<table>
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<td>lök210</td>
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<td>lök225</td>
<td>Ecology of the Soil-Water-Plant-System</td>
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<td>lök240</td>
<td>Functional Ecology of communities in heterogeneous landscapes</td>
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<td>lök250</td>
<td>Functional Ecology of Plants</td>
<td>32</td>
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<td>Restoration of Terrestrial Ecosystems</td>
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<td>lök270</td>
<td>Landscape Management Support Planning</td>
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<td>lök280</td>
<td>Special Vegetation Ecology</td>
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<tr>
<td>lök285</td>
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Basismodule

lök100 - Data Modelling

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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 (Authorized examiners)
- Greskowiak, Janek (Authorized examiners)

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

Reader's advisory

Additional literature will be announced during the course.

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<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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### Previous knowledge

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<td>Assignment</td>
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<tr>
<td>Frequency</td>
<td>WiSe</td>
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<tr>
<td>Workload attendance</td>
<td>84 h</td>
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</table>
### Module Contents
- Ecology of plants in landscapes
- Eco-physiology of plants in landscapes
- Ecology of animals in landscapes

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

### Skills to be acquired in this module
Qualification imparted to students:
Upon successful completion of the module the students will gain:

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

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

### Reader’s advisory
Literature will be announced during the course.

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

### Examination
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<th>Time of examination</th>
<th>Type of examination</th>
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| Final exam of module        | Before the end of the module | a) Written examination (33 %)  
b) Written examination (33 %)  
c) Written examination (33 %) |

### Vorkenntnisse / Previous knowledge
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### SWS
3

### Frequency
6 / 60
| Workload attendance | 42 h |
**Iök120 - Geoeccological Processes**

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**Responsible persons**
- Pollmann, Thomas (Module responsibility)
- Pollmann, Thomas (Module counselling)
- Massmann, Gudrun (Module counselling)
- Freund, Holger (Authorized examiners)
- Kalinina, Olga (Authorized examiners)
- Massmann, Gudrun (Authorized examiners)
- Pollmann, Thomas (Authorized examiners)

**Prerequisites**
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)

**Reader’s advisory**
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

**Modullevel / module level**
MM (Mastermodul / Master module)

**Modulart / typ of module**
Wahlpflicht / Elective

**Lehr-/Lernform / Teaching/Learning method**
V, Ü/E

**Vorkenntnisse / Previous knowledge**

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

**Course type**
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**Total time of attendance for the module**
56 h
Module label: Environmental Planning
Module code: iök130
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 (Authorized examiners)
- Lecke-Lopatta, Thomas (Authorized examiners)
- Schaal, Peter (Authorized examiners)

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.

Reader's advisory:
Additional literature will be announced during the lectures.

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

Language of instruction: German
Duration (semesters): 1 Semester
Module frequency: jährlich
Module capacity: unlimited
Module level: MM (Mastermodul / Master module)
Modulart / typ of module: Wahlpflicht / Elective
Teaching/Learning method:
a) V/SE 2 SWS
b) SE 2 SWS
c) SE 2 SWS
Gruppengröße entsprechend der Zulassungszahl

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**Course type**
- Seminar

**SWS**
- 6

**Frequency**
- 84 h
## lök140 - Applied GIS Methods in Landscape Ecology

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<td>Schaal, Peter (Module counselling)</td>
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<td>Aden, Christian (Module counselling)</td>
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<td>Schaal, Peter (Authorized examiners)</td>
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<td>Aden, Christian (Authorized examiners)</td>
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<tr>
<td>Prerequisites</td>
<td>Grundlegende GIS-Kenntnisse (Basiswissen). Studierende, die diese im Bachelor-Studiengang nicht erhalten haben, wenden sich bitte an die Dozenten, die mit ihnen Möglichkeiten für das Nachholen der Kenntnisse festlegen.</td>
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<td>Skills to be acquired in this module</td>
<td>Vermittelte Qualifikation:</td>
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<tr>
<td></td>
<td>+ Erkennen und analysieren komplexer ökologischer Interdependenzen und Zusammenhänge im Rahmen eines landschaftsökologischen Systemverständnisses</td>
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<tr>
<td></td>
<td>++ Befähigung zum Transfer, d.h. Übertragen, Anpassen und Erweitern von erlernetem Wissen auf neue Problemstellungen und Kompetenz zur Problemlösung</td>
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<tr>
<td></td>
<td>++ Erlernen und selbständiges, zielgerichtetes Anwenden von Methodenkenntnissen in wissenschaftlichen Forschungsarbeiten: Erfassungs-, Mess-, Auswertungs-, Modellierungs-, Bewertungs- und Planungsmethoden</td>
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<td>++ Befähigung zur (auch englischsprachigen) fachlichen und fachübergreifenden Präsentation und Kommunikation von Arbeitsergebnissen gegenüber unterschiedlichen Adressatengruppen</td>
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<td>++ Soziale und interkulturelle Kompetenz zur Zusammenarbeit in Teams unterschiedlicher Zusammensetzung</td>
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<tr>
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<td>++ Verantwortungsvolles Anwenden der erlerneten Kompetenzen, Fähigkeiten und Fertigkeiten in verschiedenen Feldern der landschaftsökologischen Berufspraxis</td>
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<tr>
<td>Module contents</td>
<td>a) Praktisches Arbeiten mit GIS (Ü)</td>
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<td>Die Studierenden erlernen die Entwicklung von Geodatenbanken sowie die Nutzung komplexerer geographischer Analysewerkzeuge im Bereich der Vektor- und Rasteranalyse.</td>
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<td></td>
<td>b) Analysen und Modelle (Se/Ü)</td>
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<td>Die Studierenden werden dazu befähigt, raumbezogene bzw. landschaftsökologische Fragestellungen anhand von komplexen GIS-Analysen (Erosionsmodelle, Routenplanung) zu beantworten und in die räumliche Modellierung von Daten einzusteigen.</td>
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<tr>
<td>Reader's advisory</td>
<td>GI Geoinformatik GmbH (Hrsg.) ArcGIS 10.3: Das deutschsprachige Handbuch für ArcGIS for Desktop Basic und Standard mit Funktionen von ArcGIS Online für Desktopanwender— 2015</td>
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<td>Law, Michael; Collins, Amy: Getting to know ArcGIS (Englisch), 2015.</td>
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**Vorkenntnisse / Previous knowledge**

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**Course type**

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<td><strong>Frequency</strong></td>
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Iök145 - Geospatial Datamanagement and Geostatistical Analysis

Module label: Geospatial Datamanagement and Geostatistical Analysis
Module code: Iök145
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)
- Schaal, Peter (Module counselling)
- Aden, Christian (Authorized examiners)
- Schaal, Peter (Authorized examiners)

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:
Das Modul baut auf dem vorlaufenden Master - Modul "GIS-Anwendungen in der Landschaftsökologie" auf.
++ 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 erlemtem Wissen auf neue Problemstellungen und Kompetenz zur Problemlösung
++ Erlernen und selbständiges, zielgerichtetes Anwenden von Methoden-kenntnissen 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 erlernten Kompetenzen, Fähigkeiten und Fertigkeiten in den unterschiedlichen 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 Vektordaten und Einbindung von GIS-Analysen 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 (SeÜ)
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 Ansprüche von Funktionen unter Beachtung von Standards des Open Geospatial Consortiums (OGC))

**Reader's advisory**

**Links**

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<tr>
<td>Workload attendance</td>
<td>56 h</td>
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</table>
bio675 - Molecular Ecology

Module label: Molecular Ecology
Module code: bio675
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:
- Nolte, Arne (Module responsibility)
- Gerlach, Gabriele (Module counselling)
- Nolte, Arne (Authorized examiners)
- Gerlach, Gabriele (Authorized examiners)

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 in German and English (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.

Reader's advisory:
will be announced during the course

Languages of instruction:
German, English

Duration (semesters): 1 Semester

Module frequency:

Module capacity: 15

Reference text:
associated with bio890 Current Topics of Biology (Seminar)

Module level / module level:
MM (Mastermodul / Master module)

Modulart / typ of module:
Wahlpflicht / Elective

Lehr-/Lernform / Teaching/Learning method:

Vorkenntnisse / Previous knowledge:

Examination:
Time of examination: during the module
Type of examination: Präsentationen (50%), Portfolio (50%).
Regular participation is a prerequisite to pass in the module.

Course type:
Lecture

Comment:

SWS:
2

Frequency:
SuSe
28
<table>
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<tr>
<td>Exercises</td>
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<td>6</td>
<td>SuSe</td>
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</table>

**Total time of attendance for the module**: 112 h
bio770 - Field Methods in Organismal Biology

Module label: Field Methods in Organismal Biology
Module code: bio770
Credit points: 15.0 KP
Workload: 450 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:
- Zotz, Gerhard (Module responsibility)
- Gerlach, Gabriele (Module counselling)
- Albach, Dirk Carl (Module counselling)
- Glatzel, Thomas (Module counselling)
- von Hagen, Klaus Bernhard (Module counselling)
- Mouritsen, Henrik (Module counselling)
- Zotz, Gerhard (Authorized examiners)
- Gerlach, Gabriele (Authorized examiners)
- Albach, Dirk Carl (Authorized examiners)
- Glatzel, Thomas (Authorized examiners)
- von Hagen, Klaus Bernhard (Authorized examiners)

Prerequisites:
- [nop] ++ 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 German and English (written and spoken) ++ project and time management ++ statistics & scientific programming [nop]

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

Reader's advisory:
Varies with topic and field locality

Links:
www.uni-oldenburg.de/fun_eco/

Languages of instruction:
German, English

Duration (semesters):
1 Semester

Module frequency:
jährlich

Module capacity:
21

Module level / module level:
MM (Mastermodul / Master module)

Modulart / typ of module:
Wahlpflicht / Elective

Lehr-/Lernform / Teaching/Learning method:

Vorkenntnisse / Previous knowledge:

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Course type |
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**Total time of attendance for the module** 168 h
mar456 - Coastal Holocene

Module label: Coastal Holocene
Module code: mar456
Credit points: 6.0 KP
Workload: 180 h
(Präsenzzeit: 56 Stunden, Selbststudium: 124 Stunden)

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

Responsible persons:
Freund, Holger (Module responsibility)
Prinz, Markus (Module counselling)

Prerequisites:
Keine

Skills to be acquired in this module:
Die Studierenden verstehen die geologischen, sedimentologischen und landschaftsprägenden Transport- und Ablagerungsprozesse im nordwestdeutschen Tiefland (fluvialer, 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 Biologische Methoden der Faziesansprache von Küstenablagerungen – Pollen- und Diatomanalyse


Reader's advisory:

Weitere Literatur wird in den Veranstaltungen angegeben.

Links:
Language of instruction: German
Duration (semesters): 1 Semester
Module frequency: jährlich
Module capacity: 20 (20 Personen im Praktikum Fazieskunde Verfahren siehe StudIP)
<table>
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<td>Wahlpflicht / Elective</td>
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</table>
| Lehr-/Lernform / Teaching/Learning method | PR Biologische Methoden der Faziesansprache von Küstenablagerungen – Pollen- und Diatomeenanalyse (2 SWS, 3 KP)  
VL Nordwestdeutsches Küstenholozän – Geologie, Vegetation und Biostratigraphie (2 SWS, 3 KP) |
| Vorkenntnisse / Previous knowledge | Nützlich: Grundlegende Kenntnisse in Geologie und Botanik |
| Examination | Time of examination | Type of examination |
| Final exam of module | Abgabe des Berichts bis Ende des Semesters | KL |

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### mar458 - Aquatic Ecology

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<td>Credit points</td>
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<td>Workload</td>
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<td>(Präsenzzeit: 56 Stunden, Selbststudium: 124 Stunden)</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
- Simon, Meinhard (Module responsibility)
- Brinkhoff, Thorsten Henning (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 Stickstoffverbindingen für die Nährstoffbelastung von Gewässern, chemische und biologische Charakterisierung und Klassifizierung von Gewässern, Ursachen und Folgen der Gewässersversauerung, hygienische Belastung, Trinkwasseraufbereitung und -aufbereitung, mechanische, biologische und chemische Abwasserklärung, hormonell wirksame Substanzen

**VL Biologische Bedeutung von Schwebstoffen**

#### Reader's advisory

**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

Skrpt 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 / module level MM (Mastermodul / Master module)
Modulart / typ of module Wahlpflicht / Elective
Lehr-/Lernform / Teaching/Learning method Wintersemester: VL Grundlagen des Gewässerschutzes (2 SWS, 3 KP)
Sommersemester VL Biologische Bedeutung von Schwebstoffen (2 SWS, 3 KP)
Vorkenntnisse / Previous knowledge Nützlich: Allgemeine Biologie, Geochemie, Chemie
Examination Time of examination Type of examination
Final exam of module Nach Ende der Vorlesungszeit KL
Course type Lecture
SWS 4
Frequency SuSe and WiSe
Workload attendance 56 h
Vertiefungsmodul zweites Fachsemester

lök210 - Practice of Nature Conservation

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<tr>
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<td>Applicability of the module</td>
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<td>Master's Programme Landscape Ecology (Master) &gt; Vertiefungsmodul zweites Fachsemester</td>
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<tr>
<td>Master's Programme Sustainability Economics and Management (Master) &gt; Additional Modules</td>
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<tr>
<td>Master's Programme Water and Coastal Management (Master) &gt; Science</td>
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<tr>
<td>Responsible persons</td>
<td></td>
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<td>Buchwald, Rainer (Module responsibility)</td>
<td></td>
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<tr>
<td>Mose, Ingo (Module responsibility)</td>
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<tr>
<td>Buchwald, Rainer (Module counselling)</td>
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<td>Mose, Ingo (Module counselling)</td>
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<tr>
<td>Buchwald, Rainer (Authorized examiners)</td>
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<td>Dörfler, Inken (Authorized examiners)</td>
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<td>Mose, Ingo (Authorized examiners)</td>
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<tr>
<td>Fartmann, Thomas (Authorized examiners)</td>
<td></td>
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<tr>
<td>Tent, Nathalie (Authorized examiners)</td>
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<tr>
<td>Prerequisites</td>
<td>Completed ecology-oriented Bachelor course</td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td>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.</td>
</tr>
<tr>
<td>Module contents</td>
<td>a) Seminar &quot;Protected areas and regional development&quot;: 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 &quot;Introduction to the German Nature Conservation Law&quot;: 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 &quot;Habitat connectivity&quot;: 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 &quot;Protected areas&quot;: 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.</td>
</tr>
<tr>
<td>Languages of instruction</td>
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<tr>
<td>Duration (semesters)</td>
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<tr>
<td>Module frequency</td>
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<td>Module capacity</td>
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<td>Modulart / typ of module</td>
<td>Wahlpflicht / Elective</td>
</tr>
<tr>
<td>Teaching/Learning method</td>
<td>V/Ü, S, EX</td>
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| Vorkenntnisse / Previous knowledge
<table>
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<tr>
<th>Examination</th>
<th>Time of examination</th>
<th>Type of examination</th>
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</thead>
<tbody>
<tr>
<td>Final exam of module</td>
<td>Before the end of the module</td>
<td>6 CP – Paper (in the course of a seminar) or excursion report or assignment</td>
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<thead>
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<tr>
<td>Study trip</td>
<td></td>
<td>3</td>
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</table>

| Total time of attendance for the module | 98 h |

| Workload of compulsory attendance | 24 / 60 |
**Practice of Nature Conservation**

**Module label**
Practice of Nature Conservation

**Module code**
lök211

**Credit points**
9.0 KP

**Workload**
270 h

**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 (Authorized examiners)
- Dörfler, Inken (Authorized examiners)
- Fartmann, Thomas (Authorized examiners)
- Mose, Ingo (Authorized examiners)

**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

**Reader’s advisory**

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

**Languages of instruction**
German, English

**Duration (semesters)**
1 Semester

**Module frequency**
jährlich

**Module capacity**
35

**Module level / module level**
MM (Mastermodul / Master module)

**Moduleart / typ of module**
Wahlpflicht / Elective

**Lehr-/Lernform / Teaching/Learning method**
V/Ü, S, EX

**Vorkenntnisse / Previous knowledge**

**Examination**

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<td>Time of examination</td>
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<td>Before the end of the module</td>
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<td>Seminar</td>
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<tr>
<td>Study trip</td>
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**Total time of attendance for the module**
98 h
Iök229 - Ecology of the Soil-Water-Plant-System

Module label Ecology of the Soil-Water-Plant-System
Module code Iök229
Credit points 9.0 KP
Workload 270 h
Applicability of the module • Master's Programme Landscape Ecology (Master) > Vertiefungsmodule zweites Fachsemester

Responsible persons
Massmann, Gudrun (Module responsibility)
Massmann, Gudrun (Module counselling)
Pollmann, Thomas (Module counselling)
Caspers, Gerfried (Authorized examiners)
Massmann, Gudrun (Authorized examiners)
Peppler-Lisbach, Cord (Authorized examiners)
Pollmann, Thomas (Authorized examiners)

Skills to be acquired in this module

Module contents
• Field and laboratory work soil-water-plant system (Ü) • Interdisciplinary analysis of ecosystem processes and water and nutrient transport in landscapes (S)

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

Links
https://uol.de/hydrogeologie/

Languages of instruction
German, English

Duration (semesters)
1 Semester

Module frequency
jährlich

Module capacity
8

Modulelevel / module level
MM (Mastermodul / Master module)

Modulart / type of module
Wahlpflicht / Elective

Vorkenntnisse / Previous knowledge

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<td>SuSe and WiSe</td>
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<tr>
<td>Exercises</td>
<td>2</td>
<td>SuSe and WiSe</td>
<td>28</td>
<td></td>
</tr>
<tr>
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<td>Comment</td>
<td>SWS</td>
<td>Frequency</td>
<td>Workload of compulsory attendance</td>
</tr>
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<td>-------------</td>
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</tr>
<tr>
<td>Total time of attendance for the module</td>
<td></td>
<td></td>
<td></td>
<td>84 h</td>
</tr>
</tbody>
</table>
Aquatic Ecology

**Module code**
lök230

**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 (Authorized examiners)

**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;
- 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 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)

**Reader's advisory**
Relevant literature will be made available in advance via StudIP and during the course.

**Links**

**Languages of instruction**
German, English

**Duration (semesters)**
1 Semester

**Module frequency**
jährlich

**Module capacity**
20

**Modullevel / module level**
MM (Mastermodul / Master module)

**Modulart / typ of module**
Wahlpflicht / Elective

**Lehr-/Lernform / Teaching/Learning method**
V, S, Ü

**Vorkenntnisse / Previous knowledge**
Theorie u. Methoden der aquatischen Ökologie

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

<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload of compulsory attendance</th>
</tr>
</thead>
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<tr>
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<td>Exercises</td>
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<td>2</td>
<td>SuSe</td>
<td>28</td>
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<tr>
<td>Seminar</td>
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<td>2</td>
<td>SuSe</td>
<td>28</td>
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</table>

**Total time of attendance for the module**
84 h
lök240 - Functional ecology of communities in heterogeneous landscapes

Module label: Functional ecology of communities in heterogeneous landscapes
Module code: 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 (Authorized examiners)

Prerequisites

Skills to be acquired in this module:
Upon successful completion of the module students will gain:

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

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

Module contents:

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

Reader's advisory
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

Modullevel / module level
MM (Mastermodul / Master module)

Modulart / typ of module
Wahlpflicht / Elective

Lehr-/Lernform / Teaching/Learning method

Vorkenntnisse / Previous knowledge

Examination

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<tr>
<td>Veranstaltungsende</td>
<td>a) Seminar paper (weighting 20 %)</td>
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<tr>
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<td>b) Specialized practical exercise (weighting 80 %)</td>
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Course type

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<th>Workload of compulsory attendance</th>
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<td>112</td>
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<tr>
<td>Seminar</td>
<td>2</td>
<td>28</td>
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</tbody>
</table>

Total time of attendance for the module

140 h
Iök250 - Functional Ecology of Plants

Module label: Functional Ecology of Plants
Module code: Iök250
Credit points: 15.0 KP
Workload: 450 h
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 (Authorized examiners)
- Zotz, Gerhard (Authorized examiners)
- Hoeber, Vincent (Authorized examiners)
- Will, Maria (Authorized examiners)

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

Reader's advisory

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

Links

Language of instruction: English
Duration (semesters): 1 Semester
Module frequency: jährlich
Module capacity: unlimited
Reference text: http://www.uni-oldenburg.de/fun_eco/
Modullevel / module level: MM (Mastermodul / Master module)
Modulart / typ of module: Wahlpflicht / Elective

Vorkenntnisse / Previous knowledge
Examination Time of examination Type of examination
Final exam of module Two seminar papers (30%) Project report (70%)

Course type Comment SWS Frequency Workload of compulsory attendance
Lecture 2 28
Exercises 10 140
Seminar 2 28

Total time of attendance for the module: 196 h
## Iök260 - Restoration of Terrestrial Ecosystems

<table>
<thead>
<tr>
<th>Module label</th>
<th>Restoration of Terrestrial Ecosystems</th>
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</thead>
<tbody>
<tr>
<td>Module code</td>
<td>Iök260</td>
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<tr>
<td>Credit points</td>
<td>6.0 KP</td>
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<tr>
<td>Workload</td>
<td>180 h</td>
</tr>
<tr>
<td>Applicability of the module</td>
<td>• Master's Programme Landscape Ecology (Master) &gt; Vertiefungsmodul zweites Fachsemester</td>
</tr>
</tbody>
</table>

### Responsible persons
- Buchwald, Rainer (Module responsibility)
- Buchwald, Rainer (Authorized examiners)
- 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).

### Reader’s advisory

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

### Links
- [https://www.uni-oldenburg.de/vegetationskunde/](https://www.uni-oldenburg.de/vegetationskunde/)

### Language of instruction
English

### Duration (semesters)
1 Semester

### Module capacity
unlimited

### Modullevel / module level
MM (Mastermodul / Master module)

### Modulart / typ of module
Wahlpflicht / Elective

### Lehr-/Lernform / Teaching/Learning method
V(S, Ü)

### Vorkenntnisse / Previous Learning

### Final exam of module
<table>
<thead>
<tr>
<th>Course type</th>
<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload of compulsory attendance</th>
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</thead>
<tbody>
<tr>
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<tr>
<td>Exercises</td>
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<td>2</td>
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<td>28</td>
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<tr>
<td>Seminar</td>
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</table>

### Total time of attendance for the module
56 h

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33 / 60
Lök270 - Landscape Management Support Planning

<table>
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<tr>
<th>Module label</th>
<th>Landscape Management Support Planning</th>
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<tbody>
<tr>
<td>Module code</td>
<td>lök270</td>
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<tr>
<td>Credit points</td>
<td>15.0 KP</td>
</tr>
<tr>
<td>Workload</td>
<td>450 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>
</tr>
<tr>
<td>Responsible persons</td>
<td>Kleyer, Michael (Module responsibility)</td>
</tr>
<tr>
<td></td>
<td>Kleyer, Michael (Authorized examiners)</td>
</tr>
<tr>
<td></td>
<td>Kleyer, Michael (Module counselling)</td>
</tr>
<tr>
<td>Prerequisites</td>
<td></td>
</tr>
<tr>
<td>Skills to be acquired in this module</td>
<td>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:</td>
</tr>
<tr>
<td></td>
<td>• Technical skills in mapping plants and animals in landscapes: Records, sorting of records for preparing mapping keys; field mapping.</td>
</tr>
<tr>
<td></td>
<td>• 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</td>
</tr>
<tr>
<td>Ranking/position of the module within the course of studies:</td>
<td>This module imparts both action-oriented and theoretical knowledge required for landscape management support planning.</td>
</tr>
<tr>
<td>Module contents</td>
<td>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.</td>
</tr>
<tr>
<td>Reader's advisory</td>
<td>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.</td>
</tr>
<tr>
<td>Links</td>
<td><a href="https://www.uni-oldenburg.de/en/landeco/">https://www.uni-oldenburg.de/en/landeco/</a></td>
</tr>
<tr>
<td>Language of instruction</td>
<td>German</td>
</tr>
<tr>
<td>Duration (semesters)</td>
<td>1 Semester</td>
</tr>
<tr>
<td>Module frequency</td>
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</tr>
<tr>
<td>Module capacity</td>
<td>unlimited</td>
</tr>
<tr>
<td>Reference text</td>
<td>Medienformen: Geländearbeit, GIS-Arbeit, Präsentation der Inhalte über Beamer, Folie und Tafel, Selbststudium mit dem e-learning System <a href="http://www.GIMOLUS.de">www.GIMOLUS.de</a>,</td>
</tr>
<tr>
<td>Modullevel / module level</td>
<td>MM (Mastermodul / Master module)</td>
</tr>
<tr>
<td>Modulart / typ of module</td>
<td>Wahlpflicht / Elective</td>
</tr>
<tr>
<td>Lehr-/Lernform / Teaching/Learning method</td>
<td>Ü, S</td>
</tr>
<tr>
<td>Vorkenntnisse / Previous knowledge</td>
<td>Time of examination</td>
</tr>
<tr>
<td>Final exam of module</td>
<td>Before the end of the module</td>
</tr>
<tr>
<td>Course type</td>
<td>Comment</td>
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<tr>
<td>Exercises</td>
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<tr>
<td>Seminar</td>
<td>1</td>
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<td>Total time of attendance for the module</td>
<td>154 h</td>
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**lök280 - Special Vegetation Ecology**

<table>
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<tr>
<th>Module label</th>
<th>Special Vegetation Ecology</th>
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</thead>
<tbody>
<tr>
<td>Module code</td>
<td>lök280</td>
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<tr>
<td>Credit points</td>
<td>6.0 KP</td>
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<tr>
<td>Workload</td>
<td>180 h</td>
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</table>

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

**Responsible persons**
- Buchwald, Rainer (Module responsibility)
- Peppler-Lisbach, Cord (Module responsibility)
- Buchwald, Rainer (Authorized examiners)
- Dörfler, Inken (Authorized examiners)
- Peppler-Lisbach, Cord (Authorized examiners)
- Buchwald, Rainer (Module counselling)

**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 focussing on floristic, vegetation ecological, phytosociological (syntaxonomical) aspects as well as on aspects of biocoenology and nature conservation.

**Reader's advisory**

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

**Languages 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 lök285 "Special Vegetation Ecology". Therefore, it is not possible to register for the modules lök280 and lök285 simultaneously.

**Modullevel / module level**
- MM (Mastermodul / Master module)

**Modulart / typ of module**
- Wahlpflicht / Elective

**Vorkenntnisse / Previous knowledge**

**Examination**
- Time of examination
- Type of examination

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

**Course type**
- Exercises

**SWS**
- 4

**Frequency**

**Workload attendance**
- 56 h
Iök285 - Special Vegetation Ecology

Module label: Special Vegetation Ecology
Module code: Iök285
Credit points: 9.0 KP
Workload: 270 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 (Authorized examiners)
- Peppler-Lisbach, Cord (Authorized examiners)

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 focusing on floristic, vegetation ecological, phytosociological (syntaxonomical) aspects as well as on aspects of biocenology 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.

Reader's advisory:

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 Iök280 "Special Vegetation Ecology". Therefore, it is not possible to register for the modules Iök280 and Iök285 simultaneously.

Modulelevel / module level: MM (Mastermodul / Master module)
Modulart / typ of module: Wahlrichtung / Elective

Vorkenntnisse / Previous knowledge:

Examination:
Time of examination: Before the end of the module
Type of examination: Oral examination or assignment

Final exam of module:
Course type: Lecture
Comment: 2
SWS: 2
Frequency: 28
Workload of compulsory attendance: 28

Course type: Exercises
Comment: 4
SWS: 4
Frequency: 56
Workload of compulsory attendance: 56

Total time of attendance for the module: 84 h
**lök290 - Perspectives of Bioenergy**

**Module label**  
Perspectives of Bioenergy

**Module code**  
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)
- Klenke, Thomas (Authorized examiners)
- Röhrdanz, Kai Michael (Authorized examiners)
- Buchwald, Rainer (Authorized examiners)
- Pehlken, Alexandra (Authorized examiners)
- Wark, Michael (Authorized examiners)

**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" (wahliweise zu c)
c) Übung "Praktische Bioenergie" (wahliweise zu b)

**Reader's advisory**

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

**Languages of instruction**
German, English

**Duration (semesters)**
1 Semester

**Module frequency**
yährlich

**Module capacity**
unlimited

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

**Modulart / typ of module**
Wahlpflicht / Elective

**Vorkenntnisse / Previous knowledge**

**Examinaion**
Time of examination
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

**Course type**

<table>
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<th>Comment</th>
<th>SWS</th>
<th>Frequency</th>
<th>Workload of compulsory attendance</th>
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<tr>
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<tr>
<td>Exercises</td>
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<td>Seminar</td>
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**Total time of attendance for the module**
84 h
### lök215 - Ornithologische Bestandsschätzungen

<table>
<thead>
<tr>
<th>Module label</th>
<th>Ornithologische Bestandsschätzungen</th>
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</thead>
<tbody>
<tr>
<td>Module code</td>
<td>lök215</td>
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<tr>
<td>Credit points</td>
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<tr>
<td>Workload</td>
<td>180 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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<tr>
<td>Responsible persons</td>
<td>Schmaljohann, Heiko (Module responsibility)</td>
</tr>
<tr>
<td></td>
<td>Schmaljohann, Heiko (Module counselling)</td>
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<td>Schmaljohann, Heiko (Authorized examiners)</td>
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</table>

**Prerequisites**

**Skills to be acquired in this module**

**Module contents**

**Reader's advisory**

**Links**

**Language of instruction**

**German**

**Duration (semesters)**

1 Semester

**Module frequency**

**Module capacity**

unlimited

**Modullevel / module level**

MM (Mastermodul / Master module)

**Modulart / typ of module**

Wahlpflicht / Elective

**Lehr-/Lernform / Teaching/Learning method**

**Vorkenntnisse / Previous knowledge**

**Examination**

<table>
<thead>
<tr>
<th>Time of examination</th>
<th>Type of examination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 Prüfungsleistungen:</td>
</tr>
<tr>
<td></td>
<td>- Hausarbeit (70%)</td>
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<tr>
<td></td>
<td>- Referat (30%)</td>
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</table>

**Final exam of module**

Course type

Course selection

**SWS**

4

**Frequency**

SuSe or WiSe

**Workload attendance**

56 h
Vertiefungsmodul drittes Fachsemester

Iök310 - Group Project: Sustainable Spatial Development

<table>
<thead>
<tr>
<th>Module label</th>
<th>Group Project: Sustainable Spatial Development</th>
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</thead>
<tbody>
<tr>
<td>Module code</td>
<td>lök310</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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<tr>
<td>Applicability of the module</td>
<td>Master's Programme Landscape Ecology (Master) &gt; Vertiefungsmodule drittes Fachsemester</td>
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Responsible persons
- Mose, Ingo (Module responsibility)
- Mose, Ingo (Module counselling)
- Schaal, Peter (Module counselling)
- Mose, Ingo (Authorized examiners)
- Schaal, Peter (Authorized examiners)
- Tent, Nathalie (Authorized examiners)

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.

Reader's advisory
- Literature will be announced during the lectures.

Links

Language of instruction
- German

Duration (semesters)
- 1 Semester

Module frequency
- jährlich

Module capacity
- unlimited

Modullevel / module level
- MM (Mastermodul / Master module)

Modulart / typ of module
- Wahlpflicht / Elective

Vorkenntnisse / Previous knowledge

Examination
- Time of examination
- Type of examination

Final exam of module
- Before the end of the module
- Special exercise (70%) und presentation (30%)

Course type
- Project group

SWS
- 6

Frequency

Workload attendance
- 84 h
### iök320 - Sustainable Spatial Development in Europe

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#### Applicability of the module
- Master's Programme Landscape Ecology (Master) > Vertiefungmodule 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 (Authorized examiners)
- Klenke, Thomas (Authorized examiners)
- Kramer, Nadine (Authorized examiners)
- Prinz, Markus (Authorized examiners)
- Schaal, Peter (Authorized examiners)

#### 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.

#### Reader's advisory
Schmied, D. (ed.): Winning and losing. The changing geography of Europe's rural areas.

Additional literature will be announced in the seminars.

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<th><a href="https://www.uni-oldenburg.de/en/geo/">https://www.uni-oldenburg.de/en/geo/</a></th>
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**Total time of attendance for the module**: 140 h
lök321 - Sustainable Spatial Development in Europe

Module label
Sustainable Spatial Development in Europe

Module code
lök321

Credit points
9.0 KP

Workload
270 h

Workload points

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

Responsible persons
- Mose, Ingo (Module responsibility)
- Mose, Ingo (Module counselling)
- Klenke, Thomas (Authorized examiners)
- Kramer, Nadine (Authorized examiners)
- Mose, Ingo (Authorized examiners)
- Prinz, Markus (Authorized examiners)
- Schaal, Peter (Authorized examiners)

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 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.

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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.

Reader's advisory
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
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| Total time of attendance for the module | 140 h |


Module label: Advanced Limnology
Module code: lök345
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 (Authorized examiners)
- Niedringhaus, Rolf (Authorized examiners)

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

Skills to be acquired in this module:
- Special Aquatic Ecology
  The module imparts general and special knowledge of the ecology of typical floodplain water systems with special emphasis on floodplain dynamics and the resulting processes related to those water systems. Floodplain development and (faunistic) biodiversity are further main topics comprising e.g. the explanation of ecological conditions and colonisation processes and referring to questions of nature protection, examining the habitat preference of selected species and describing the population development of typical floodplain species.
  
  E Special Aquatic Ecology
  Familiarization with the course of a planning process on the basis of an exemplary project in Northwest Germany; independent development of a concept of methods for assessing the faunistic actual state and subsequent realization in the field; scientific documentation and ecologically relevant assessment of the situation in the project area using selected indicator groups (scientific determination of selected taxa); preparation of final expert opinions on the project

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

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

Reader's advisory:
See announcements in StudIP

Links:

Languages of instruction:
German, English

Duration (semesters):
1 Semester

Module frequency:
jährlich

Module capacity:
unlimited

Reference text:
The courses of this module are integrated into lök350 "Special Animal Ecology" (9 CP). Students graduating in Special Animal Ecology cannot graduate in Special Aquatic Ecology.

Modullevel / module level:
MM (Mastermodul / Master module)

Modulart / typ of module:
Wahlpflicht / Elective

Vorkenntnisse / Previous knowledge:

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Course type | Comment | SWS | Frequency | Workload of compulsory attendance |
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Lecture | | 1 | | 14 |
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Total time of attendance for the module 56 h
Iök350 - Advanced Animal Ecology

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**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 (Authorized examiners)
- Niedringhaus, Rolf (Authorized examiners)
- 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 state; 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

**Reader's advisory**
See announcements in StudIP

**Languages of instruction**
German, English

**Duration (semesters)**
1 Semester

**Module frequency**
jährlich

**Module capacity**
unlimited

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

**Modullevel / module level**
MM (Mastermodul / Master module)
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**Module label**: Special Abiotic Factors (Soil/Water)

**Module code**: lök360

**Credit points**: 6.0 KP

**Workload**: 180 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 (Authorized examiners)
- Kalinina, Olga (Authorized examiners)
- Massmann, Gudrun (Authorized examiners)

**Prerequisites**: Basic knowledge of Soil Science, Hydrogeology and Hydrochemistry

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

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

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

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

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

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

- L: Major Soils of the World and excursion to the World Soil Museum in Wageningen (The Netherlands):
  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.

**Reader's advisory**

**International soil classification system for naming soils and creating legends for soil maps.**
World Soil Resources Reports No. 106. FAQ, Rom; www.fao.org/3/a-i3794e.pdf
- see also announcements in StudIP

**Links**

**Languages of instruction**: German, English

**Duration (semesters)**: 1 Semester
### Module frequency
- **jährlich**

### Module capacity
- 15

### 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 / module level
- MM (Mastermodul / Master module)

### Modulart / typ of module
- Wahlpflicht / Elective

### Lehr-/Lernform / Teaching/Learning method

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### Examination
- **Time of examination**
- **Type of examination**
- Final exam of module: Before the end of the module, Oral examination or assignment

### Course type

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### Total time of attendance for the module
- 56 h
Iök365 - Special Abiotic Factors (Soil/Water)

Module label                  Special Abiotic Factors (Soil/Water)
Module code                   Iök365
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 (Authorized examiners)
- Kalinina, Olga (Authorized examiners)
- Massmann, Gudrun (Authorized examiners)
- Pollmann, Thomas (Authorized examiners)

Prerequisites
- Basic knowledge of Soil Science, Hydrogeology and Hydrochemistry

Skills to be acquired in this module
- E: Applied modelling of water and solute transport in groundwater:
- E: Hydrochemical modelling of water-rock interactions using PHREEQC:
  Modelling of hydrogeochemical processes (speciation reactions and mineral reactions, pyrite oxidation, oxidation of organic matter, redox reactions, ion exchange, equilibrium reactions and reaction kinetics) using the software PHREEQC (http://wwwbrr.cr.usgs.gov/projects/GWC_coupled/phreeqc/)
- L: Major Soils of the World and excursion to the World Soil Museum in Wageningen (The Netherlands):
  Impartment of knowledge into distribution, properties and classification of soils of the world. Qualification to apply the World Reference Base for Soil Resources (WRB) and to identify the soils of the world.
- E: Special soil science field and laboratory exercises:
  Impartment of knowledge into specific field and laboratory methods. Qualification to select and apply specific field and laboratory methods as well as to analyse and interpret results.

Module contents
- E: Applied modelling of water and substance transfer in ground water:
- E: Hydrochemical modelling of water-rock interactions using PHREEQC:
  Modelling of hydrogeochemical processes (speciation reactions and mineral reactions, pyrite oxidation, oxidation of organic substances, redox reactions, ion exchange, balance reactions and reaction kinetics) using the software PHREEQC (http://wwwbrr.cr.usgs.gov/projects/GWC_coupled/phreeqc/)
- L: Major Soils of the World and excursion to the World Soil Museum in Wageningen (The Netherlands):
  Application of the international soil classification system "WRB", step-wise familiarization with soils and their properties as well as with the related landscapes and catenas (from polar to tropical soils), study of varnished profiles of globally distributed soils.
- E: Special soil science field and laboratory exercises:
  Selection of current scientific objectives, construction of a sampling and investigation design, performance of field studies (preferably abroad) and laboratory analysis, analysis and interpretation of results.

Reader's advisory

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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**Vorkenntnisse / Previous knowledge**

Grundkenntnisse der Bodenkunde, Hydrogeologie und Hydrochemie.

**Examination**

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<th>Type of examination</th>
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**Course type**

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<th>Frequency</th>
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**Total time of attendance for the module**

84 h
Module label: Ornithology
Module code: lök370
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)
- Liedvogel, Miriam (Module counselling)
- Bouwhuis, Sandra (Authorized examiners)
- Klump, Georg Martin (Authorized examiners)
- Köppl, Christine (Authorized examiners)
- Langemann, Ulrike (Authorized examiners)
- Liedvogel, Miriam (Authorized examiners)
- Mouritsen, Henrik (Authorized examiners)
- Schmaljohann, Heiko (Authorized examiners)

Prerequisites:

Skills to be acquired in this module:
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

Module contents:
Lecture "Ecology and Physiology of Birds":
This lecture consolidates special aspects of systematics, morphology, physiology, migration, orientation, population biology, communication and behavioural ecology in birds.

Reader's advisory:

Links:

Languages of instruction: German, English
Duration (semesters): 1 Semester
Module frequency: jährlich
Module capacity: 30
Modulelevel / module level: MM (Mastermodul / Master module)
Modulart / typ of module: Wahlpflicht / Elective
Lehr-/Lernform / Teaching/Learning method: V, S

Vorkenntnisse / Previous knowledge:

Examination:
- Time of examination
- Type of examination

Final exam of module:
- Written exam in the last week of the term
- Written examintaiton
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### lök375 - Advanced Ornithology

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<tr>
<td>Responsible persons</td>
<td>Liedvogel, Miriam (Module responsibility)</td>
</tr>
<tr>
<td></td>
<td>Klump, Georg Martin (Module counselling)</td>
</tr>
<tr>
<td></td>
<td>Liedvogel, Miriam (Module counselling)</td>
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<td></td>
<td>Bouwhuis, Sandra (Authorized examiners)</td>
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<td>Klump, Georg Martin (Authorized examiners)</td>
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<td>Langemann, Ulrike (Authorized examiners)</td>
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<td>Liedvogel, Miriam (Authorized examiners)</td>
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<tr>
<td></td>
<td>Schmaljohann, Heiko (Authorized examiners)</td>
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<td></td>
<td>Vedder, Oscar Herman (Authorized examiners)</td>
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</table>

#### Prerequisites

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 to 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 methods 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.

Reader's advisory

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:

Links

Languages of instruction          German, English
Duration (semesters)              1 Semester
Module frequency                 jährlich
Module capacity                  12
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<tr>
<th>Workload attendance</th>
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Iök390 - Experimental designs in ecological field studies

Module label: Experimental designs in ecological field studies
Module code: Iök390
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 (Authorized examiners)

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

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

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

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

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

Reader's advisory:
TIEE: http://www.esa.org/tiee/misc/about.html
Additional scientific publications and materials with examples of relevant research work will be made available via StudIP as an E-reserve of reference literature prior to the start of the course.

Links:

Language of instruction: English
Duration (semesters): 2 Semester
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<td><strong>Modulart / typ of module</strong></td>
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<tr>
<td></td>
<td></td>
<td>1) oral or written presentation of the method design</td>
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<td></td>
<td>2) documentation of experimental procedure, data analysis and data processing</td>
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<td>3) oral or written subject-specific analysis of the planning in respect of the relevant questions and elaborated hypotheses</td>
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<td>4) interdisciplinary analysis of the experiments (oral or in writing)</td>
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| **Total time of attendance for the module** | 56 h |
# Abschlussmodul

**mam - Master’s Degree Module**

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<tr>
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<td>der Landschaftsoekologie, Lehrende (Authorized examiners)</td>
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## Prerequisites

**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.

**Reader's advisory**

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

**Modullevel / module level** MM (Mastermodul / Master module)

**Modulart / typ of module** Pflicht / Mandatory

**Lehr-/Lernform / Teaching/Learning method** S (angeleitete selbständige Arbeit)

## Previous knowledge

**Examination**

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**Course type** Seminar

**SWS** 2

**Frequency**

**Workload attendance** 28 h