

## Background Modules

### bio703 - Basic Concepts in Plant Sciences

<b>Modulbezeichnung</b>	Basic Concepts in Plant Sciences
<b>Modulkürzel</b>	bio703
<b>Kreditpunkte</b>	12.0 KP
<b>Workload</b>	360 h
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"> <li>• Master Biologie (Master) &gt; Background Modules</li> <li>• Master Biology (Master) &gt; Background Modules</li> <li>• Master Landschaftsökologie (Master) &gt; Wahlpflichtmodule</li> </ul>
<b>Zuständige Personen</b>	<ul style="list-style-type: none"> <li>• Zotz, Gerhard (Modulverantwortung)</li> <li>• Albach, Dirk Carl (Modulberatung)</li> <li>• von Hagen, Klaus Bernhard (Modulberatung)</li> <li>• Zotz, Gerhard (Prüfungsberechtigt)</li> <li>• Albach, Dirk Carl (Prüfungsberechtigt)</li> <li>• von Hagen, Klaus Bernhard (Prüfungsberechtigt)</li> <li>• Will, Maria (Prüfungsberechtigt)</li> </ul>
<b>Teilnahmevoraussetzungen</b>	
<b>Kompetenzziele</b>	<p>Communicating in-depth knowledge in ecology, phylogeny, evolution and genetics of plants. Practicing an approach to scientific questions that considers different scales and methodologies Communicating theoretical concepts of ecology, evolution and genetics of plants.</p> <p>++ 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            + ability to perform independent biological research            ++ data presentation and discussion in English (written and spoken)            + teamwork            ++ ethics and professional behaviour</p>
<b>Modulinhalte</b>	<p>V: Biodiversity of plants (2 SWS) V: Resource acquisition and use by plants (1 SWS) V: Gene expression in plants (1 SWS) S: Phylogeny of plants (2 SWS) S: Interactions of plants with environmental parameters (2 SWS)</p>
<b>Literaturempfehlungen</b>	<p>Bresinsky et al. Strasburger's Plant Sciences. 2013 Springer, available as ebook. Oliveira, R.S. 2019. Plant Physiological Ecology. New York: Springer, available as ebook</p>
<b>Links</b>	
<b>Unterrichtssprache</b>	Englisch
<b>Dauer in Semestern</b>	1 Semester
<b>Angebotsrhythmus Modul</b>	annually, winter term
<b>Aufnahmekapazität Modul</b>	12
<b>Hinweise</b>	associated with bio765 (Current Methods in Plant Science) (recommended)
<b>Modulart</b>	Wahlpflicht / Elective
<b>Modullevel</b>	MM (Mastermodul / Master module)

<b>Lehr-/Lernform</b>	Lecture, seminar			
<b>Vorkenntnisse</b>	Ecology, flora, genetics			
Prüfung	Prüfungszeiten		Prüfungsform	
<b>Gesamtmodul</b>	1 Portfolio			
Lehrveranstaltungsform	Kommentar	SWS	Angebotsrhythmus	Workload Präsenz
Vorlesung		4	WiSe	56
Seminar		4	WiSe	56
<b>Präsenzzeit Modul insgesamt</b>				<b>112 h</b>

## bio765 - Current Methods in Plant Sciences - Ecology, Phylogeny and Molecular Biology

<b>Modulbezeichnung</b>	Current Methods in Plant Sciences - Ecology, Phylogeny and Molecular Biology
<b>Modulkürzel</b>	bio765
<b>Kreditpunkte</b>	12.0 KP
<b>Workload</b>	360 h
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"> <li>• Master Biologie (Master) &gt; Background Modules</li> <li>• Master Biology (Master) &gt; Background Modules</li> <li>• Master Landschaftsökologie (Master) &gt; Wahlpflichtmodule</li> </ul>
<b>Zuständige Personen</b>	<ul style="list-style-type: none"> <li>• Albach, Dirk Carl (Modulverantwortung)</li> <li>• Zotz, Gerhard (Modulberatung)</li> <li>• Will, Maria (Modulberatung)</li> <li>• Khan, Gulzar (Modulberatung)</li> <li>• von Hagen, Klaus Bernhard (Modulberatung)</li> <li>• Zotz, Gerhard (Prüfungsberechtigt)</li> <li>• Will, Maria (Prüfungsberechtigt)</li> <li>• Albach, Dirk Carl (Prüfungsberechtigt)</li> <li>• Khan, Gulzar (Prüfungsberechtigt)</li> <li>• von Hagen, Klaus Bernhard (Prüfungsberechtigt)</li> </ul>
<b>Teilnahmevoraussetzungen</b>	
<b>Kompetenzziele</b>	<p>Acquaintance and practicing ecological, phylogenetic and molecular methods            Communication of scale- and method-overarching thinking and project planning            Knowledge of current methods and questions in plant science            Capacity for teamwork, project- and time management</p> <p>++ 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            + ability to perform independent biological research            + data presentation and discussion (written and spoken)            + teamwork            + statistics &amp; scientific programming</p>
<b>Modulinhalte</b>	<p>Current Methods in Plant Science. Subject to annual change.            The specific topics for the coming semester will be presented at the module introduction during the orientation week, please check the community-Forum:            5.02.InfoB Informationen MSc Biology for the            timetable: <a href="https://elearning.uni-oldenburg.de/dispatch.php/course/details?sem_id=d35edd08df0fb5c6a8ae3a81ea738b88&amp;again=yes">https://elearning.uni-oldenburg.de/dispatch.php/course/details?sem_id=d35edd08df0fb5c6a8ae3a81ea738b88&amp;again=yes</a></p>
<b>Literaturempfehlungen</b>	
<b>Links</b>	
<b>Unterrichtssprache</b>	Englisch
<b>Dauer in Semestern</b>	1 Semester
<b>Angebotsrhythmus Modul</b>	annually, winter term
<b>Aufnahmekapazität Modul</b>	12
<b>Hinweise</b>	associated with bio703 (Basic Concepts in Plant Sciences) (recommended)
<b>Modulart</b>	Wahlpflicht / Elective
<b>Modullevel</b>	MM (Mastermodul / Master module)
<b>Lehr-/Lernform</b>	Exercise
<b>Vorkenntnisse</b>	Ecology, flora, genetics

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Prüfung	Prüfungszeiten	Prüfungsform
<b>Gesamtmodul</b>		<b>1 portfolio (1 poster, 1 short report, 1 report)</b>
<b>Lehrveranstaltungsform</b>	Übung	
<b>SWS</b>	8	
<b>Angebotsrhythmus</b>	WiSe	
<b>Workload Präsenzzeit</b>	112 h	

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## bio655 - Ornithology in theoretical Concepts

<b>Modulbezeichnung</b>	Ornithology in theoretical Concepts
<b>Modulkürzel</b>	bio655
<b>Kreditpunkte</b>	12.0 KP
<b>Workload</b>	360 h
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"><li>• Master Biologie (Master) &gt; Background Modules</li><li>• Master Biology (Master) &gt; Background Modules</li></ul>
<b>Zuständige Personen</b>	<ul style="list-style-type: none"><li>• Liedvogel, Miriam (Modulverantwortung)</li><li>• Bouwhuis, Sandra (Modulberatung)</li><li>• Köppl, Christine (Modulberatung)</li><li>• Langemann, Ulrike (Modulberatung)</li><li>• Mouritsen, Henrik (Modulberatung)</li><li>• Schmaljohann, Heiko (Modulberatung)</li><li>• Heim, Wieland (Modulberatung)</li><li>• Köppl, Christine (Prüfungsberechtigt)</li><li>• Liedvogel, Miriam (Prüfungsberechtigt)</li><li>• Bouwhuis, Sandra (Prüfungsberechtigt)</li><li>• Langemann, Ulrike (Prüfungsberechtigt)</li><li>• Mouritsen, Henrik (Prüfungsberechtigt)</li><li>• Schmaljohann, Heiko (Prüfungsberechtigt)</li><li>• Heim, Wieland (Prüfungsberechtigt)</li></ul>

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### Teilnahmevoraussetzungen

### Kompetenzziele

The aim of the module is to consolidate various aspects of ornithology. The module imparts advanced knowledge on different aspects of ornithology.

The students acquire:

An extended knowledge of behavioural, sensory, morphological and physiological characteristics in birds and relevant fundamental concept in conservation, ecology and evolution smorphological 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

++ broad and deepened biological expertise

+ deepened in depths knowledge of biological working methods

+ interdisciplinary thinking

+ critical and analytical thinking

+ independent searching and knowledge of scientific literature

++ data presentation and discussion in German and English (written and spoken)

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### Modulinhalte

The module is composed of the lecture "Ecology, evolution and sensory biology in birds", a seminar accompanying the lecture "Current Questions in Ornithology", a seminar "Behavioural Ecology of Birds", and a seminar "Methods in Field Ornithology".

Lecture "Ecology, evolution and sensory biology in birds":

This lecture covers in-depth and specific aspects of phylogeny, speciation and hybridisation, bird migration, orientation, behavioural ecology, population biology, life history and sensory systems of birds. Seminar "Current Questions of Ornithology":

In this seminar, original English publications are presented and discussed which deal with current research results from various fields covered in the lectures. Every student reads a paper on one scientific article, presents the study and discusses the results of that article with the other participants.

Seminar "Behavioural Ecology of Birds" (option 1):

In the seminar, current literature relating to the life history of birds will be reported. During the term, each participant is presenting an original paper in a short talk and the group of students will be guided to critically discuss the paper.

Seminar "Methods in Field Ornithology" (option 2):

The core methods of field ornithology, such as stable isotopes, bird census, ringing, radar, radio tracking, etc., will be introduced with the help of English scientific papers by the students. In the presentations the corresponding methods will be explained in detail with an emphasis on the pros and cons of the method. The aim of this seminar is to learn how to deal with scientific methods in a critical way.

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## Literaturempfehlungen

Bairlein F (2022) Das große Buch vom Vogelzug: Eine umfassende Gesamtdarstellung. AULA-Verlag

Bennett PM, Owens IPF (2002) Evolutionary Ecology of birds: Life histories, mating systems, and extinction. Oxford

Berthold P, Gwinner E, Sonnenschein E (2003) Avian migration. Springer, Berlin.

Carey C (1996) Avian energetics and nutritional ecology. Chapman & Hall, New York.

Catchpole CK, Slater PJB (1995) Bird song. Cambridge UP, Cambridge.

Danchin E, Giraldeau L-A, Cezilly F (2008) Behavioural Ecology. Oxford

Gill FB (2007). Ornithology, 3rd edition (London: W.H. Freeman & Company)

Lovette IJ, Fitzpatrick JW (2017) Handbook of Bird Biology – The Cornell Lab of Ornithology (2017). 3rd edition

Scanes CG (2015) Sturkie's Avian Physiology, 6th edition. Academic Press

Scott G (2010) Essential Ornithology. Oxford University Press, Oxford.

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## Links

Participating Institution: Institute of Avian Research für Vogelforschung

<http://www.ifv-vogelwarte.de> <https://ifv-vogelwarte.de/en/home>

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<b>Unterrichtssprache</b>	Englisch	
<b>Dauer in Semestern</b>	1 Semester	
<b>Angebotsrhythmus Modul</b>	winter term	
<b>Aufnahmekapazität Modul</b>	30	
<b>Hinweise</b>	associated with bio663	
<b>Modulart</b>	Wahlpflicht / Elective	
<b>Modullevel</b>	MM (Mastermodul / Master module)	
<b>Lehr-/Lernform</b>	Lecture, seminar	
<b>Prüfung</b>	<b>Prüfungszeiten</b>	<b>Prüfungsform</b>
<b>Gesamtmodul</b>	exam during final lecture week	3 exams: - 2 presentations (20% each; the main seminar is mandatory, one of the two options need to be taken in addition) - 1 written exam or 1 oral exam (60%)

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Prüfung

Prüfungszeiten

Prüfungsform

Regular active participation is required for the module to be passed successfully.

Lehrveranstaltungsform	Kommentar	SWS	Angebotsrhythmus	Workload Präsenz
Vorlesung		4	WiSe	56
Seminar		4	WiSe	56
<b>Präsenzzeit Modul insgesamt</b>				<b>112 h</b>

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## bio770 - Field Methods in Organismal Biology

<b>Modulbezeichnung</b>	Field Methods in Organismal Biology
<b>Modulkürzel</b>	bio770
<b>Kreditpunkte</b>	15.0 KP
<b>Workload</b>	450 h
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"><li>• Master Biologie (Master) &gt; Background Modules</li><li>• Master Biology (Master) &gt; Background Modules</li><li>• Master Landschaftsökologie (Master) &gt; Wahlpflichtmodule</li></ul>
<b>Zuständige Personen</b>	<ul style="list-style-type: none"><li>• Zotz, Gerhard (Modulverantwortung)</li><li>• Gerlach, Gabriele (Modulberatung)</li><li>• Albach, Dirk Carl (Modulberatung)</li><li>• von Hagen, Klaus Bernhard (Modulberatung)</li><li>• Mouritsen, Henrik (Modulberatung)</li><li>• Nolte, Arne (Modulberatung)</li><li>• Schmaljohann, Heiko (Modulberatung)</li><li>• Zotz, Gerhard (Prüfungsberechtigt)</li><li>• Gerlach, Gabriele (Prüfungsberechtigt)</li><li>• Albach, Dirk Carl (Prüfungsberechtigt)</li><li>• Will, Maria (Prüfungsberechtigt)</li><li>• von Hagen, Klaus Bernhard (Prüfungsberechtigt)</li><li>• Mouritsen, Henrik (Prüfungsberechtigt)</li><li>• Nolte, Arne (Prüfungsberechtigt)</li><li>• Khan, Gulzar (Prüfungsberechtigt)</li><li>• Schmaljohann, Heiko (Prüfungsberechtigt)</li></ul>
<b>Teilnahmevoraussetzungen</b>	
<b>Kompetenzziele</b>	<p>++ 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 ++ ability to perform independent biological research + data presentation and discussion (E) (written and spoken) ++ project and time management ++ statistics &amp; scientific programming</p> <p>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).</p>
<b>Modulinhalte</b>	<p>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</p>
<b>Literaturempfehlungen</b>	<p>Varies with topic and venue</p>
<b>Links</b>	<p><a href="http://www.uni-oldenburg.de/fun_eco/">www.uni-oldenburg.de/fun_eco/</a></p>
<b>Unterrichtssprache</b>	Englisch
<b>Dauer in Semestern</b>	1 Semester



<b>Angebotsrhythmus Modul</b>	annually in summer term		
<b>Aufnahmekapazität Modul</b>	21		
<b>Modulart</b>	Wahlpflicht / Elective		
<b>Modullevel</b>	MM (Mastermodul / Master module)		
<b>Lehr-/Lernform</b>	Seminar, exercise		
Prüfung	Prüfungszeiten		Prüfungsform

**Gesamtmodul**

2 Presentations (30 %) Laboratory course report on project work (70 %)  
PLEASE NOTE: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.

Lehrveranstaltungsform	Kommentar	SWS	Angebotsrhythmus	Workload Präsenz
Übung		10	SoSe	140
Seminar		2	SoSe	28
Seminar (Pflichtveranstaltung für Erstsemester OHNE bisherige Belehrung)			WiSe	0
<b>Präsenzzeit Modul insgesamt</b>				<b>168 h</b>

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## bio720 - Marine Biodiversity

<b>Modulbezeichnung</b>	Marine Biodiversity	
<b>Modulkürzel</b>	bio720	
<b>Kreditpunkte</b>	15.0 KP	
<b>Workload</b>	450 h	
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"><li>• Master Biologie (Master) &gt; Background Modules</li><li>• Master Biology (Master) &gt; Background Modules</li></ul>	
<b>Zuständige Personen</b>	<ul style="list-style-type: none"><li>• Martinez Arbizu, Pedro Miguel (Modulverantwortung)</li><li>• Martinez Arbizu, Pedro Miguel (Prüfungsberechtigt)</li><li>• Wehrmann, Achim (Prüfungsberechtigt)</li><li>• Rossel, Sven (Prüfungsberechtigt)</li><li>• Gutt, Julian (Prüfungsberechtigt)</li><li>• Kröncke, Ingrid (Prüfungsberechtigt)</li></ul>	
<b>Teilnahmevoraussetzungen</b>		
<b>Kompetenzziele</b>	<ul style="list-style-type: none"><li>++ deepened biological expertise</li><li>++ deepened knowledge of biological working methods</li><li>++ data analysis skills</li><li>++ interdisciplinary thinking</li><li>++ critical and analytical thinking</li><li>++ independent searching and knowledge of scientific literature</li><li>++ ability to perform independent biological research</li><li>++ data presentation and discussion (written and spoken) (E)</li><li>++ teamwork</li><li>+ ethics and professional behaviour</li><li>+ project and time management</li><li>++ statistics &amp; scientific programming</li></ul> <p>Knowledge of fundamentals, topical subjects and methods in Marine Biology and Marine Geology. Studies and critical assessment of the scientific literature.</p>	
<b>Modulinhalte</b>	<p>L: (AW) General Marine Geology E: Biogenic sedimentation, Interaction benthos-sediment; (SS) Plankton of the oceans; (MH) unicellular plankton; (IK) benthos of the North-Sea; (PM) biodiversity in the deep sea and on sea-mountains; (JG) conceptions and hypotheses of marine biodiversity, biodiversity of marine vertebrates; (GG) animal migrations and dispersal behaviour. Methods and scientific work on research vessels. A lecture comprises the above-mentioned subjects and imparts marine biological theories, research results and methods. In the seminar, research is presented and discussed. In the laboratory course/exercises, subjects are treated in coordination with the contents of the lecture. With the aid of a computer, data are analysed and interpreted statistically.</p>	
<b>Literaturempfehlungen</b>	as announced in the lecture	
<b>Links</b>		
<b>Unterrichtsprachen</b>	Englisch, Deutsch	
<b>Dauer in Semestern</b>	1 Semester	
<b>Angebotsrhythmus Modul</b>	winter term	
<b>Aufnahmekapazität Modul</b>	unbegrenzt	
<b>Modulart</b>	Wahlpflicht / Elective	
<b>Modullevel</b>	MM (Mastermodul / Master module)	
<b>Lehr-/Lernform</b>	Lecture, seminar, exercise	
<b>Prüfung</b>	Prüfungszeiten	Prüfungsform
<b>Gesamtmodul</b>		Written examination (60 %), short presentation

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Prüfung

Prüfungszeiten

Prüfungsform

(20%), practical exercise (20%)  
Regular active participation is required for the  
module to be passed.

Lehrveranstaltungsform	Kommentar	SWS	Angebotsrhythmus	Workload Präsenz
Vorlesung		3	WiSe	42
Übung		9	WiSe	126
Seminar		1	WiSe	14
<b>Präsenzzeit Modul insgesamt</b>				<b>182 h</b>

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## bio780 - Biodiversity of Littoral Communities

<b>Modulbezeichnung</b>	Biodiversity of Littoral Communities
<b>Modulkürzel</b>	bio780
<b>Kreditpunkte</b>	15.0 KP
<b>Workload</b>	450 h
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"><li>• Master Biologie (Master) &gt; Background Modules</li><li>• Master Biology (Master) &gt; Background Modules</li></ul>
<b>Zuständige Personen</b>	<ul style="list-style-type: none"><li>• Martinez Arbizu, Pedro Miguel (Modulverantwortung)</li><li>• Martinez Arbizu, Pedro Miguel (Prüfungsberechtigt)</li></ul>
<b>Teilnahmevoraussetzungen</b>	Safe apnoeiving with aptitude test and medical fitness certificate
<b>Kompetenzziele</b>	<p>+ deepened knowledge of biological working methods + ability to perform independent biological research ++ teamwork + ethics and professional behaviour + project and time management</p> <p>By actively participating in this module students acquire qualifications in the following fields: Biological oceanography, marine biology and marine ecology: - Geological formation history of the Mediterranean Sea and Atlantic Ocean, respectively, or the Red Sea and adjacent seas - Oceanography and hydrology - Development of the faunal and floral composition of the Atlantic Ocean, the Mediterranean Sea and the Mediterranean region or the Red Sea (biogeography) - Commercial utilization of the seas and its impacts - Biotopes and biotic communities - Evolution, systematics, morphology, modes of life, and ecology of selected animal groups - Applying theoretical knowledge to real-world organisms/systems - Improved and specialized knowledge of species - Adaptation of life cycles - Interaction between organisms and environment - Dynamics of reef-building and reef-degrading processes - Threat to coral reefs/protection of marine environments Methods: - Formulation and definition of scientific approaches and selection of methods - Observation and investigation of organisms and their habitats (snorkelling/diving) - Documentation of small research projects in groups in the style of a scientific publication - Editorial work to prepare a module report - Popular presentation of results to be published by the media and to be presented at the University Further skills: - Social engagement in groups/teamwork in projects - Independent scientific work in groups - Improvement of scientific discussion culture - Consciousness of the threat to coral reefs - Practising English - Dealing with the culture of the visited region Culture: - History, culture, politics, and religion Additionally: - Physiological aspects of apnoeiving - Measures in case of accidents (also caused by "poisonous" organisms)</p>
<b>Modulinhalte</b>	Biodiversity of littoral biotic communities – topographical field research
<b>Literaturempfehlungen</b>	<p>GRÜTER, W., 2001: Leben im Meer - Vielfalt und Zusammenhänge. Dr. Friedrich Pfeil Verlag, München. %% Should be read prior to a marine biological excursion! This book will arouse your curiosity about the submarine world. A reading book!%% HEMPEL, G., HEMPEL, I. &amp; S. SCHIEL (HRSG.), 2006: Faszination Meeresforschung – Ein biologisches Lesebuch. Hauschild Verlag. %% This textbook is information and fun for all readers interested in marine life as well as in the protection of marine environments.%% HOFRICHTER, R., 2001: Das Mittelmeer - Fauna, Flora, Ökologie. Spektrum Akademischer Verlag, Heidelberg - Berlin: Band I, II, III. %%The textbook for the Mediterranean Sea! The general 1st part provides valuable information on symbioses or feeding types, for example.%% LALLI, C. M. &amp; T. R., PARSONS, 1997: Biological Oceanography: An Introduction. 2. Edition. The Open University, Butterworth, Heinemann. %%Very compact, explanatory! Not expensive! A must for biological oceanography! Recommended for preparing examinations! Provides basic information!%% NYBAKKEN, J. W. &amp; M. D. MERTNESS, 2005: Marine Biology - An ecological approach. Pearson,</p>

Education paperback book. Addison, Wesley, Publishers. %%Highly illustrative! Much additional information on different fields! The authors provide a unique ecological approach that helps students understand the real-world relevance of marine biology by exploring how organisms interact within their individual ecosystems.%% SOMMER, U., 2005: Biologische Meereskunde. 2. Auflage, Springer Verlag, Berlin, Heidelberg. %%Connecting biological oceanography with theoretical ecology!%% Literature study: Web of science: [externhttp://www.bis.uni-oldenburg.de](http://www.bis.uni-oldenburg.de) – Data banks(DBIS) – Biology – TOP data banks, e.g. ASFA, Science Citation Index, Zoological Record <http://www.biodiversitylibrary.org/bibliography/14107> [externhttp://scholar.google.de/](http://scholar.google.de/) [externhttp://www.vifabio.de](http://www.vifabio.de) Open access journals: [externhttp://www.doaj.org/](http://www.doaj.org/) - [externhttp://www.plosone.org](http://www.plosone.org)

<b>Links</b>				
<b>Unterrichtssprache</b>		Englisch		
<b>Dauer in Semestern</b>		1 Semester		
<b>Angebotsrhythmus Modul</b>		annually in summer term		
<b>Aufnahmekapazität Modul</b>		unbegrenzt		
<b>Modulart</b>		Wahlpflicht / Elective		
<b>Modullevel</b>		MM (Mastermodul / Master module)		
<b>Lehr-/Lernform</b>		Exercise, seminar		
Prüfung	Prüfungszeiten	Prüfungsform		
<b>Gesamtmodul</b>				
	during the lectures	2 short presentations (30 %), 1 internship report (70 %) (project report in the style of a scientific publication) PLEASE NOTE: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.		
<b>Lehrveranstaltungsform</b>	<b>Kommentar</b>	<b>SWS</b>	<b>Angebotsrhythmus</b>	<b>Workload Präsenz</b>
Übung		9	SoSe	126
Seminar		3	SoSe	42
Seminar (Pflichtveranstaltung für Erstsemester OHNE bisherige Belehrung)			WiSe	0
<b>Präsenzzeit Modul insgesamt</b>				168 h

## bio733 - Evolutionary Biology Population Genetics

<b>Modulbezeichnung</b>	Evolutionary Biology Population Genetics			
<b>Modulkürzel</b>	bio733			
<b>Kreditpunkte</b>	6.0 KP			
<b>Workload</b>	180 h			
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"> <li>• Master Biologie (Master) &gt; Background Modules</li> <li>• Master Biology (Master) &gt; Background Modules</li> </ul>			
<b>Zuständige Personen</b>	<ul style="list-style-type: none"> <li>• Gerlach, Gabriele (Modulverantwortung)</li> <li>• Albach, Dirk Carl (Modulberatung)</li> <li>• Khan, Gulzar (Modulberatung)</li> <li>• Gerlach, Gabriele (Prüfungsberechtigt)</li> <li>• Albach, Dirk Carl (Prüfungsberechtigt)</li> <li>• Khan, Gulzar (Prüfungsberechtigt)</li> </ul>			
<b>Teilnahmevoraussetzungen</b>	keine			
<b>Kompetenzziele</b>	+ vertiefte biologische Fachkenntnisse ++ vertiefte Kenntnisse biologischer Arbeitstechniken ++ Fähigkeit zur Datenanalyse ++ kritisches und analytisches Denken ++ eigenständige Recherche und Kenntnisse wissenschaftlicher Primärliteratur ++ Datenpräsentation und Diskussion in Wort und Schrift (E) + Teamfähigkeit ++ Statistik und wissenschaftliches Programmieren			
<b>Modulinhalte</b>	Die Vorlesung vermittelt Fachkenntnisse zu den Arbeitsgebieten der Populationsgenetik, Evolution und Artbildung. Es werden wichtige Labormethoden im Zusammenhang mit DNA Sequenzierung und die Grundlagen zur Analyse von Wanderungen, Verbreitung, genetischen Diversität von Pflanzen- und Tierarten vermittelt. Übung: Es werden Datensätze und Methoden vorgestellt und angewendet, um die Verbreitung und genetischen Austausch zwischen Populationen zu bestimmen.			
<b>Literaturempfehlungen</b>	aktuelle wissenschaftliche Artikel zur Evolutionsbiologie Futuyama D. Evolutionary Biology, Elsevier, Hartl & Clark Principles of Population Genetics, Sinauer			
<b>Links</b>				
<b>Unterrichtssprache</b>	Englisch			
<b>Dauer in Semestern</b>	1 Semester			
<b>Angebotsrhythmus Modul</b>	Wintersemester			
<b>Aufnahmekapazität Modul</b>	12			
<b>Hinweise</b>	verknüpft mit dem Modul bio736 (Evolutionäre Transkriptomik)			
<b>Modulart</b>	Wahlpflicht / Elective			
<b>Modullevel</b>	MM (Mastermodul / Master module)			
<b>Lehr-/Lernform</b>	Vorlesung, Übung			
<b>Vorkenntnisse</b>	Grundkenntnisse Evolutionsbiologie			
Prüfung	Prüfungszeiten	Prüfungsform		
<b>Gesamtmodul</b>		1 Portfolio (Präsentation, Laborprotokoll)		
Lehrveranstaltungsform	Kommentar	SWS	Angebotsrhythmus	Workload Präsenz
Vorlesung		1	WiSe	14
Übung		3	WiSe	42
<b>Präsenzzeit Modul insgesamt</b>				56 h

## bio736 - Evolutionary Transcriptomics

<b>Modulbezeichnung</b>	Evolutionary Transcriptomics	
<b>Modulkürzel</b>	bio736	
<b>Kreditpunkte</b>	6.0 KP	
<b>Workload</b>	180 h	
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"> <li>• Master Biologie (Master) &gt; Background Modules</li> <li>• Master Biology (Master) &gt; Background Modules</li> </ul>	
<b>Zuständige Personen</b>	<ul style="list-style-type: none"> <li>• Nolte, Arne (Modulverantwortung)</li> <li>• Dennenmoser, Stefan (Modulberatung)</li> <li>• Nolte, Arne (Prüfungsberechtigt)</li> <li>• Dennenmoser, Stefan (Prüfungsberechtigt)</li> </ul>	
<b>Teilnahmevoraussetzungen</b>	none	
<b>Kompetenzziele</b>	<ul style="list-style-type: none"> <li>+ deepened biological expertise</li> <li>++ deepened knowledge of biological working methods</li> <li>++ data analysis skills;</li> <li>++ critical and analytical thinking</li> <li>+ independent searching and knowledge of scientific literature</li> <li>++ data presentation and discussion in English (written and spoken)</li> <li>++ statistics &amp; scientific programming</li> </ul>	
<b>Modulinhalte</b>	<p>Lecture: Gene expression represents the first step of the translation of genomic information into a phenotype. This phenotype is of broad interest in all disciplines of biology. Gene expression data can reveal how genetic changes at single genes manifest phenotypically and how gene expression is regulated. The same data can also explain differences in life history and adaptation to different environments. Different perspectives can be understood by studying mechanisms of gene regulation as well as broad scale transcriptomics analyses. Exercise: We will generate and analyze gene expression data during the course including wet lab and computational methods. Practicals include the analysis of single-gene expression data as well as RNAseq data representing complete transcriptomes.</p>	
<b>Literaturempfehlungen</b>		
<b>Links</b>		
<b>Unterrichtssprache</b>	Englisch	
<b>Dauer in Semestern</b>	1 Semester	
<b>Angebotsrhythmus Modul</b>	Wintersemester	
<b>Aufnahmekapazität Modul</b>	12	
<b>Hinweise</b>	associated with bio733: Evolutionary Biology Population Genetics (recommended)	
<b>Modulart</b>	Wahlpflicht / Elective	
<b>Modullevel</b>	MM (Mastermodul / Master module)	
<b>Lehr-/Lernform</b>	Lecture, exercise	
<b>Vorkenntnisse</b>	Basic knowledge of evolutionary biology	
<b>Prüfung</b>	<b>Prüfungszeiten</b>	<b>Prüfungsform</b>
<b>Gesamtmodul</b>	portfolio (presentation, laboratory protocol)	

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Lehrveranstaltungsform	Kommentar	SWS	Angebotsrhythmus	Workload Präsenz
Vorlesung		1	WiSe	14
Übung		3	WiSe	42
<b>Präsenzzeit Modul insgesamt</b>				<b>56 h</b>



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## bio675 - Molecular Ecology

<b>Modulbezeichnung</b>	Molecular Ecology
<b>Modulkürzel</b>	bio675
<b>Kreditpunkte</b>	12.0 KP
<b>Workload</b>	360 h
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"><li>• Master Biologie (Master) &gt; Background Modules</li><li>• Master Biology (Master) &gt; Background Modules</li><li>• Master Landschaftsökologie (Master) &gt; Wahlpflichtmodule</li></ul>
<b>Zuständige Personen</b>	<ul style="list-style-type: none"><li>• Nolte, Arne (Modulverantwortung)</li><li>• Gerlach, Gabriele (Modulberatung)</li><li>• Nolte, Arne (Prüfungsberechtigt)</li><li>• Gerlach, Gabriele (Prüfungsberechtigt)</li><li>• Dennenmoser, Stefan (Prüfungsberechtigt)</li></ul>
<b>Teilnahmevoraussetzungen</b>	
<b>Kompetenzziele</b>	<p>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.</p> <p>++ deepened biological expertise ++ deepened knowledge of biological working methods ++ data analysis skills + interdisciplinary thinking + critical and analytical thinking + independent searching and knowledge of scientific literature ++ ability to perform independent biological research ++ data presentation and discussion (E) (written and spoken) + statistics &amp; scientific programming</p>
<b>Modulinhalte</b>	<p>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.</p>
<b>Literaturempfehlungen</b>	will be announced during the course
<b>Links</b>	
<b>Unterrichtssprache</b>	Englisch
<b>Dauer in Semestern</b>	1 Semester
<b>Angebotsrhythmus Modul</b>	summer term
<b>Aufnahmekapazität Modul</b>	15
<b>Hinweise</b>	associated with bio890 Current Topics of Biology (Seminar)
<b>Modulart</b>	Wahlpflicht / Elective

<b>Modullevel</b>	MM (Mastermodul / Master module)			
<b>Lehr-/Lernform</b>	Lecture, Exercise			
<b>Vorkenntnisse</b>	Reading English literature and presenting seminar topics in English. Basic knowledge of working in a gene laboratory and with a computer.			
Prüfung	Prüfungszeiten	Prüfungsform		
<b>Gesamtmodul</b>	during the module	<b>Portfolio (Presentation, research proposal)</b>		
Lehrveranstaltungsform	Kommentar	SWS	Angebotsrhythmus	Workload Präsenz
Vorlesung		2	SoSe	28
Übung		6	SoSe	84
<b>Präsenzzeit Modul insgesamt</b>				112 h

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## bio605 - Molecular Genetics and Cell Biology

<b>Modulbezeichnung</b>	Molecular Genetics and Cell Biology
<b>Modulkürzel</b>	bio605
<b>Kreditpunkte</b>	12.0 KP
<b>Workload</b>	360 h
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"><li>• Master Biologie (Master) &gt; Background Modules</li><li>• Master Biology (Master) &gt; Background Modules</li><li>• Master Neuroscience (Master) &gt; Background Modules</li><li>• Master's Programme Molecular Biomedicine (Master) &gt; Background Modules</li></ul>
<b>Zuständige Personen</b>	<ul style="list-style-type: none"><li>• Neidhardt, John (Modulverantwortung)</li><li>• Neidhardt, John (Prüfungsberechtigt)</li><li>• Koch, Karl-Wilhelm (Prüfungsberechtigt)</li><li>• Jüschke, Christoph (Prüfungsberechtigt)</li></ul>
<b>Teilnahmevoraussetzungen</b>	BSc (Biology, Biochemistry)
<b>Kompetenzziele</b>	<p>++ 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 + data presentation and discussion (E) (written and spoken) + teamwork + ethics and professional behaviour + project and time management</p> <p>Addressing students with an emphasis on molecular biology, molecular genetics, cell biology, and neurobiology</p>
<b>Modulinhalte</b>	<p>Lecture: To improve knowledge in molecular genetics, molecular biology and cell biology in correlation with human diseases. Exercise: Learn to transfer the theoretical knowledge to experiments. Gaining methodological knowledge in molecular genetics, cell biology and therapeutic approaches. Initial training on how to perform research projects. Subjects of the lecture and seminar: Molecular bases of neurodegenerative diseases, structure and function of DNA/RNA/proteins/membranes, cytoskeleton, cell cycle, programmed cell death, cells in the social structure. Exercises: Learning current methods of molecular biology and human genetics; high throughput technologies, introduction to cell cultivation techniques.</p>
<b>Literaturempfehlungen</b>	Textbooks of Cell Biology
<b>Links</b>	<a href="http://www.uni-oldenburg.de/humangenetik/">http://www.uni-oldenburg.de/humangenetik/</a>
<b>Unterrichtssprache</b>	Englisch
<b>Dauer in Semestern</b>	1 Semester
<b>Angebotsrhythmus Modul</b>	winter term
<b>Aufnahmekapazität Modul</b>	15
<b>Hinweise</b>	associated with bio900

<b>Modulart</b>	Wahlpflicht / Elective	
<b>Modullevel</b>	MM (Mastermodul / Master module)	
<b>Vorkenntnisse</b>	Zellbiologische Grundkenntnisse, Genetik, Biochemie	
Prüfung	Prüfungszeiten	Prüfungsform

**Gesamtmodul**

written examination (70 %), paper(s) presentation 30 %; not graded: signed lab protocols, regular active participation is required for the module to be passed.

Lehrveranstaltungsform	Kommentar	SWS	Angebotsrhythmus	Workload Präsenz
Vorlesung		2	WiSe	28
Seminar		1	WiSe	14
Übung		5	WiSe	70
<b>Präsenzzeit Modul insgesamt</b>				<b>112 h</b>

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## bio845 - Introduction to Development and Evolution

<b>Modulbezeichnung</b>	Introduction to Development and Evolution
<b>Modulkürzel</b>	bio845
<b>Kreditpunkte</b>	6.0 KP
<b>Workload</b>	180 h
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"><li>• Master Biologie (Master) &gt; Background Modules</li><li>• Master Biology (Master) &gt; Background Modules</li><li>• Master Neuroscience (Master) &gt; Background Modules</li><li>• Master's Programme Molecular Biomedicine (Master) &gt; Background Modules</li></ul>
<b>Zuständige Personen</b>	<ul style="list-style-type: none"><li>• Sienknecht, Ulrike (Modulverantwortung)</li><li>• Sienknecht, Ulrike (Modulberatung)</li><li>• Sienknecht, Ulrike (Prüfungsberechtigt)</li><li>• Claußen, Maike (Prüfungsberechtigt)</li></ul>
<b>Teilnahmevoraussetzungen</b>	
<b>Kompetenzziele</b>	

Upon successful completion of this course, students

- know the fundamental problems organisms share in development
- know the common basic steps of ontogenesis after comparing the life cycles of different species (both vertebrates and invertebrates)
- know the fundamentals of the genetic control of cell-fate specification, morphogenesis, and organogenesis
- know the principles of gene regulatory networks in development and are able to explain examples
- are able to explain and discuss mechanisms of development across taxonomic groups and questions about the evolution of developmental mechanisms
- have in-depth knowledge of the development of animal nervous systems, including cellular and net-work properties

skills:

- ++ deepened biological expertise
- + deepened knowledge of biological working methods
- ++ interdisciplinary thinking
- ++ critical and analytical thinking
- + independent searching and knowledge of scientific literature
- + ability to perform independent biological research
- + teamwork

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### Modulinhalte

Lectures on the fundamentals and concepts of developmental biology, including evolutionary aspects. Parallel seminars matching the topics of the lectures and emphasizing discussion. Lecture topics:

- Introduction to Developmental Biology
- Cell-Cell Communication
- Differential Gene Expression (I and II)
- Early Development of Vertebrates, Gastrulation
- Neurulation
- Brain Development
- Axonal Growth, Target Selection, Synaptogenesis and Refinement
- Neural Crest
- Mesoderm Development
- Morphogenesis
- Developmental Mechanisms of Evolutionary Change
- Model Organisms in Developmental Biology
- Transgenic Mice
- Medical Implications of Developmental Biology

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### Literaturempfehlungen

**textbook:** Gilbert S.F.: Developmental Biology, Macmillan Publishers Ltd, 11th edition 2016 (current edition); and current literature on course topics

<b>Links</b>	
<b>Unterrichtssprache</b>	Englisch
<b>Dauer in Semestern</b>	1 Semester
<b>Angebotsrhythmus Modul</b>	winter term
<b>Aufnahmekapazität Modul</b>	20 (
	selection criteria: sequence of registration
	)

<b>Hinweise</b>	associated with bio846 (neu120) (Lab Exercises in Development and Evolution)
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<b>Modulart</b>	Wahlpflicht / Elective
<b>Modullevel</b>	MM (Mastermodul / Master module)
<b>Lehr-/Lernform</b>	Vorlesung, Seminar
<b>Vorkenntnisse</b>	organismic biology, developmental biology, evolutionary biology, neurobiology, genetics, molecular biology

Prüfung	Prüfungszeiten	Prüfungsform
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<b>Gesamtmodul</b>	same winter term	oral exam of 30 minutes (or written exam)
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Lehrveranstaltungsform	Kommentar	SWS	Angebotsrhythmus	Workload Präsenz
Vorlesung		3	WiSe	45
Seminar		3	WiSe	45
<b>Präsenzzeit Modul insgesamt</b>				<b>90 h</b>

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## bio846 - Lab Exercises in Development and Evolution

<b>Modulbezeichnung</b>	Lab Exercises in Development and Evolution
<b>Modulkürzel</b>	bio846
<b>Kreditpunkte</b>	6.0 KP
<b>Workload</b>	180 h
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"><li>• Master Biologie (Master) &gt; Background Modules</li><li>• Master Biology (Master) &gt; Background Modules</li><li>• Master Neuroscience (Master) &gt; Background Modules</li></ul>
<b>Zuständige Personen</b>	<ul style="list-style-type: none"><li>• Sienknecht, Ulrike (Modulverantwortung)</li><li>• Sienknecht, Ulrike (Modulberatung)</li><li>• Sienknecht, Ulrike (Prüfungsberechtigt)</li><li>• Claußen, Maike (Prüfungsberechtigt)</li><li>• Ebbers, Lena (Prüfungsberechtigt)</li></ul>
<b>Teilnahmevoraussetzungen</b>	mandatory prerequisite is the module bio845 (neu110) (Introduction to Development and Evolution)

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### Kompetenzziele

Upon successful completion of this course, students have skills in methods of developmental biology:

- are capable of performing live embryo husbandry
- are able to carry out in-ovo stainings
- are familiar with the use of embryonic stage discrimination standards for model organisms
- document the observed embryonic stages by drawings with anatomical labelling
- are familiar with tissue preparation (including cryosectioning), the use of different molecular markers, and immunohistological staining methods
- microscopy, data analysis, and photographic data documentation
- know the standards of proper documentation of research data and the universal format of a lab notebook
- know how to carry out formal laboratory reports (and the structure of a scientific paper)
- have basic knowledge in the field of auditory system development
- have basic knowledge of the organisation of the auditory system across vertebrate groups
- have basic knowledge of the development of the middle and inner ear, as well as selected auditory brain centres

are able to summarize current hypotheses about the evolution of the auditory system in vertebrates skills:

- ++ deepened biological expertise
- ++ deepened knowledge of biological working methods
- ++ data analysis skills
- ++ critical and analytical thinking
- + independent searching and knowledge of scientific literature
- ++ ability to perform independent biological research
- + data presentation and discussion (written and spoken)
- + teamwork
- + ethics and professional behaviour
- + project and time management

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### Modulinhalte

Lab exercises in developmental biology of auditory research model organisms, such as chicken and mouse embryos. Practical introduction to methods, such as in-ovo live observation; developmental stage discrimination and description, tissue preparation for histology, sectioning, staining, and microscopy, including data analyses. Seminars in the field of auditory system development and methods based on current literature

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### Literaturempfehlungen

**textbooks:** Gilbert S.F., Development, Macmillan Publishers Ltd, 11th edition 2016; Mathews W.W & Schoenwolf G.C., Atlas of Descriptive Embryology, Prentice-Hall Inc., Simon & Schuster, 5th edition 1998; in addition, current research papers

<b>Links</b>		
<b>Unterrichtssprache</b>	Englisch	
<b>Dauer in Semestern</b>	1 winter term Semester	
<b>Angebotsrhythmus Modul</b>	Wintersemester	
<b>Aufnahmekapazität Modul</b>	6 (	
	selection criteria: advance of studies in MA program	
	)	
<b>Hinweise</b>		
	Associated with bio845 (neu110) (Introduction to Development and Evolution)	
<b>Modulart</b>	Wahlpflicht / Elective	
<b>Modullevel</b>	MM (Mastermodul / Master module)	
<b>Lehr-/Lernform</b>	Exercise, lecture, seminar	
<b>Vorkenntnisse</b>	organismic biology, experience with lab work	
Prüfung	Prüfungszeiten	Prüfungsform
<b>Gesamtmodul</b>	same winter term	1 report
<b>Lehrveranstaltungsform</b>	Übung	
<b>SWS</b>	6	
<b>Angebotsrhythmus</b>	WiSe	
<b>Workload Präsenzzeit</b>	90 h	



## bio860 - Comparative Developmental Biology

<b>Modulbezeichnung</b>	Comparative Developmental Biology	
<b>Modulkürzel</b>	bio860	
<b>Kreditpunkte</b>	6.0 KP	
<b>Workload</b>	180 h	
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"> <li>• Master Biologie (Master) &gt; Background Modules</li> <li>• Master Biology (Master) &gt; Background Modules</li> </ul>	
<b>Zuständige Personen</b>	<ul style="list-style-type: none"> <li>• Sienknecht, Ulrike (Modulverantwortung)</li> <li>• Sienknecht, Ulrike (Prüfungsberechtigt)</li> </ul>	
<b>Teilnahmevoraussetzungen</b>		
<b>Kompetenzziele</b>	<ul style="list-style-type: none"> <li>++ deepened biological knowledge</li> <li>++ deepened knowledge of techniques in biology</li> <li>++ knowledge in data analysis and presentation</li> <li>+ cross-disciplinary knowledge and thinking</li> <li>++ critical and analytical thinking</li> <li>+ independent searching and knowledge of scientific literature</li> <li>++ ability to perform independent biological research</li> <li>++ data presentation and discussion (E) (written and spoken)</li> <li>+ team work</li> <li>+ ethics and professional behaviour</li> <li>++ project and time management</li> </ul>	
<b>Modulinhalte</b>	Lectures and Lab exercises in topics of evolutionary developmental biology, i.e. comparative developmental biology, such as the development of sensory systems in different species.	
<b>Literaturempfehlungen</b>	Gilbert S.F., Development, Macmillan Publishers Ltd, 11th edition 2016	
<b>Links</b>		
<b>Unterrichtssprache</b>	Englisch	
<b>Dauer in Semestern</b>	1 Semester	
<b>Angebotsrhythmus Modul</b>	summer term	
<b>Aufnahmekapazität Modul</b>	6 (	
	Reihenfolge der Anmeldungen	
	)	
<b>Hinweise</b>	associated with bio845 Introduction to Development and Evolution	
<b>Modulart</b>	Wahlpflicht / Elective	
<b>Modullevel</b>	MM (Mastermodul / Master module)	
<b>Lehr-/Lernform</b>	Lecture, exercise, seminar	
<b>Vorkenntnisse</b>	organismic biology, experience with lab work	
<b>Prüfung</b>	<b>Prüfungszeiten</b>	<b>Prüfungsform</b>
<b>Gesamtmodul</b>	same summer term	protocol

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<b>Lehrveranstaltungsform</b>	Übung
<b>SWS</b>	6
<b>Angebotsrhythmus</b>	SoSe
<b>Workload Präsenzzeit</b>	84 h

## bio695 - Biochemical concepts in signal transduction

<b>Modulbezeichnung</b>	Biochemical concepts in signal transduction		
<b>Modulkürzel</b>	bio695		
<b>Kreditpunkte</b>	12.0 KP		
<b>Workload</b>	360 h		
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"> <li>• Master Biologie (Master) &gt; Background Modules</li> <li>• Master Biology (Master) &gt; Background Modules</li> <li>• Master Neuroscience (Master) &gt; Background Modules</li> <li>• Master's Programme Molecular Biomedicine (Master) &gt; Background Modules</li> </ul>		
<b>Zuständige Personen</b>	<ul style="list-style-type: none"> <li>• Koch, Karl-Wilhelm (Modulverantwortung)</li> <li>• Koch, Karl-Wilhelm (Prüfungsberechtigt)</li> <li>• Scholten, Alexander (Prüfungsberechtigt)</li> <li>• Scholten, Alexander (Modulberatung)</li> </ul>		
<b>Teilnahmevoraussetzungen</b>	none		
<b>Kompetenzziele</b>	<p>++ deepened knowledge of biological working methods          ++ methods: protein expression and purification, functional assays, enzyme kinetics, spectroscopic techniques          ++ 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)          ++ teamwork          + project and time management</p>		
<b>Modulinhalte</b>	Lecture: Molecular fundamentals of cellular signal processes Seminar: Signal transduction Exercises: Experiments on cellular signal transduction and enzymology Mechanisms of biochemical signal transduction are imparted theoretically and experimentally		
<b>Literaturempfehlungen</b>	Textbooks of cell biology and biochemistry. Current literature on topics of signal transduction (as announced in the preparatory meeting).		
<b>Links</b>			
<b>Unterrichtssprache</b>	Englisch		
<b>Dauer in Semestern</b>	1 Semester		
<b>Angebotsrhythmus Modul</b>	winter term		
<b>Aufnahmekapazität Modul</b>	20		
<b>Modulart</b>	Wahlpflicht / Elective		
<b>Modullevel</b>	MM (Mastermodul / Master module)		
<b>Lehr-/Lernform</b>	Lecture, seminar, exercise		
<b>Prüfung</b>	<b>Prüfungszeiten</b>	<b>Prüfungsmom</b>	
<b>Gesamtmodul</b>	<p>written examinaton (90 minutes) (50%), protocols (50%)          Prerequisite for passing the module is active participation: Presentation(s) in the seminar</p>		

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Lehrveranstaltungsform	Kommentar	SWS	Angebotsrhythmus	Workload Präsenz
Vorlesung		1	WiSe	14
Seminar		1	WiSe	14
Übung		6	WiSe	84
<b>Präsenzzeit Modul insgesamt</b>				<b>112 h</b>

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## neu210 - Neurosensory Science and Behaviour

<b>Modulbezeichnung</b>	Neurosensory Science and Behaviour
<b>Modulkürzel</b>	neu210
<b>Kreditpunkte</b>	9.0 KP
<b>Workload</b>	270 h (  4 SWS Lecture (VO) "Neuroethology" and "Behavioural ecology" Total workload 180h: 56h contact/ 60h background reading/ 64h exam preparation 2 SWS Seminar (SE) "Current issues of ethology" Total workload 90h: 28h contact/ 30h literature reading/ 32h preparation of presentation  )
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"><li>• Master Biologie (Master) &gt; Background Modules</li><li>• Master Biology (Master) &gt; Background Modules</li><li>• Master Neuroscience (Master) &gt; Background Modules</li></ul>
<b>Zuständige Personen</b>	<ul style="list-style-type: none"><li>• Langemann, Ulrike (Modulverantwortung)</li><li>• Klump, Georg Martin (Prüfungsberechtigt)</li><li>• Mouritsen, Henrik (Prüfungsberechtigt)</li><li>• Langemann, Ulrike (Prüfungsberechtigt)</li><li>• Albert, Jörg (Prüfungsberechtigt)</li><li>• Clemens, Jan (Prüfungsberechtigt)</li><li>• Langemann, Ulrike (Modulberatung)</li><li>• Mouritsen, Henrik (Modulberatung)</li></ul>
<b>Teilnahmevoraussetzungen</b>	Fundamentals of Neurobiology, Behavioural Biology, Evolution, Ecology
<b>Kompetenzziele</b>	[nop] ++ Neurosci. knowlg. + Expt. methods + Independent research + Scient. literature + Social skills ++ Interdiscipl. knowlg. + Data present./disc. + Scientific English [/nop] Upon successful completion of this course, students - know the fundamentals of behavioural ecology and neuroethology - are able to present and critically assess scientific data and approaches
<b>Modulinhalte</b>	The lecture "Neuroethology" provides an introduction to the mechanisms underlying the behaviour of animals. Subjects are, e.g., the mechanisms of perception, control of movement patterns, mechanisms of learning, orientation and navigation. The lecture "Behavioural ecology" provides an introduction to topics such as predator-prey interactions, optimal food utilization, spatial and temporal distribution of animals, social relations and group formation, mating systems and reproductive strategies, sexual selection, investment of parents in offspring, and communication. In the seminar "Current issues of Ethology", current original literature relating to behavioural biology is reported and discussed.
<b>Literaturempfehlungen</b>	Carew TJ (2004) Behavioral Neurobiology: The Cellular Organization of Natural Behavior. Sinauer Davis NB, Krebs JR, West SA (2012) An Introduction to Behavioural Ecology. Wiley Blackwell
<b>Links</b>	
<b>Unterrichtssprache</b>	Englisch
<b>Dauer in Semestern</b>	1 Semester
<b>Angebotsrhythmus Modul</b>	annually
<b>Aufnahmekapazität Modul</b>	26 (

Recommended in combination with: neu220 BM "Neurocognition and Psychopharmacology" Shared course components with (cannot be credited twice): bio610 (5.02.611 "Neuroethologie", 5.02.612 "Verhaltensökologie", 5.02.613 "Aktuelle Themen der Ethologie")

)

**Hinweise**

Course in the second half of the semester Regular active participation is required to pass the module.

**Modulart**

je nach Studiengang Pflicht oder Wahlpflicht

**Vorkenntnisse**

Fundamentals of Neurobiology, Behavioural Biology, Evolution, Ecology

**Prüfung**

**Prüfungszeiten**

**Prüfungsform**

**Gesamtmodul**

as agreed, usually in the break after the winter term 80% written exam (content of the two lecture series), 20% presentation(s)

Lehrveranstaltungsform	Kommentar	SWS	Angebotsrhythmus	Workload Präsenz
Vorlesung		4		56
Seminar		2		28
<b>Präsenzzeit Modul insgesamt</b>				<b>84 h</b>

## neu220 - Neurocognition and Psychopharmacology

<b>Modulbezeichnung</b>	Neurocognition and Psychopharmacology		
<b>Modulkürzel</b>	neu220		
<b>Kreditpunkte</b>	6.0 KP		
<b>Workload</b>	180 h ( 3 SWS Lecture (VO) "Introd. to Cognitive Neuroscience" and "Psychopharmacol." Total workload 135h: 45h contact/ 45 background reading/ 45h exam preparation 1 SWS Supervised exercise (UE) Total workload 45h: 14h contact/ 31h paper reading )		
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"> <li>• Master Biologie (Master) &gt; Background Modules</li> <li>• Master Biology (Master) &gt; Background Modules</li> <li>• Master Neuroscience (Master) &gt; Background Modules</li> <li>• Master's Programme Molecular Biomedicine (Master) &gt; Background Modules</li> </ul>		
<b>Zuständige Personen</b>	<ul style="list-style-type: none"> <li>• Thiel, Christiane Margarete (Modulverantwortung)</li> <li>• Thiel, Christiane Margarete (Modulberatung)</li> <li>• Thiel, Christiane Margarete (Prüfungsberechtigt)</li> <li>• Gießing, Carsten (Prüfungsberechtigt)</li> </ul>		
<b>Teilnahmevoraussetzungen</b>			
<b>Kompetenzziele</b>	[nop] ++ Neurosci. knowlg. + Expt. methods + Scient. literature + Social skills ++ Interdiscipl. knowlg. + Data present./disc. + Scientific English [nop] Upon successful completion of this course, students know the fundamentals of neurotransmission know the basic neural mechanisms underlying attention, learning, emotion, language and executive functions understand the relationship between disturbances in neurotransmitter systems, cognitive functions and psychiatric disease know the principles of drug treatment for psychiatric disorders have in-depth knowledge in selected areas of these topics are able to understand, explain and critically assess neuroscientific approaches in animals and humans are able to understand and critically assess published work in the area of cognitive neuroscience		
<b>Modulinhalte</b>	The lecture "Introduction to Cognitive Neuroscience" gives a short introduction into neuroanatomy and cognitive neuroscience methods and then covers different cognitive functions. Lecture topics: History of cognitive neuroscience Methods of cognitive neuroscience Attention Learning Emotion Language Executive functions. The supervised exercise either deepens that knowledge by exercises or discussions of recent papers/ talks on the respective topic covered during that week. The lecture "Psychopharmacology" illustrates the connection between neurotransmitters and behaviour and its links to psychiatric disease. The lecture contains several interactive parts to consolidate and critically evaluate the acquired knowledge. Lecture topics: Introduction to Terms and Definitions in Drug Research Dopaminergic and Noradrenergic System Cholinergic and Serotonergic System GABAergic and Glutamatergic System Addiction Depression Schizophrenia Anxiety Alzheimer's Disease		
<b>Literaturempfehlungen</b>	Ward J (2010) The Student's Guide to Cognitive Neuroscience. Psychology Press Meyer JS and Quenzer LF (2012) Psychopharmacology. Sinauer		
<b>Links</b>			
<b>Unterrichtssprache</b>	Englisch		
<b>Dauer in Semestern</b>	1 Semester		
<b>Angebotsrhythmus Modul</b>	annually		
<b>Aufnahmekapazität Modul</b>	30 ( Recommended in combination with neu210 "Neurosensory Science and Behaviour", neu300 "Functional MRI data analysis" Shared course components with (cannot be credited twice): bio610 and psy181 (5.02.614 "Introduction to Cognitive Neuroscience", 5.02.615 "Psychopharmacology") )		
<b>Hinweise</b>	Course in the second half of the semester Regular active participation is required to pass the module.		
<b>Modulart</b>	je nach Studiengang Pflicht oder Wahlpflicht		
<b>Vorkenntnisse</b>	Fundamentals of Neurobiology, Behavioural Biology		
<b>Prüfung</b>	<b>Prüfungszeiten</b>	<b>Prüfungsform</b>	
<b>Gesamtmodul</b>	as agreed, usually in the break after the winter term		100% written exam (content of the lectures)
<b>Lehrveranstaltungsform</b>	<b>Kommentar</b>	<b>SWS</b>	<b>Angebotsrhythmus</b> <b>Workload</b> <b>Präsenz</b>

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Lehrveranstaltungsform	Kommentar	SWS	Angebotsrhythmus	Workload Präsenz
Vorlesung		3	--	42
Übung		1	--	14
<b>Präsenzzeit Modul insgesamt</b>				<b>56 h</b>

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## neu141 - Visual Neuroscience - Physiology and Anatomy

<b>Modulbezeichnung</b>	Visual Neuroscience - Physiology and Anatomy
<b>Modulkürzel</b>	neu141
<b>Kreditpunkte</b>	12.0 KP
<b>Workload</b>	360 h ( 3 SWS Lecture (VO) Total workload 90 h: 30h contact / 60h background literature reading and preparation for sh 1 SWS Seminar (SE) Total workload 30h: 10h contact / 20h literature reading and preparation of result presentation 8 SWS Supervised exercise (UE) Total workload 240h: 200h contact / 40h results analysis, writing of short reports for portfolio )
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"> <li>• Master Biologie (Master) &gt; Background Modules</li> <li>• Master Biology (Master) &gt; Background Modules</li> <li>• Master Neuroscience (Master) &gt; Background Modules</li> <li>• Master's Programme Molecular Biomedicine (Master) &gt; Background Modules</li> </ul>
<b>Zuständige Personen</b>	<ul style="list-style-type: none"> <li>• Greschner, Martin (Modulverantwortung)</li> <li>• Greschner, Martin (Prüfungsberechtigt)</li> <li>• Ahlers, Malte (Prüfungsberechtigt)</li> <li>• Dedek, Karin (Prüfungsberechtigt)</li> <li>• Dömer, Patrick (Prüfungsberechtigt)</li> </ul>
<b>Teilnahmevoraussetzungen</b>	Basic knowledge of neurobiology
<b>Kompetenzziele</b>	<p>++ Neurosci. knowlg. ++ Expt. Methods + Independent research ++ Scient. Literature + Social skills + Maths/Stats/Progr. ++ Data present./disc. + Scientific English + Ethics</p> <p>Upon successful completion of this course, students</p> <ul style="list-style-type: none"> <li>• have basic knowledge of electrophysiological techniques used in neuroscience research</li> <li>• have acquired first practical skills in some electrophysiological techniques</li> <li>• have acquired basic skills in data analysis</li> <li>• have knowledge on retinal physiology and anatomy of the visual system</li> <li>• have basic knowledge of brain structures and their function</li> <li>• have profound knowledge of the architecture and circuits of the vertebrate retina</li> <li>• have acquired basic skills in histological techniques (tissue fixation, embedding, sectioning, staining procedures, immunohistochemistry)</li> <li>• have acquired fundamental skills in microscopy (differential interference contrast microscopy, phase-contrast microscopy, confocal microscopy)</li> </ul>
<b>Modulinhalte</b>	<p>The background module Neurophysiology consists of two weeks of theoretical introduction and two weeks of hands-on lab exercises in patch or extracellular recordings and two weeks of hands-on lab exercises in anatomy.</p> <p>The seminars cover the following topics:</p> <ul style="list-style-type: none"> <li>• Visual system</li> <li>• Introduction to electrophysiological methods</li> <li>• Introduction into methods used in neuroanatomy and neurochemistry</li> <li>• Introduction into microscopy and image analysis</li> <li>• Presentation and discussion of results relating to the literature</li> </ul>
<b>Literaturempfehlungen</b>	Course scripts and mandatory scientific literature discussed in the seminar will be available in Stud.IP.

Background and seminar literature will be available in Stud.IP.

<b>Links</b>				
<b>Unterrichtssprache</b>		Englisch		
<b>Dauer in Semestern</b>		1 Semester		
<b>Angebotsrhythmus Modul</b>		annually, summer term, first half (full time)		
<b>Aufnahmekapazität Modul</b>		12 - with Visual Neuroscience: Anatomy ( Shared course components with (cannot be credited twice): neu151 BM Visual Neuroscience: Anatomy )		
<b>Modulart</b>		Wahlpflicht / Elective		
<b>Modullevel</b>		MM (Mastermodul / Master module)		
<b>Vorkenntnisse</b>		Basic knowledge in neurobiology		
Prüfung		Prüfungszeiten	Prüfungsform	
<b>Gesamtmodul</b>		during the course (summer semester, first half) In addition, mandatory but ungraded: seminar presentation	Portfolio consisting of short tests and short reports	
Lehrveranstaltungsform	Kommentar	SWS	Angebotsrhythmus	Workload Präsenz
Vorlesung		2	SoSe oder WiSe	28
Seminar		2	SoSe oder WiSe	28
Übung		2	SoSe oder WiSe	28
<b>Präsenzzeit Modul insgesamt</b>				<b>84 h</b>

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## neu360 - Auditory Neuroscience

<b>Modulbezeichnung</b>	Auditory Neuroscience
<b>Modulkürzel</b>	neu360
<b>Kreditpunkte</b>	6.0 KP
<b>Workload</b>	180 h (  1 SWS Lecture (VO) Total workload 45h: 14 h contact / 31 h background reading  1 SWS Seminar (SE) Total workload 45h: 14 h contact / 15 h background reading / 16 h preparation and presentation  2 SWS Supervised exercise (UE) Total workload 90h: 10 h contact / 20 h literature search / 60 h work on essay paper  )
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"><li>• Master Biologie (Master) &gt; Background Modules</li><li>• Master Biology (Master) &gt; Background Modules</li><li>• Master Neuroscience (Master) &gt; Background Modules</li></ul>
<b>Zuständige Personen</b>	<ul style="list-style-type: none"><li>• Ashida, Go (Modulverantwortung)</li><li>• Puschmann, Sebastian (Prüfungsberechtigt)</li><li>• Ashida, Go (Prüfungsberechtigt)</li><li>• Puschmann, Sebastian (Modulberatung)</li></ul>
<b>Teilnahmevoraussetzungen</b>	Recommended previous knowledge/skills: Basics of Neurosensory Science and Behavioural Biology
<b>Kompetenzziele</b>	<p>++ Neurosci. knowlg + Expt. methods ++ Scient. Literature + Social skills ++ Interdiscipl. knowlg ++ Data present./disc. ++ Scientific English + Ethics</p> <p>Introduction to Auditory Physiology. May serve as preparation for a Research Module in this area.</p> <p>Upon successful completion of this course, students</p> <ul style="list-style-type: none"><li>• have profound knowledge on auditory sensory processing at several levels (including cochlear transduction mechanisms, central auditory processing)</li><li>• have basic knowledge of the large range of techniques used in auditory research</li><li>• are able to read and critically report to others on an original research paper in auditory neuroscience</li><li>• are able to research and review a specific topic in auditory neuroscience</li></ul>
<b>Modulinhalte</b>	<p>One week introductory block course, comprised of a lecture series and matching seminar that emphasizes discussion.</p> <p>Topics: Hair cells: structure, transduction mechanism, receptor potential, synaptic transmission Basilar papilla / cochlea: structure, micromechanics, amplification; otoacoustic emissions Auditory nerve: phase locking, rate coding. Excitation patterns</p>

Ascending auditory pathways: wiring, principles of excitation/inhibition, examples of cellular/molecular specialisations  
 Sound localisation in birds and mammals  
 Central auditory processing: imaging techniques, auditory streams, cortex, primates  
 Relation between psychophysics and neurophysiology

The introductory block is followed by a supervised literature search and individually written term paper on a specific topic in auditory neuroscience.

**Literaturempfehlungen**

About 20 selected original papers (selection varies)  
 Pickles JO (2012) An Introduction to the Physiology of Hearing. Brill, Netherlands

**Links**

<b>Unterrichtssprache</b>	Englisch
<b>Dauer in Semestern</b>	1 Semester
<b>Angebotsrhythmus Modul</b>	annually, summer term, second half
<b>Aufnahmekapazität Modul</b>	15 (

BM neu211 "Neurosensory Science and Behaviour"  
 or BM neu270 "Neurocognition and Psychophysics"  
 or skills module bioX "Current Topics in Hearing Science"

)

**Hinweise**

Registration procedure / selection criteria: StudIP, final acceptance after assignment of seminar presentation

<b>Modulart</b>	Wahlpflicht / Elective
<b>Modullevel</b>	MM (Mastermodul / Master module)
<b>Vorkenntnisse</b>	Basics of Neurosensory Science and Behavioural Biology

Prüfung	Prüfungszeiten	Prüfungsform
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**Gesamtmodul**

within a few weeks of the end of summer term lecture period	term paper In addition, mandatory but ungraded: 1 paper presentation in seminar, active participation in discussions
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Lehrveranstaltungsform	Kommentar	SWS	Angebotsrhythmus	Workload Präsenz
Vorlesung		1	SoSe	14
Seminar		1	SoSe	14
Übung		2	SoSe	28
<b>Präsenzzeit Modul insgesamt</b>				<b>56 h</b>

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## neu340 - Invertebrate Neuroscience - Neurophysiology

<b>Modulbezeichnung</b>	Invertebrate Neuroscience - Neurophysiology
<b>Modulkürzel</b>	neu340
<b>Kreditpunkte</b>	6.0 KP
<b>Workload</b>	180 h (  2 SWS Seminar (SE) Total workload 72h: 28h contact / 44h background literature reading, preparation for short tests, portfolio assignments and results presentation  3 SWS Supervised exercise (UE) Total workload 108h: 42h contact / 66h data analysis and preparation of portfolio assignments)  )
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"><li>• Master Biologie (Master) &gt; Background Modules</li><li>• Master Biology (Master) &gt; Background Modules</li><li>• Master Neuroscience (Master) &gt; Background Modules</li></ul>
<b>Zuständige Personen</b>	<ul style="list-style-type: none"><li>• Kretzberg, Jutta (Modulverantwortung)</li><li>• Kretzberg, Jutta (Prüfungsberechtigt)</li><li>• Albert, Jörg (Prüfungsberechtigt)</li></ul>
<b>Teilnahmevoraussetzungen</b>	attendance in pre-meeting
<b>Kompetenzziele</b>	<p>++ Neurosci. knowlg. ++ Expt. Methods + Scient. Literature + Social skills + Maths/Stats/Progr. + Independent Research + Data present./disc. + Scientific English + Ethics</p> <p>Upon successful completion of this course, students</p> <ul style="list-style-type: none"><li>• have knowledge on invertebrate neuronal systems in comparison to vertebrate systems</li><li>• have discussed an overview of experimental and theoretical methods of invertebrate neuroscienc</li><li>• have acquired first practical skills in intracellular recordings from invertebrate neurons</li><li>• have acquired basic skills in data analysis</li><li>• have acquired an intuitive understanding of membrane potential and action potential generation based on computer simulations</li></ul>
<b>Modulinhalte</b>	<p>The module consists of three weeks of seminar and hands-on lab exercises on intracellular recordings from leech neurons, as well as computer simulations to study the basis of membrane potential and action potential generation.</p> <p>The seminar covers the following topics:</p> <ul style="list-style-type: none"><li>• Invertebrate neuronal systems in comparison to vertebrate systems</li><li>• Ion channels, membrane potential and action potential generation</li><li>• Introduction to electrophysiological methods</li><li>• Introduction to data analysis methods</li></ul> <p>In the practical exercises, portfolio assignments will be performed on:</p> <ul style="list-style-type: none"><li>• Qualitative electrophysiological classification of different cell types in the leech nervous system</li><li>• Quantitative analysis (stimulus - response relationship) of at least one cell type</li><li>• Action potential generation: Comparison of model simulations and experiments</li></ul>

- Planning a small individual team-work project based on the techniques taught in this module, that can be used as basis for the module neu345

<b>Literaturempfehlungen</b>	Course scripts and mandatory scientific literature (3 review articles) discussed in the seminar will be available in Stud.IP Background and seminar literature will be available in Stud.IP			
<b>Links</b>				
<b>Unterrichtssprache</b>	Englisch			
<b>Dauer in Semestern</b>	1 Semester			
<b>Angebotsrhythmus Modul</b>	annually, summer term, second half			
<b>Aufnahmekapazität Modul</b>	12 ( this module provides the background for neu345 "Neural Computation in invertebrate systems" )			
<b>Modulart</b>	Wahlpflicht / Elective			
<b>Modullevel</b>	MM (Mastermodul / Master module)			
<b>Vorkenntnisse</b>	basic knowledge of neurobiology, basic MATLAB programming skills			
<b>Prüfung</b>	<b>Prüfungszeiten</b>	<b>Prüfungsform</b>		
<b>Gesamtmodul</b>	during the course (summer term, second half)	Portfolio consisting of short tests, short reports (according to portfolio assignments) and seminar presentations.		
<b>Lehrveranstaltungsform</b>	<b>Kommentar</b>	<b>SWS</b>	<b>Angebotsrhythmus</b>	<b>Workload Präsenz</b>
Seminar		2	SoSe	28
Übung		3	SoSe	42
<b>Präsenzzeit Modul insgesamt</b>				70 h

## neu310 - Psychophysics of Hearing

<b>Modulbezeichnung</b>	Psychophysics of Hearing		
<b>Modulkürzel</b>	neu310		
<b>Kreditpunkte</b>	12.0 KP		
<b>Workload</b>	360 h ( 5 SWS Practical (PR) "Experiments in Hearing" Total workload 225h: 70h contact / 110h experimental work / 45h exam preparation 1 SWS Supervised exercise (UE) "Fundamentals in psychoacoustic data analysis" Total workload 45h: 15h contact / 30h practising data analysis (incl. SPSS) 2 SWS Seminar (SE) "Hearing" Total workload 90h: 30h contact / 60h background reading )		
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"> <li>• Master Biologie (Master) &gt; Background Modules</li> <li>• Master Biology (Master) &gt; Background Modules</li> <li>• Master Neuroscience (Master) &gt; Background Modules</li> </ul>		
<b>Zuständige Personen</b>	<ul style="list-style-type: none"> <li>• Klump, Georg Martin (Modulverantwortung)</li> <li>• Klump, Georg Martin (Prüfungsberechtigt)</li> <li>• Langemann, Ulrike (Prüfungsberechtigt)</li> <li>• Beutelmann, Rainer (Prüfungsberechtigt)</li> <li>• Beutelmann, Rainer (Modulberatung)</li> </ul>		
<b>Teilnahmevoraussetzungen</b>			
<b>Kompetenzziele</b>	<p>[nop] + Neurosci. knowlg. ++ Expt. Methods + Social skills ++ Maths/Stats/Progr. + Data present./disc. + Scientific English [/nop] Students will learn the basics about performing a psychoacoustic experiment. Based on an experiment in which they study their own hearing, they will learn how to conduct a behavioural study in hearing and analyze the data. In addition, they will be provided with an overview of the mechanisms of auditory perception.</p>		
<b>Modulinhalte</b>	<p>The modul comprises (i) a seminar "Hearing" [2 SWS] (ii) an exercise "Fundamentals in psychoacoustic data analysis" [1 SWS], and a (iii) practical course [7 SWS] including aspects of planning and conducting psychoacoustic experiments.</p>		
<b>Literaturempfehlungen</b>	<p>Plack, Christopher J. (2005) The sense of hearing. Mahwah, NJ [u.a.] : Erlbaum (sufficient number of copies available in the university library)</p>		
<b>Links</b>			
<b>Unterrichtssprache</b>	Englisch		
<b>Dauer in Semestern</b>	1 Semester		
<b>Angebotsrhythmus Modul</b>	annually, summer term, second half		
<b>Aufnahmekapazität Modul</b>	8 (in total with bio640)		
<b>Modulart</b>	Wahlpflicht / Elective		
<b>Modullevel</b>	MM (Mastermodul / Master module)		
<b>Prüfung</b>	<b>Prüfungszeiten</b>	<b>Prüfungsform</b>	
<b>Gesamtmodul</b>	end of summer term	70% report or oral exam, 30% presentation In addition, mandatory but ungraded: regular active participation	
<b>Lehrveranstaltungsform</b>	<b>Kommentar</b>	<b>SWS</b>	<b>Angebotsrhythmus</b>
			<b>Workload Präsenz</b>

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Lehrveranstaltungsform	Kommentar	SWS	Angebotsrhythmus	Workload Präsenz
Übung		1	SoSe	14
Seminar		2	SoSe	28
Praktikum		5	SoSe	70
Vorlesung			SoSe	0
<b>Präsenzzeit Modul insgesamt</b>				<b>112 h</b>



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## Research Modules

### bio900 - Biology Research Module

<b>Modulbezeichnung</b>	Biology Research Module
<b>Modulkürzel</b>	bio900
<b>Kreditpunkte</b>	15.0 KP
<b>Workload</b>	450 h
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"><li>• Master Biologie (Master) &gt; Research Modules</li><li>• Master Biology (Master) &gt; Research Modules</li></ul>
<b>Zuständige Personen</b>	<ul style="list-style-type: none"><li>• Zotz, Gerhard (Modulverantwortung)</li><li>• der Biologie, Lehrende (Modulberatung)</li><li>• der Biologie, Lehrende (Prüfungsberechtigt)</li></ul>
<b>Teilnahmevoraussetzungen</b>	
<b>Kompetenzziele</b>	<p>Students will learn to plan, perform and analyse a study in a biological field. Topics will be chosen in close coordination with teaching staff. Depending on the particular project, knowledge in statistics, molecular biology, physiology, modelling, or ethology will be necessary. Results will be related to the current biological literature in a written report and be presented in the seminar of the hosting working group.</p> <p>+ deepened knowledge of biological working methods ++ data analysis skills ++ 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) + teamwork ++ project and time management + statistics &amp; scientific programming</p>
<b>Modulinhalte</b>	<p>The students develop an empirical investigation, carry it out and analyse the results. The students present and discuss their project both orally and in writing</p>
<b>Literaturempfehlungen</b>	
<b>Links</b>	<p><a href="https://uol.de/en/biology/groups-our-research">https://uol.de/en/biology/groups-our-research</a></p>
<b>Unterrichtssprache</b>	Englisch
<b>Dauer in Semestern</b>	1 Semester
<b>Angebotsrhythmus Modul</b>	winter and summer term
<b>Aufnahmekapazität Modul</b>	unbegrenzt
<b>Hinweise</b>	<p>Students can choose between many options of individual projects, offered by the different groups involved in the MScBiology study program. All members of the regular IBU Biology faculty at the University of Oldenburg can act as local supervisor (see list of examiners, <a href="https://uol.de/fk5/studium/studiengaenge/pruefungsberechtigte">https://uol.de/fk5/studium/studiengaenge/pruefungsberechtigte</a>). Please refer to the list of options in Stud.IP and contact potential supervisors directly.</p> <p>Within the Modul bio900 it is possible to take several courses as long as their contents differ substantially. When taking the course group 5.02.960 it is mandatory to choose two courses out of the group A – D.</p>

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<b>Modulart</b>	Wahlpflicht / Elective			
<b>Modullevel</b>	MM (Mastermodul / Master module)			
<b>Lehr-/Lernform</b>	projekt-based components			
Prüfung	Prüfungszeiten		Prüfungsform	
<b>Gesamtmodul</b>			internship report	
Lehrveranstaltungsform	Kommentar	SWS	Angebotsrhythmus	Workload Präsenz
Vorlesung (optional)			SoSe oder WiSe	0
Seminar		1	SoSe oder WiSe	14
Projektorientiertes Modul		10	SoSe und WiSe	140
<b>Präsenzzeit Modul insgesamt</b>				<b>154 h</b>

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## bio810 - External Research Project

<b>Modulbezeichnung</b>	External Research Project
<b>Modulkürzel</b>	bio810
<b>Kreditpunkte</b>	15.0 KP
<b>Workload</b>	450 h
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"><li>• Master Biologie (Master) &gt; Research Modules</li><li>• Master Biology (Master) &gt; Research Modules</li></ul>
<b>Zuständige Personen</b>	<ul style="list-style-type: none"><li>• Zotz, Gerhard (Modulverantwortung)</li><li>• der Biologie, Lehrende (Prüfungsberechtigt)</li></ul>
<b>Teilnahmevoraussetzungen</b>	

External research projects are done on an individual basis. They are supervised by one person from Oldenburg (see list of examiners, <https://uol.de/fk5/studium/studiengaenge/pruefungsberechtigte>) and a local supervisor at any university or research institution in Germany or abroad. Please contact Gerhard Zotz (Gerhard.zotz@uol.de) for details. See <https://uol.de/ibu/studium-und-lehre/fach-master-biology/downloads-und-links/> (Learning Agreement for External Research Module)

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### Kompetenzziele

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

Students perform individual research projects to learn: • planning and organization of a research project in a group outside of University of Oldenburg • formulate a scientific hypothesis • planning, performing and analyzing experiments and / or simulations • working with scientific background literature on the specific context of the project • oral presentation and discussion of backgrounds and results in the lab seminar • write a scientific report in publication format • prepare and present a scientific poster

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### Modulinhalte

Students are introduced to independent research in a specific area of biology by a scientific working group outside of the regular IBU Biology faculty at the University of Oldenburg (usually a university research institute in Germany or abroad).

The content and venue of this module is chosen in close coordination with the Prüfungsausschuss Master Biologie, possibly with consultations of other professors. Course work should cover all parts of a scientific project, i.e. data collection, data analysis and the presentation of the results. Irrespective of the particular venue (universities, research institutes) the student has to report to a professor in Oldenburg in form of a written report and an oral presentation, both in English.

Note: • all members of the regular IBU Biology faculty at the University of Oldenburg can act as local supervisor (see list of examiners, <https://uol.de/fk5/studium/studiengaenge/pruefungsberechtigte>), students should contact appropriate supervisors individually • prior to project start, external and local supervisors must fill the learning agreement form (<https://uol.de/ibu/studium-und-lehre/fach-master-biology/downloads-und-links/>) • the supervisor at the host institution is invited to submit a short written statement of assessment, final grading is done by the local supervisor • participation in a joint poster presentation of concurrent research modules is highly recommended.

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### Literaturempfehlungen

varies with chosen topic

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**Links**

<b>Unterrichtssprache</b>	Englisch	
<b>Dauer in Semestern</b>	1 Semester	
<b>Angebotsrhythmus Modul</b>	summer and winter term	
<b>Aufnahmekapazität Modul</b>	unbegrenzt	
<b>Modulart</b>	Wahlpflicht / Elective	
<b>Modullevel</b>	MM (Mastermodul / Master module)	
<b>Lehr-/Lernform</b>	projekt-based components	
<b>Prüfung</b>	Prüfungszeiten	Prüfungsform
<b>Gesamtmodul</b>		internship report

Lehrveranstaltungsform	Kommentar	SWS	Angebotsrhythmus	Workload Präsenz
Seminar		1	SoSe und WiSe	14
Projektorientiertes Modul		10	SoSe und WiSe	140
<b>Präsenzzeit Modul insgesamt</b>				<b>154 h</b>

## bio820 - Research Module Fast Track

<b>Modulbezeichnung</b>	Research Module Fast Track	
<b>Modulkürzel</b>	bio820	
<b>Kreditpunkte</b>	15.0 KP	
<b>Workload</b>	450 h	
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"> <li>• Master Biologie (Master) &gt; Research Modules</li> <li>• Master Biology (Master) &gt; Research Modules</li> </ul>	
<b>Zuständige Personen</b>	<ul style="list-style-type: none"> <li>• Klump, Georg Martin (Modulverantwortung)</li> <li>• Klump, Georg Martin (Prüfungsberechtigt)</li> </ul>	
<b>Teilnahmevoraussetzungen</b>		
<b>Kompetenzziele</b>	<p>[nop] ++ deepened biological expertise ++ deepened knowledge of biological working methods ++ data analysis skills ++ 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) + teamwork ++ project and time management ++ statistics &amp; scientific programming [/nop]</p>	
<b>Modulinhalte</b>		
<b>Literaturempfehlungen</b>		
<b>Links</b>		
<b>Unterrichtssprache</b>	Englisch	
<b>Dauer in Semestern</b>	1 Semester	
<b>Angebotsrhythmus Modul</b>	irregular	
<b>Aufnahmekapazität Modul</b>	unbegrenzt	
<b>Modulart</b>	je nach Studiengang Pflicht oder Wahlpflicht	
<b>Lehr-/Lernform</b>	Project-based component	
<b>Prüfung</b>	<b>Prüfungszeiten</b>	<b>Prüfungsform</b>
<b>Gesamtmodul</b>	internship report	
<b>Lehrveranstaltungsform</b>	Seminar	
<b>SWS</b>	1	
<b>Angebotsrhythmus</b>	--	

# Skills Modules

## bio870 - Communicating Biology

<b>Modulbezeichnung</b>	Communicating Biology	
<b>Modulkürzel</b>	bio870	
<b>Kreditpunkte</b>	6.0 KP	
<b>Workload</b>	180 h	
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"> <li>• Master Biologie (Master) &gt; Skills Modules</li> <li>• Master Biology (Master) &gt; Skills Modules</li> </ul>	
<b>Zuständige Personen</b>	<ul style="list-style-type: none"> <li>• Zotz, Gerhard (Modulverantwortung)</li> <li>• Albach, Dirk Carl (Modulberatung)</li> <li>• Schmaljohann, Heiko (Modulberatung)</li> <li>• Zotz, Gerhard (Prüfungsberechtigt)</li> <li>• Albach, Dirk Carl (Prüfungsberechtigt)</li> <li>• Schmaljohann, Heiko (Prüfungsberechtigt)</li> <li>• Nolte, Arne (Prüfungsberechtigt)</li> <li>• Will, Maria (Prüfungsberechtigt)</li> <li>• Heim, Wieland (Prüfungsberechtigt)</li> <li>• Khan, Gulzar (Prüfungsberechtigt)</li> </ul>	
<b>Teilnahmevoraussetzungen</b>		
<b>Kompetenzziele</b>	<p>Communicating and practicing scientific presentation techniques (talk, publication, poster) Presentation of data and discussion in spoken and written (english) Practising and improving oral presentation skills and scientific writing. Independent writing of an in-depth literature review of a chosen biological topic demonstrating a comprehensive overview of the literature and a critical discussion of challenges and gaps in the particular field and scientific writing Independent investigation and knowledge of scientific primary literature</p> <p>+ interdisciplinary thinking          ++ critical and analytical thinking          ++ independent searching and knowledge of scientific literature          ++ data presentation and discussion (written and spoken)</p>	
<b>Modulinhalte</b>	<p>S: Working group seminar (2 SWS; Choice 1: Functional Ecology; Choice 2: Plant biodiversity and evolution) S: Scientific Communication in Biology (2SWS)</p>	
<b>Literaturempfehlungen</b>		
<b>Links</b>		
<b>Unterrichtssprache</b>	Englisch	
<b>Dauer in Semestern</b>	1 Semester	
<b>Angebotsrhythmus Modul</b>	annually, winter term	
<b>Aufnahmekapazität Modul</b>	12	
<b>Modulart</b>	Wahlmodul / Opportunity	
<b>Modullevel</b>	MM (Mastermodul / Master module)	
<b>Lehr-/Lernform</b>	Seminar	
<b>Vorkenntnisse</b>	Ecology, flora, genetics	
<b>Prüfung</b>	<b>Prüfungszeiten</b>	<b>Prüfungsform</b>
<b>Gesamtmodul</b>	1 term paper	
<b>Lehrveranstaltungsform</b>	Seminar	

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<b>SWS</b>	4
<b>Angebotsrhythmus</b>	WiSe
<b>Workload Präsenzzeit</b>	56 h

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## bio880 - Plant Diversity

<b>Modulbezeichnung</b>	Plant Diversity			
<b>Modulkürzel</b>	bio880			
<b>Kreditpunkte</b>	6.0 KP			
<b>Workload</b>	180 h			
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"> <li>• Master Biologie (Master) &gt; Skills Modules</li> <li>• Master Biology (Master) &gt; Skills Modules</li> </ul>			
<b>Zuständige Personen</b>	<ul style="list-style-type: none"> <li>• Albach, Dirk Carl (Modulverantwortung)</li> <li>• von Hagen, Klaus Bernhard (Modulberatung)</li> <li>• Albach, Dirk Carl (Prüfungsberechtigt)</li> <li>• von Hagen, Klaus Bernhard (Prüfungsberechtigt)</li> <li>• Khan, Gulzar (Prüfungsberechtigt)</li> </ul>			
<b>Teilnahmevoraussetzungen</b>				
<b>Kompetenzziele</b>	<p>In this module, we provide the skills necessary to describe and distinguish species for floras and monographs/first publication of species. For that, an overview over the plant kingdom is provided. Further, various non-molecular methods of systematics are practiced, such as morphometry, SEM, identification key generation, nomenclature, species delimitation methods, and interpretation of phylogenetic analyses.</p> <p>+ deepened biological expertise          ++ deepened knowledge of biological working methods          ++ data analysis skills + critical and analytical thinking          ++ independent searching and knowledge of scientific literature          + ability to perform independent biological research          ++ data presentation and discussion (E) (written and spoken)          + teamwork          + statistics &amp; scientific programming</p>			
<b>Modulinhalte</b>	<p>In the seminar we provide an overview over the larger groups of plants and characters for their grouping. We analyse methods for phylogeny generation, angiosperm classification and description of new taxa. In the exercises morphological characters are investigated in various ways and internet resources for further morphological characters presented. Species delimitation methods for molecular and morphological characters are used. Identification keys are generated and nomenclatural rules discussed.</p>			
<b>Literaturempfehlungen</b>				
<b>Links</b>				
<b>Unterrichtssprache</b>	Englisch			
<b>Dauer in Semestern</b>	1 Semester			
<b>Angebotsrhythmus Modul</b>	winter term			
<b>Aufnahmekapazität Modul</b>	8			
<b>Modulart</b>	Wahlmodul / Opportunity			
<b>Modullevel</b>	MM (Mastermodul / Master module)			
<b>Lehr-/Lernform</b>	Seminar, exercise			
<b>Vorkenntnisse</b>	Good knowledge of native flora			
<b>Prüfung</b>	<b>Prüfungszeiten</b>	<b>Prüfungsform</b>		
<b>Gesamtmodul</b>	2 examinations: 1 presentation (50%); 1 report (50%)			
<b>Lehrveranstaltungsform</b>	<b>Kommentar</b>	<b>SWS</b>	<b>Angebotsrhythmus</b>	<b>Workload Präsenz</b>
Seminar		2	WiSe	28
Übung		2	WiSe	28



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Lehrveranstaltungsform	Kommentar	SWS	Angebotsrhythmus	Workload Präsenz
<b>Präsenzzeit Modul insgesamt</b>				<b>56 h</b>

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## bio890 - Current Topics in Biology

<b>Modulbezeichnung</b>	Current Topics in Biology	
<b>Modulkürzel</b>	bio890	
<b>Kreditpunkte</b>	3.0 KP	
<b>Workload</b>	90 h	
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"> <li>• Master Biologie (Master) &gt; Skills Modules</li> <li>• Master Biology (Master) &gt; Skills Modules</li> <li>• Master Landschaftsökologie (Master) &gt; Wahlpflichtmodule</li> </ul>	
<b>Zuständige Personen</b>	<ul style="list-style-type: none"> <li>• Gerlach, Gabriele (Modulverantwortung)</li> <li>• Gerlach, Gabriele (Prüfungsberechtigt)</li> <li>• Laakmann, Silke (Prüfungsberechtigt)</li> <li>• Beutelmann, Rainer (Prüfungsberechtigt)</li> <li>• Bartölke, Rabea (Prüfungsberechtigt)</li> <li>• Fleischmann, Pauline (Prüfungsberechtigt)</li> </ul>	
<b>Teilnahmevoraussetzungen</b>		
<b>Kompetenzziele</b>	<p>+ biological knowledge            + biologically relevant, natural / mathematical scientific basic knowledge            ++ interdisciplinary knowledge and thinking            ++ abstract, logical, and analytical thinking            ++ expanded knowledge in a specific biological field            ++ presentation of results and factual discussion, both written and spoken            ++ (scientific) communication skills</p> <p>To develop skills in the critical analysis and interpretation of results and themes in diverse areas of modern biology, including (but not limited to) evolutionary biology, population genetics, biodiversity, ecology, genomics, ornithology, and neurobiology.</p>	
<b>Modulinhalte</b>	<p>Discussion and interpretations of one or more themes in modern biology. The themes and exact content will be provided by the instructor(s) at the beginning of the course. The module bio890 may be taken more than once as long as the content covered in the seminars differ substantially.</p>	
<b>Literaturempfehlungen</b>	<p>Varies with chosen topic (will be provided by the instructor(s) at the beginning of the course)</p>	
<b>Links</b>		
<b>Unterrichtssprache</b>	Englisch	
<b>Dauer in Semestern</b>	1 Semester	
<b>Angebotsrhythmus Modul</b>	summer and winter term	
<b>Aufnahmekapazität Modul</b>	unbegrenzt	
<b>Modulart</b>	Wahlmodul / Opportunity	
<b>Modullevel</b>	MM (Mastermodul / Master module)	
<b>Lehr-/Lernform</b>	Seminar	
<b>Vorkenntnisse</b>	Participation in one or more basic modules of the Master Biology	
<b>Prüfung</b>	<b>Prüfungszeiten</b>	<b>Prüfungsform</b>
<b>Gesamtmodul</b>	open	Final exam of module: 1 Portfolio. Components vary in the seminars. They are specified in Stud.IP in the respective seminar.
<b>Lehrveranstaltungsform</b>	Seminar	

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<b>SWS</b>	2
<b>Angebotsrhythmus</b>	SoSe und WiSe
<b>Workload Präsenzzeit</b>	28 h

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## neu730 - Biosciences in the Public Eye and in our Laws

<b>Modulbezeichnung</b>	Biosciences in the Public Eye and in our Laws
<b>Modulkürzel</b>	neu730
<b>Kreditpunkte</b>	6.0 KP
<b>Workload</b>	180 h (  56h contact / 84h research for presentations / 40h term paper  )
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"><li>• Master Biologie (Master) &gt; Skills Modules</li><li>• Master Biology (Master) &gt; Skills Modules</li><li>• Master Neuroscience (Master) &gt; Skills Modules</li></ul>
<b>Zuständige Personen</b>	<ul style="list-style-type: none"><li>• Sienknecht, Ulrike (Modulverantwortung)</li><li>• Sienknecht, Ulrike (Prüfungsberechtigt)</li></ul>
<b>Teilnahmevoraussetzungen</b>	
<b>Kompetenzziele</b>	<p>+ Expt. methods + Scient. Literature ++ Social skills ++ Interdiscipl. knowl/g + Data present./disc. + Scientific English ++ Ethics</p> <p>Upon completion of this course, students</p> <ul style="list-style-type: none"><li>• know basic rules of good scientific practise</li><li>• are aware of the legal framework that is relevant to biological research, e.g. on animal welfare or genetically modified organisms</li><li>• have practised to research and summarize different viewpoints on biological research, using both scientific (peer-reviewed) and non-scientific sources</li><li>• are able to identify and critically discuss ethical conflicts in biological research, e.g., in the context of stem cell research or data manipulation</li><li>• are able to prepare and give a coherent presentation in a team</li><li>• have practised to lead a group discussion</li></ul>
<b>Modulinhalte</b>	<p>In supervised exercises, students research the ethical aspects and controversial issues on several specific topics in the biosciences. Everyone participates in researching all topics. Students then take turns in summarizing and presenting each topic in small teams, and leading a critical discussion of each topic. Problem-based, independent research of the scientific background by the students is an integral part of this module.</p> <p>Example topics: Good scientific practise and fraud Neuroenhancement Artificial intelligence Animal welfare, Animal experiments Overfishing, Nature conservation State-of-the-art genetic tools and their implications Genetically modified organisms, e.g., in food production, chimeras Stem cells Humans as experimental subjects</p> <p>A bonus can be obtained through active participation during the semester. Active participation requires regular oral contributions to the group discussions, that go beyond giving your own talks. A bonus improves the exam mark by one step (0.3 or 0.4). The bonus is optional, an exam mark of 1.0 is achievable without a bonus. A bonus cannot be applied to pass a failed exam.</p>
<b>Literaturempfehlungen</b>	

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**Links**

<b>Unterrichtssprache</b>	Englisch	
<b>Dauer in Semestern</b>	1 Semester	
<b>Angebotsrhythmus Modul</b>	summer term	
<b>Aufnahmekapazität Modul</b>	12	
<b>Modulart</b>	Wahlpflicht / Elective	
<b>Modullevel</b>	MM (Mastermodul / Master module)	
<b>Vorkenntnisse</b>	Fundamentals of genetics, physiology, ecology and biological systematics	
<b>Prüfung</b>	<b>Prüfungszeiten</b>	<b>Prüfungsform</b>
<b>Gesamtmodul</b>	within a few weeks of summer term lecture period	Term paper Regular participation during the semester is required (max 3 days of absence)

Lehrveranstaltungsform	Kommentar	SWS	Angebotsrhythmus	Workload Präsenz
Vorlesung			SoSe	0
Seminar und Übung		4	SoSe	56
<b>Präsenzzeit Modul insgesamt</b>				<b>56 h</b>

## neu751 - Laboratory Animal Science

<b>Modulbezeichnung</b>	Laboratory Animal Science
<b>Modulkürzel</b>	neu751
<b>Kreditpunkte</b>	3.0 KP
<b>Workload</b>	<p>90 h ( 1 week full-time in semester break + flexible time for studying and exam preparation</p> <p>1 SWS Lecture total workload 45h: 2h contact / 20h background reading / 23h exam preparation</p> <p>1 SWS Supervised exercise total workload 45h: 35h contact / 10h background reading )</p>
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"> <li>• Master Biologie (Master) &gt; Skills Modules</li> <li>• Master Biology (Master) &gt; Skills Modules</li> <li>• Master Neuroscience (Master) &gt; Skills Modules</li> <li>• Master's Programme Molecular Biomedicine (Master) &gt; Skills Modules</li> </ul>
<b>Zuständige Personen</b>	<ul style="list-style-type: none"> <li>• Köppl, Christine (Prüfungsberechtigt)</li> <li>• Langemann, Ulrike (Prüfungsberechtigt)</li> <li>• Winkhofer, Michael (Prüfungsberechtigt)</li> <li>• Nolte, Arne (Prüfungsberechtigt)</li> <li>• Heyers, Dominik (Prüfungsberechtigt)</li> <li>• Ebbers, Lena (Prüfungsberechtigt)</li> <li>• Dedek, Karin (Prüfungsberechtigt)</li> <li>• Schmaljohann, Heiko (Prüfungsberechtigt)</li> <li>• Helgers, Simeon (Modulverantwortung)</li> </ul>
<b>Teilnahmevoraussetzungen</b>	none
<b>Kompetenzziele</b>	<p>++ Expt. Methods + Independent Research + Scient. Literature ++ Social skills ++ Interdiscipl. knowl + Scientific English ++ Ethics</p> <p>Upon successful completion of this course, students</p> <ul style="list-style-type: none"> <li>• know the relevant EU legislation governing animal welfare and are able to explain its meaning in common language</li> <li>• understand and are able to critically discuss salient ethical concepts in animal experimentation, such as the three Rs and humane endpoint.</li> <li>• have basic knowledge of the biology and husbandry of laboratory animal species held at the University of Oldenburg (rodents or birds or fish)</li> <li>• are able to critically assess the needs and welfare of animals without compromising scientific integrity of the investigation</li> <li>• have practical skills in handling small rodents or birds or fish</li> <li>• have profound knowledge of anaesthesia, analgesia and basic principles of surgery.</li> <li>• have practised invasive procedures and euthanasia.</li> </ul> <p>NOTE: These objectives aim to satisfy the requirements for EU directive A „Persons carrying out animal experiments“ and EU directive D „Persons killing animals“.</p>
<b>Modulinhalte</b>	<p>Background knowledge is taught using the third-party online platform "LAS Interactive" which concludes with a written exam that has to be passed before the practical part. Topics covered are:</p> <ul style="list-style-type: none"> <li>• Legislation, ethics and the 3Rs</li> <li>• Scientific integrity</li> <li>• Data collection "</li> <li>• Basic biology of rodents, birds and fish</li> <li>• Husbandry, and nutrition of rodents, birds and fish</li> <li>• Animal Welfare</li> <li>• Health monitoring</li> <li>• Pain and distress</li> <li>• Euthanasia</li> </ul>

Practical procedures will first be demonstrated, important aspects will then be practiced under supervision by every participant, on an animal model of their choice (rodents, birds or fish):

- Handling and external examination
- Administration of substances, blood sampling
- Euthanasia and dissection
- Transcardial perfusion
- Anaesthesia and surgery

<b>Literatureempfehlungen</b>	"LAS interactive" internet-based learning platform		
<b>Links</b>			
<b>Unterrichtssprache</b>	Englisch		
<b>Dauer in Semestern</b>	1 Semester		
<b>Angebotsrhythmus Modul</b>	semester break, every semester		
<b>Aufnahmekapazität Modul</b>	20 ( Registration procedure / selection criteria: StudIP. Priority according to urgency of qualification for work. )		
<b>Modulart</b>	je nach Studiengang Pflicht oder Wahlpflicht		
<b>Prüfung</b>	<b>Prüfungszeiten</b>	<b>Prüfungsform</b>	
<b>Gesamtmodul</b>	immediately before the practical part	written exam of 90 minutes	
<b>Lehrveranstaltungsform</b>	<b>Kommentar</b>	<b>SWS</b>	<b>Angebotsrhythmus</b> <b>Workload Präsenz</b>
Vorlesung		1	SoSe und WiSe      14
Übung		1	SoSe und WiSe      14
<b>Präsenzzeit Modul insgesamt</b>			28 h

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## neu760 - Scientific English

<b>Modulbezeichnung</b>	Scientific English
<b>Modulkürzel</b>	neu760
<b>Kreditpunkte</b>	6.0 KP
<b>Workload</b>	180 h (  0,5 SWS Lecture (VO) Total workload 23h: 8h contact / 15h research for term paper  3,5 SWS Supervised exercise (UE) Total workload 158h: 46h contact / 46h preparation of texts and presentations / 66h term paper  )
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"><li>• Master Biologie (Master) &gt; Skills Modules</li><li>• Master Biology (Master) &gt; Skills Modules</li><li>• Master Neuroscience (Master) &gt; Skills Modules</li><li>• Master's Programme Molecular Biomedicine (Master) &gt; Skills Modules</li></ul>
<b>Zuständige Personen</b>	<ul style="list-style-type: none"><li>• Albert, Jörg (Modulverantwortung)</li><li>• Albert, Jörg (Prüfungsberechtigt)</li></ul>
<b>Teilnahmevoraussetzungen</b>	
<b>Kompetenzziele</b>	+ Neurosci. knowlg. ++ Social skills ++ Data present./disc. ++ Scientific English  Upon completion of this course, students <ul style="list-style-type: none"><li>• have increased their proficiency in different forms of scientific presentation and communication in English, with special emphasis on neuroscience</li><li>• are able to express themselves with correct sentence structure and grammar, correct use of idioms and correct pronunciation</li><li>• are proficient in different contexts of scientific communication (e.g., paper, poster and informal exchange by email or phone)</li><li>• are able to recognize and avoid common errors of non-native speakers.</li></ul>
<b>Modulinhalte</b>	Lectures cover - characteristics of the different forms of scientific presentations - sentence structure using the passive voice - scientific vocabulary and terminology as contrasted to common speech - appropriate language for communication with scientific editors and referees  Students read neuroscience texts of an advanced level and practice explaining and presenting these in both written and oral form. They also practice different contexts of scientific communication (e.g., paper, poster and informal exchange by email or phone). Emphasis is placed on individual problems in pronunciation and language use errors.
<b>Literaturempfehlungen</b>	<a href="http://users.wpi.edu/~nab/sci_eng/ScientificEnglish.pdf">http://users.wpi.edu/~nab/sci_eng/ScientificEnglish.pdf</a>
<b>Links</b>	
<b>Unterrichtssprache</b>	Englisch
<b>Dauer in Semestern</b>	1 Semester
<b>Angebotsrhythmus Modul</b>	annually, semester break
<b>Aufnahmekapazität Modul</b>	12



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**Hinweise**

Usually held in the break before summer term  
Outsourced to STELS-OL (Scientific and Technical English Language Service);  
native English speaker with in-depth neuroscience knowlg.

<b>Modulart</b>	je nach Studiengang Pflicht oder Wahlpflicht			
<b>Vorkenntnisse</b>	This course is open to all students with English skill level B2 or above (according to the Common European Framework of Reference for Languages, CEFR). Scientific English is not spoken as a native language anywhere on the planet (so it is a foreign language for everyone). The course thus invites both native speakers of English and students for whom English is a foreign (or second) language. Please note that this course while offering support for improving basic language skills and increasing respective awareness is not a simple 'top-up' course of English language skills. It is rather a joint exploration into the most basic (and most universal) tool of scientific thought and expression: Scientific English!			
<b>Prüfung</b>	<b>Prüfungszeiten</b>	<b>Prüfungsform</b>		
<b>Gesamtmodul</b>	within 2 months of completing the course	Portfolio: 70% several quick tests, texts, presentations, 30% term paper Bonus system for active participation		
<b>Lehrveranstaltungsform</b>	<b>Kommentar</b>	<b>SWS</b>	<b>Angebotsrhythmus</b>	<b>Workload Präsenz</b>
Vorlesung		0.5	WiSe	7
Übung		3.5	WiSe	49
<b>Präsenzzeit Modul insgesamt</b>				<b>56 h</b>

## neu780 - Biological Data Analysis with Python

<b>Modulbezeichnung</b>	Biological Data Analysis with Python			
<b>Modulkürzel</b>	neu780			
<b>Kreditpunkte</b>	6.0 KP			
<b>Workload</b>	180 h ( 2 SWS Lecture total workload 90h: 30h contact / 60h individual reading 2 SWS Supervised exercise total workload 90h: 45h contact / 45h solving programming exercises )			
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"> <li>• Master Biologie (Master) &gt; Skills Modules</li> <li>• Master Biology (Master) &gt; Skills Modules</li> <li>• Master Neuroscience (Master) &gt; Skills Modules</li> </ul>			
<b>Zuständige Personen</b>	<ul style="list-style-type: none"> <li>• Winklhofer, Michael (Modulverantwortung)</li> <li>• Winklhofer, Michael (Prüfungsberechtigt)</li> </ul>			
<b>Teilnahmevoraussetzungen</b>				
<b>Kompetenzziele</b>	<p>+ Neurosci. knowlg. ++ Maths/Stats/Progr. + Data present./disc.</p> <p>The objective of the module is the acquisition of programming skills with focus on analysis of neurobiological datasets, using the programming language python. Python is available for any computer platform (PC, Mac, Linux) and is open source (for free), see <a href="https://www.python.org/">https://www.python.org/</a>.</p> <p>Students will learn how to write effective scripts for data processing and visualisation, making use of pre-existing program libraries for various generic purposes (maths, statistics, plotting, image analysis).</p> <p>Typical applications will be analysis of time series (e.g., electrophysiological recordings, movement data), images (e.g. immunohistochemical images, MRI slices), and spatio-temporal correlations in volume data. Students will also learn how to produce synthetic data from various noise models to assess signal-to-noise ratio in instrumental datasets.</p>			
<b>Modulinhalte</b>	<p>Data types and data structures, control structures, functions, modules, file input/output</p> <p>Standard libraries and SciPy libraries (Matplotlib, NumPy,...), scikit-image, VPython, ...</p>			
<b>Literaturempfehlungen</b>	<p>open access <a href="http://www.swaroopch.com/notes/python/">http://www.swaroopch.com/notes/python/</a> <a href="http://docs.python.org/3/tutorial/index.html">http://docs.python.org/3/tutorial/index.html</a></p>			
<b>Links</b>				
<b>Unterrichtssprache</b>	Englisch			
<b>Dauer in Semestern</b>	1 Semester			
<b>Angebotsrhythmus Modul</b>	semester break, annually			
<b>Aufnahmekapazität Modul</b>	20			
<b>Hinweise</b>	Shared course components with (cannot be credited twice): pb328 "Einführung in Datenanalyse mit Python" (Professionalisierungsmodul im Bachelorstudiengang Biologie)			
<b>Modulart</b>	Wahlpflicht / Elective			
<b>Vorkenntnisse</b>	No prior knowledge in programming required, but useful.			
<b>Prüfung</b>	<b>Prüfungszeiten</b>	<b>Prüfungsform</b>		
<b>Gesamtmodul</b>	term break, immediately after the course (2 weeks in February)	assignment of programming exercises, 4 out of 5 exercises to be assessed		
<b>Lehrveranstaltungsform</b>	<b>Kommentar</b>	<b>SWS</b>	<b>Angebotsrhythmus</b>	<b>Workload Präsenz</b>
Vorlesung		2	WiSe	28
Übung		2	WiSe	28
<b>Präsenzzeit Modul insgesamt</b>				56 h

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## neu790 - Communicating Neuroscience

<b>Modulbezeichnung</b>	Communicating Neuroscience
<b>Modulkürzel</b>	neu790
<b>Kreditpunkte</b>	3.0 KP
<b>Workload</b>	90 h (  90 h  (28 h contact / 62 h individual reading and preparing discussion questions)  )
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"><li>• Master Biologie (Master) &gt; Skills Modules</li><li>• Master Biology (Master) &gt; Skills Modules</li><li>• Master Neuroscience (Master) &gt; Skills Modules</li></ul>
<b>Zuständige Personen</b>	<ul style="list-style-type: none"><li>• Kretzberg, Jutta (Modulverantwortung)</li><li>• Kretzberg, Jutta (Prüfungsberechtigt)</li><li>• Köppl, Christine (Prüfungsberechtigt)</li></ul>
<b>Teilnahmevoraussetzungen</b>	
<b>Kompetenzziele</b>	<p>+ Neurosci. knowlg. ++ Scient. Literature ++ Social skills + Interdiscipl. knowlg. ++ Data present./disc. + Scientific English ++ Ethics</p> <p>Upon successful completion of this course, students will have thought about and discussed in depth scientific, social and ethical aspects of communication in and about neuroscience. In particular, participants practice critical reading of neuroscience literature, learn about the scientific publication process and discuss science communication to the general public.</p>
<b>Modulinhalte</b>	<p>The overall goal of critical discussion of neuroscientific results in a scientific, social and ethical context requires preparation and active participation both before (Stud.IP wiki) and during the weekly sessions. Each participant is responsible for the preparation and moderation of at least one session in a group of 2-3 students. For passing the module, additional active participation is required in at least 10 of the seminar sessions. The specific papers and topics that are discussed vary, but typically cover:</p> <ul style="list-style-type: none"><li>• How to find literature?</li><li>• How to read different types of scientific papers: Classic papers, review papers, perspective papers, recent original papers?</li><li>• Publication process, Authorship and impact metrics</li><li>• Alternative publication paths and data sharing in neuroscience</li><li>• Science communication for the general public and on social media</li><li>• Face-to-face scientific communication</li></ul>
<b>Literaturempfehlungen</b>	<p>List of published papers, as well as online resources for preparation will be selected by the teachers and participants and announced via Stud.IP.</p> <p>Background neuroscience textbooks, e.g.:</p> <p>Galizia, Lledo 'Neuroscience – From Molecule to Behavior', 2013, Springer</p> <p>Nicholls et al. 'From Neuron to Brain', 5th edition 2012, Sinauer</p> <p>Kandel et al. 'Principles of Neural Science', 5th Edition 2013, McGraw-Hill Comp.</p>

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## Links

Related content: Science communication workshop:

[https://elearning.uni-oldenburg.de/dispatch.php/course/overview?cid=6fc0dbbf  
a53d7b3f5e3680f52ac7d0f7](https://elearning.uni-oldenburg.de/dispatch.php/course/overview?cid=6fc0dbbf<br/>a53d7b3f5e3680f52ac7d0f7)

<b>Unterrichtssprache</b>	Englisch	
<b>Dauer in Semestern</b>	1 Semester	
<b>Angebotsrhythmus Modul</b>	winter semester	
<b>Aufnahmekapazität Modul</b>	20 ( Registration procedure / selection criteria: StudIP )	
<b>Modulart</b>	Wahlpflicht / Elective	
<b>Modullevel</b>	MM (Mastermodul / Master module)	
<b>Prüfung</b>	<b>Prüfungszeiten</b>	<b>Prüfungsform</b>
<b>Gesamtmodul</b>		Presentation (ungraded, pass / fail)
<b>Lehrveranstaltungsform</b>	Seminar	
<b>SWS</b>	2	
<b>Angebotsrhythmus</b>	WiSe	
<b>Workload Präsenzzeit</b>	28 h	

## neu800 - Introduction to Matlab

<b>Modulbezeichnung</b>	Introduction to Matlab		
<b>Modulkürzel</b>	neu800		
<b>Kreditpunkte</b>	3.0 KP		
<b>Workload</b>	90 h (		
	2 SWS Supervised exercise (UE) "Introduction to MATLAB" Total workload 90h: 28h contact / 62h practising learned programming skills		
	)		
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"> <li>• Master Biologie (Master) &gt; Skills Modules</li> <li>• Master Biology (Master) &gt; Skills Modules</li> <li>• Master Neuroscience (Master) &gt; Skills Modules</li> </ul>		
<b>Zuständige Personen</b>	<ul style="list-style-type: none"> <li>• Gießing, Carsten (Modulverantwortung)</li> <li>• Gießing, Carsten (Prüfungsberechtigt)</li> </ul>		
<b>Teilnahmevoraussetzungen</b>			
<b>Kompetenzziele</b>	<p>[nop] ++ Expt. Methods + Social skills + Interdiscipl. knowlg. ++ Maths/Stats/Progr. + Data present./disc. + Scientific English [/nop] Within this introductory course students will learn the basics of MATLAB programming. Participants will be introduced in fundamental programming concepts.</p>		
<b>Modulinhalte</b>	<p>The modul comprises an introduction to data structures, flow control, loops, graphics, basic data analyses with MATLAB, scripts and functions.</p>		
<b>Literaturempfehlungen</b>	<p>Recommended: Wallisch, Pascal (2014) MATLAB for neuroscientists: an introduction to scientific computing in MATLAB. 2. ed., Amsterdam: Elsevier.</p>		
<b>Links</b>			
<b>Unterrichtssprache</b>	Englisch		
<b>Dauer in Semestern</b>	1 Semester		
<b>Angebotsrhythmus Modul</b>	annually, summer term, second half		
<b>Aufnahmekapazität Modul</b>	25 (in total with bio640) (		
	shared course components with (cannot be credited twice): bio640		
	)		
<b>Modulart</b>	Wahlpflicht / Elective		
<b>Modullevel</b>	MM (Mastermodul / Master module)		
<b>Prüfung</b>	<b>Prüfungszeiten</b>	<b>Prüfungsform</b>	
<b>Gesamtmodul</b>	end of summer term	Working on exercises Regular active participation	
<b>Lehrveranstaltungsform</b>	<b>Kommentar</b>	<b>SWS</b>	<b>Angebotsrhythmus</b>
Vorlesung			SoSe
Seminar			SoSe
Übung		2	SoSe
<b>Präsenzzeit Modul insgesamt</b>			28 h



## neu810 - International Meeting Contribution

<b>Modulbezeichnung</b>	International Meeting Contribution		
<b>Modulkürzel</b>	neu810		
<b>Kreditpunkte</b>	3.0 KP		
<b>Workload</b>	90 h		
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"> <li>• Master Biologie (Master) &gt; Skills Modules</li> <li>• Master Biology (Master) &gt; Skills Modules</li> <li>• Master Neuroscience (Master) &gt; Skills Modules</li> </ul>		
<b>Zuständige Personen</b>	<ul style="list-style-type: none"> <li>• Kretzberg, Jutta (Modulverantwortung)</li> <li>• Kretzberg, Jutta (Prüfungsberechtigt)</li> <li>• Köppl, Christine (Prüfungsberechtigt)</li> </ul>		
<b>Teilnahmevoraussetzungen</b>			
<b>Kompetenzziele</b>	<p>+ Neurosci. knowlg.            ++ Independent research            + Scient. Literature            ++ Social skills            + Interdiscipl. knowlg.            ++ Data present./disc.            + Scientific English            + Ethics</p> <p>Preparation, presentation and critical discussion of own studies for an international audience:</p> <ul style="list-style-type: none"> <li>• participate in an international meeting</li> <li>• prepare a poster or talk for an international meeting</li> <li>• present own results in a way that is appropriate for the target audience</li> <li>• put own studies into the context of scientific literature</li> <li>• acquire additional knowledge about a broader field of research</li> </ul>		
<b>Modulinhalte</b>	<p>Active participation in a scientific conference, workshop, summer school etc, lasting a minimum of 3 full days. Student must be the presenter (poster or talk) and an author of the presented work, typically carried out in the context of a research module or the Master thesis.</p> <p>It is mandatory to present the poster or talk to Christine Köppl or Jutta Kretzberg prior to the meeting and incorporate the feedback on the presentation.</p>		
<b>Literaturempfehlungen</b>	dependent on the scientific topic		
<b>Links</b>			
<b>Unterrichtssprache</b>	Englisch		
<b>Dauer in Semestern</b>	1 Semester		
<b>Angebotsrhythmus Modul</b>	every semester, flexible		
<b>Aufnahmekapazität Modul</b>	unbegrenzt ( please contact module organizer individually )		
<b>Modulart</b>	Wahlpflicht / Elective		
<b>Modullevel</b>	MM (Mastermodul / Master module)		
<b>Prüfung</b>	<b>Prüfungszeiten</b>	<b>Prüfungsform</b>	
<b>Gesamtmodul</b>		presentation (ungraded, pass/fail)	
<b>Lehrveranstaltungsform</b>	Seminar		
<b>SWS</b>	2		
<b>Angebotsrhythmus</b>	SoSe und WiSe		
<b>Workload Präsenzzeit</b>	28 h		

## bio777 - Objekte in wissenschaftlichen Sammlungen: Konservierung, Management und Forschungsfragen

<b>Modulbezeichnung</b>	Objekte in wissenschaftlichen Sammlungen: Konservierung, Management und Forschungsfragen
<b>Modulkürzel</b>	bio777
<b>Kreditpunkte</b>	6.0 KP
<b>Workload</b>	180 h
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"> <li>• Master Biologie (Master) &gt; Skills Modules</li> <li>• Master Biology (Master) &gt; Skills Modules</li> </ul>
<b>Zuständige Personen</b>	<ul style="list-style-type: none"> <li>• Will, Maria (Modulverantwortung)</li> <li>• Albach, Dirk Carl (Modulberatung)</li> <li>• von Lindern, Klara (Modulberatung)</li> <li>• Will, Maria (Prüfungsberechtigt)</li> <li>• von Lindern, Klara (Prüfungsberechtigt)</li> </ul>
<b>Teilnahmevoraussetzungen</b>	
<b>Kompetenzziele</b>	<p>+vertiefte biologische Fachkenntnisse</p> <p>++vertiefte Kenntnisse biologischer Arbeitstechniken</p> <p>++fächerübergreifendes Denken</p> <p>+kritisches und analytisches Denken</p> <p>+eigenständige Recherche und Kenntnisse wissenschaftlicher Primärliteratur</p> <p>+Fähigkeit zur eigenständigen biologischen Forschung</p> <p>+Datenpräsentation und Diskussion in Wort und Schrift (D/E)</p> <p>+Teamfähigkeit</p> <p>+Ethik und professionelles Verhalten</p> <p>++Projekt- und Zeitmanagement</p>
<b>Modulinhalte</b>	<p>- Geschichte (europäischer) Universitäts-sammlungen und deren Bedeutungen für die wissenschaftliche Theoriebildung auch auf einer überfachlichen Ebene;</p> <p>- Sammlungsbildungsprozesse;</p> <p>- Überblick über die Bestände an der CvO als Infrastruktur für Forschung &amp; Lehre;</p> <p>- theoretische und praktische Grundlagen der Sammlungsarbeit (Sammlungskonzepte, Dokumentation, sachgerechtes Handling, Thesauri &amp; Datenbanken, Digitalisierung, Inventarisierung) aus einer fächerübergreifenden Perspektive;</p> <p>- Fähigkeit zur zielgerichteten wissenschaftlichen Befragung von Beständen auf Objekt- und Metaebene im Sinne der Entwicklung von Forschungsfragen und/oder Vermittlungsangeboten für verschiedene Zielgruppen;</p> <p>- exemplarische Kenntnis von Methoden der sammlungsbezogenen Objektbeforschung (Objektbiografie, Provenienzforschung);</p> <p>- ...</p>
<b>Literaturempfehlungen</b>	<p>Artikel und ausgewählte Buchkapitel zu Themen wie (1) Geschichte/Gegenwart/Zukunft von Sammlungen, (2) Sammlungsarbeit (präventive Konservierung, Objekthandling) und (3) Forschungs- und Vermittlungspotentiale von Objekten</p>
<b>Links</b>	<a href="https://uol.de/kustodien/zertifikatsprogramm">https://uol.de/kustodien/zertifikatsprogramm</a>
<b>Unterrichtssprachen</b>	Deutsch, Englisch
<b>Dauer in Semestern</b>	1 Semester
<b>Angebotsrhythmus Modul</b>	Wintersemester
<b>Aufnahmekapazität Modul</b>	10 (Vorlesung & Seminar als transdisziplinäre LV in Kooperation mit Fak. III



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**Hinweise**

verknüpft mit dem Modul bio783 "Object-based Research Projects in Biological Collections" (unabhängig Belegung möglich).

Wegen inhaltlicher Überschneidungen kann das Modul nicht zusätzlich zu pb335 belegt werden.

**Modulart**

Wahlmodul / Opportunity

**Modullevel**

MM (Mastermodul / Master module)

**Prüfung**

**Prüfungszeiten**

**Prüfungsform**

**Gesamtmodul**

2 Prüfungsleistungen:  
- 1 Klausur oder 1 mündliche Prüfung (100%)  
und  
- 1 Fachpraktische Übung (unbenotet)

Lehrveranstaltungsform	Kommentar	SWS	Angebotsrhythmus	Workload Präsenz
Vorlesung		1	WiSe	14
Seminar		2	WiSe	28
Übung		1	WiSe	14
<b>Präsenzzeit Modul insgesamt</b>				<b>56 h</b>

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## bio783 - Object-based Research Projects in Biological Collections

<b>Modulbezeichnung</b>	Object-based Research Projects in Biological Collections
<b>Modulkürzel</b>	bio783
<b>Kreditpunkte</b>	6.0 KP
<b>Workload</b>	180 h
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"><li>• Master Biologie (Master) &gt; Skills Modules</li><li>• Master Biology (Master) &gt; Skills Modules</li></ul>
<b>Zuständige Personen</b>	<ul style="list-style-type: none"><li>• Will, Maria (Modulverantwortung)</li><li>• Albach, Dirk Carl (Modulberatung)</li><li>• Will, Maria (Prüfungsberechtigt)</li></ul>
<b>Teilnahmevoraussetzungen</b>	
<b>Kompetenzziele</b>	<p>++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) +teamwork +ethics and professional behaviour ++project and time management</p> <p>++Projekt- und Zeitmanagement</p>
<b>Modulinhalte</b>	<p>- documentation of a natural history collection (e.g., university or from an herbarium) including a description of the object(s), digitalization, check for traces of use and/or damage;</p> <p>- if needed: restauration, i.e. fixing loose plants on herbarium vouchers;</p> <p>- trace biographies of the collector and the collection/object (provenance);</p> <p>- trace comparable collections using databases;</p> <p>- as far as possible: identification/validation of scientific identification using databases and scientific literature</p> <p>- generating and answer scientific questions based on the collection or develop an educational approach (e.g., teaching lecture)</p> <p>- communicate the results, i.e. prepare a poster for a congress and defend your theses and summarize the results in a manuscripts</p> <p>...</p>
<b>Literaturempfehlungen</b>	scientific literature corresponding to the individual research project
<b>Links</b>	
<b>Unterrichtssprache</b>	Englisch
<b>Dauer in Semestern</b>	1 Semester
<b>Angebotsrhythmus Modul</b>	irregular
<b>Aufnahmekapazität Modul</b>	4

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**Hinweise**

Linked to the module bio777 'Objects in scientific collections: Conservation, management and research issues' (independent allocation possible). The competences overlap with pb336. If module pb336 has been completed previously, admission to the module will be decided on an individual basis.

<b>Modulart</b>	Wahlmodul / Opportunity	
<b>Modullevel</b>	MM (Mastermodul / Master module)	
<b>Lehr-/Lernform</b>	Übung	
<b>Prüfung</b>	<b>Prüfungszeiten</b>	<b>Prüfungsform</b>
<b>Gesamtmodul</b>	individual	1 Portfolio
<b>Lehrveranstaltungsform</b>	Übung	
<b>SWS</b>	4	
<b>Angebotsrhythmus</b>	WiSe	
<b>Workload Präsenzzeit</b>	56 h	

## neu820 - Neuroscience Journal Club

<b>Modulbezeichnung</b>	Neuroscience Journal Club	
<b>Modulkürzel</b>	neu820	
<b>Kreditpunkte</b>	3.0 KP	
<b>Workload</b>	90 h ( 30h contact / 60h reading and preparation of oral and poster presentation )	
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"> <li>• Master Biologie (Master) &gt; Skills Modules</li> <li>• Master Biology (Master) &gt; Skills Modules</li> <li>• Master Neuroscience (Master) &gt; Skills Modules</li> </ul>	
<b>Zuständige Personen</b>	<ul style="list-style-type: none"> <li>• Mertsch, Sonja (Modulverantwortung)</li> <li>• Mertsch, Sonja (Prüfungsberechtigt)</li> </ul>	
<b>Teilnahmevoraussetzungen</b>		
<b>Kompetenzziele</b>	<p>Students will learn to read, interpret, present and discuss neuroscientific literature.</p> <p>++ Neurosci. knowledge + Expt. Methods ++ Scient. Literature ++ Social skills + Interdiscipl. knowledge ++ Data present./disc. + Scientific English + Ehtics</p>	
<b>Modulinhalte</b>	<p>Week 1: How to read and present a scientific paper and how to generate a scientific poster? Distribution of papers to participants Week 2: Example presentation of a scientific paper by the teacher with discussion Week 3-13: Oral presentation / moderation of discussion of one scientific paper per week by one or two student(s) Week 14: Short poster presentations of all students</p> <p>The focus topic of the scientific literature will change between semesters.</p>	
<b>Literaturempfehlungen</b>	Scientific literature will be available in Stud.IP	
<b>Links</b>		
<b>Unterrichtssprache</b>	Englisch	
<b>Dauer in Semestern</b>	1 Semester	
<b>Angebotsrhythmus Modul</b>	winter term, annually	
<b>Aufnahmekapazität Modul</b>	20	
<b>Modulart</b>	Wahlpflicht / Elective	
<b>Modullevel</b>	MM (Mastermodul / Master module)	
<b>Prüfung</b>	<b>Prüfungszeiten</b>	<b>Prüfungsform</b>
<b>Gesamtmodul</b>	during the semester	presentation and attendance of at least 70% in the seminars
<b>Lehrveranstaltungsform</b>	Seminar	
<b>SWS</b>	2	
<b>Angebotsrhythmus</b>	SoSe und WiSe	
<b>Workload Präsenzzeit</b>	30 h	

# Abschlussmodul

## mam - Masterarbeitsmodul

<b>Modulbezeichnung</b>	Masterarbeitsmodul	
<b>Modulkürzel</b>	mam	
<b>Kreditpunkte</b>	30.0 KP	
<b>Workload</b>	900 h	
<b>Verwendbarkeit des Moduls</b>	<ul style="list-style-type: none"> <li>• Master Biologie (Master) &gt; Abschlussmodul</li> </ul>	
<b>Zuständige Personen</b>	<ul style="list-style-type: none"> <li>• der Biologie, Lehrende (Prüfungsberechtigt)</li> </ul>	
<b>Teilnahmevoraussetzungen</b>		
<b>Kompetenzziele</b>	<p>Studierende besitzen nach erfolgreichem Besuch des Moduls die Fähigkeit innerhalb einer vorgegebenen Frist ein Problem aus dem Bereich der Biologie nach wissenschaftlichen Methoden zu bearbeiten.</p> <p>++ vertiefte biologische Fachkenntnisse          ++ vertiefte Kenntnisse biologischer Arbeitstechniken          ++ Fähigkeit zur Datenanalyse          ++ kritisches und analytisches Denken          + eigenständige Recherche und Kenntnisse wissenschaftlicher Primärliteratur          ++ Fähigkeit zur eigenständigen biologischen Forschung          ++ Datenpräsentation und Diskussion in Wort und Schrift (E)          + Teamfähigkeit          + Ethik und professionelles Verhalten          ++ Projekt- und Zeitmanagement</p>	
<b>Modulinhalte</b>	Anfertigung der Masterarbeit Aktive Mitarbeit im Mitarbeiter-Seminar der Arbeitsgruppe, in der die Master-Arbeit geschrieben wird.	
<b>Literaturempfehlungen</b>	Literatur zum Einstieg in das Thema wird vom jeweiligen Betreuer bereitgestellt. Im weiteren Verlauf wird eine eigenständige Literaturrecherche erwartet.	
<b>Links</b>		
<b>Unterrichtsprachen</b>	Englisch, Deutsch	
<b>Dauer in Semestern</b>	1 Semester	
<b>Angebotsrhythmus Modul</b>	halbjährlich	
<b>Aufnahmekapazität Modul</b>	unbegrenzt	
<b>Modulart</b>	Pflicht / Mandatory	
<b>Modullevel</b>	MM (Mastermodul / Master module)	
Prüfung	Prüfungszeiten	Prüfungsform
<b>Gesamtmodul</b>	Masterarbeit (90%) Abschlusskolloquium (10%)	
<b>Lehrveranstaltungsform</b>	Seminar	
<b>SWS</b>	2	
<b>Angebotsrhythmus</b>	SoSe und WiSe	
<b>Workload Präsenzzeit</b>	28 h	

