broad and in-depth biological expertise
- In-depth knowledge of biological working methods
- Data analysis skills
- Interdisciplinary thinking
- Critical and analytical thinking
- Independent searching and knowledge of scientific literature
- Data presentation and discussion in German and English (written and spoken)
- Teamwork
- Project and time management
- Statistics and scientific programming

The aim of the module is to consolidate various aspects of ornithology as well as impart up to date methods applied in ornithological research.

Module contents:

The module comprises four required elective courses (6 CP each), one of which needs to be chosen.

Required elective course 1: Laboratory course and seminar “Ecology of Colonial Seabirds” (6 CP) The Institute of Avian Research safeguards a long-term individual-based study on common terns: colonially breeding, migratory, piscivorous seabirds. Students spend a week at the colony (located at the Banter See in Wilhelmshaven) to ask a scientific question (e.g. about foraging behaviour, coloniality or courtship behaviour) and collect data to answer it, then spend a week analysing the data statistically, writing a short report in Biology Letters format and presenting their results to their peers. Students receive one mark for the report and one for the presentation and the final mark for the course will be the average of these two marks.

Required elective course 2: Laboratory course and seminar “Communication in Birds” (6 CP). Original recordings from bird songs will be used to generate new data sets for the practical. From these recordings we will prepare spectrograms and analyze the waveforms and frequency spectra. Techniques and statistical method that allow to classify song types from individuals or from populations.
will be introduced and applied. For example, cluster analysis and discriminant analysis are statistical methods to assess the dissimilarity between "objects" or song type characteristics. The theoretical background for the practical is provided by the seminar using a standard text book on bird song Catchpole & Slater 2008).

Required elective course 3: Laboratory course and seminar “Japanese Quail” (6 CP). Observations and investigations of behaviour in relation to reproductive activity of male and female Japanese quail, at the Institute of Avian Research. Students will learn about theory regarding pace of life and exploration behaviour and develop predictions for inter-individual differences in exploration behaviour in relation to sex and reproductive activity. These predictions will be tested with standardized behavioural observations and measurements of food intake in the quail. The data will be analysed and discussed in the broader context of life-history theory.

Required elective course 4: Laboratory course and seminar “Scientific research in field ornithology, incl. identification of birds” (6 CP) This course has three teaching objectives. Firstly, to impart knowledge of the local bird community. This is conveyed through practical courses, work on bird specimens, and lectures. Secondly, learning and getting to know some standard methods of field ornithology, e.g. breeding survey, waterbird counts, radio telemetry, mist netting. Both teaching objectives form the basis for the third teaching objective. In this, the students independently conduct a scientific ornithological study. The data are analysed in the course under supervision. The results are summarised in a two-page scientific publication. At the end of the course, a kind of scientific conference takes place, in which all scientific projects are presented and discussed. The final grade is made up of the grades for the presentations and the scientific publication.

Recommended reading

Required elective course 1:

Required elective course 2:
Catchpole CK & Slater PJB (2008), "Bird Song, Biological themes and variations", Cambridge University Press, 2nd Edition

Required elective course 3:

Required elective course 4:
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**Module label**  
Experimental designs in ecological field studies

**Module abbreviation**  
lök390

**Credit points**  
6.0 KP

**Workload**  
180 h

**Applicability of the module**
- Master's Programme Landscape Ecology (Master) > Vertiefungsmodule drittes Fachsemester

**Responsible persons**
- Kiel, Ellen (module responsibility)
- Kiel, Ellen (Module counselling)
- Kiel, Ellen (Prüfungsberechtigt)

**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 “Aquatic Ecology”
  - Comparable courses at other universities

**Skills to be acquired in this module**
- Qualification to independently plan field experiments suitable for answering current ecological questions (individuals, populations, communities)
- Methodological competence/independence in performing field experiments
- Qualification to independently analyse the experiments in the laboratory, guided by hypotheses and using adequate methods, materials and statistical methods
- Competence in presenting results on a scientific level (scientific report presenting and discussing the method; scientific publication; both in English)
- Impartment of manifold methodological skills in the field of aquatic ecology, experimental field research (autecological, population-ecological and synecological 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**
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.

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**Module label**
Landscape Ecology External Research Project

**Module abbreviation**
lök810

**Credit points**
15.0 KP

**Workload**
450 h

**Applicability of the module**
- Master’s Programme Landscape Ecology (Master) > Basismodule
- Master’s Programme Landscape Ecology (Master) > Vertiefungsmodul drittes Fachsemester

**Responsible persons**
- Schmaljohann, Heiko (module responsibility)
- Schmaljohann, Heiko (Module counselling)
- der Landschaftsökologie, Lehrende (Prüfungsberechtigt)

**Skills to be acquired in this module**
- **deepened expertise in landscape ecology**
- **deepened knowledge of working methods in the field of landscape ecology**
- **data analysis skills**
- **critical and analytical thinking**
- **independent searching and knowledge of scientific literature**
- **ability to perform independent landscape ecology research**
- **data presentation and discussion in German or English (written and spoken)**
- **teamwork**
- **project and time management**
- **statistics & scientific programming**
- **experience of working in a new scientific environment**

Students perform individual research projects to learn:
- planning and organization of a research project in a group outside of the University of Oldenburg
- formulating a scientific hypothesis
- planning, performing and analyzing experiments or correlative studies
- working with scientific literature on the specific context of the project
- oral presentation and discussion of backgrounds and results in the lab seminar
- writing a scientific report in publication format
- or presenting a scientific poster

**Module contents**
Students are introduced to independent research in a specific area of landscape ecology by a working group of the regular IBU Biology faculty at the University of Oldenburg.

Course work should cover all parts of a scientific project, i.e. developing hypotheses, data collection, data analysis and the presentation of the results. Irrespective of the particular venue (universities, research institutes) the student has to report to a professor in Oldenburg in form of a written scientific report (or scientific poster) and an oral presentation, both in English or German.

**Note:**
- all Professors and fulltime lecturers in Landscape Ecology at the IBU can act
as supervisor, students should contact appropriate supervisors individually and in time (e.g. 2-3 months in advance)

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**lökö0 - Landscape Ecology Internal Research Module**

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<td>der Landschaftsoekologie, Lehrende (Prüfungsberechtigt)</td>
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**Prerequisites**

**Skills to be acquired in this module**

++ deepened expertise in landscape ecology
++ deepened knowledge of working methods in the field of landscape ecology
++ data analysis skills
++ critical and analytical thinking
++ independent searching and knowledge of scientific literature
++ ability to perform independent landscape ecology research
++ data presentation and discussion in German or English (written and spoken)
+ teamwork
++ project and time management
++ statistics & scientific programming
++ experience of working in a new scientific environment

Students perform individual research projects to learn:

• planning and organization of a research project in a group outside of the University of Oldenburg
• formulating a scientific hypothesis
• planning, performing and analyzing experiments or correlative studies
• working with scientific literature on the specific context of the project
• oral presentation and discussion of backgrounds and results in the lab seminar
• writing a scientific report in publication format

• or presenting a scientific poster

**Module contents**

Students are introduced to independent research in a specific area of landscape ecology by a working group of the regular IBU Biology faculty at the University of Oldenburg.

Course work should cover all parts of a scientific project, i.e. developing hypotheses, data collection, data analysis and the presentation of the results. Irrespective of the particular venue (universities, research institutes) the student has to report to a professor in Oldenburg in form of a written scientific report (or scientific poster) and an oral presentation, both in English or German.
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### Abschlussmodul

**mam - Master´s Degree Module**

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### Skills to be acquired in this module

Successful completion of the Master module demonstrates that students are able to work on a problem in the field of Landscape Ecology within a fixed period applying scientific methods.

### Module contents

- **E:** Preparing the Master thesis
- **SE:** Active participation in the seminar of the research group, in which the Master thesis is written.

### Recommended reading

Supervisors may supply an initial reading list with important literature. The students are expected to find and use further literature as needed.

### Links

- Languages of instruction
- Duration (semesters) 1 Semester
- Module frequency semiannual
- Module capacity unlimited

### Teaching/Learning method

#### Previous knowledge

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### Type of course

- Seminar

### SWS

- 2

### Frequency

- Präsenzzeit 28 h