Module Name
Marine Biology and Ecology of Freshwater Fish

Type of Module	**Module Code**
o Advanced Module	Marine Biology

Identification Number	**Workload**	**Credit Points**	**Term**	**Offered Every**	**Start**	**Duration**
MN-B-SM (E 1)	360 h	12 CP	2nd term of studying	Summer term	summer term only	7 weeks

1	**Course Types**	**Contact Time**	**Private Study**	**Planned Group Size**
	a) Lectures	21 h	42 h	max. 10
	b) Practical/Lab	155 h	113 h	max. 10
	c) Seminar	5 h	24 h	max. 10

2 **Module Objectives and Skills to be Acquired**

Students who successfully completed this module

- have acquired detailed knowledge on the diversity of marine animals and plants incl. the macrofauna, meiofauna, microfauna and nanofauna, as well as algae in pelagic and benthic habitats and on the functioning of different marine ecosystems (incl. open sea, tidal flats, rocky shore and deep sea).
- are able to use different sampling strategies and to analyze marine organisms during excursions to rock pools, tidal flat areas and rocky shore environments.
- have acquired detailed knowledge regarding the ecology of freshwater fish with special emphasizes on spatial and temporal aspects of population dynamics in relation to their ecological community as well as first experiences on conducting and analyzing experiments on fish behavior, biodiversity assessment with focus on the fish-trophic spectrum, molecular methods to prepare, sequence and analyze metabarcoding data.
- are able to use a variety of different fishing and sampling methods that are needed as baseline in projecting different kind of studies in the field of ecology.
- can independently carry out small scientific projects related to the topic of the module.
- have learned how to present research results in oral and written form and to critically discuss scientific publications related to the topic of the module on a professional level.
- are able to transfer skills acquired in this module to other fields of biology.

3	**Module Content** • Introduction to marine biology (oceanography, adaptations to abiotic and biotic environments, etc.) • Analysis of typical life forms and communities of marine habitats (pelagial, muddy and sandy sediments, rocky shore, trenches of the North Sea) • Trophic interactions, development of organisms • Field course at the Biologische Anstalt Helgoland (see General time schedule) with expedition with boat for plankton, oral presentation of results of laboratory work and expeditions • Current topics in ecology of freshwater fish (esp. spatial and temporal aspects of ecology; incl. excursions) • Fish behaviour • Variety of fishing and biodiversity assessment methods • Methods for field experiments including on-site and real-time DNA metabarcoding (Nanopore sequencing) • Analysis of juvenile fish • Accomplishment and analysis of field data, species diversity and abundance data, molecular metabarcoding data
4	**Teaching Methods** Lectures; Practical/Lab; Seminar; Excursions; Guidance to independent research; Training on presentation techniques in oral and written form
5	**Prerequisites (for the Module)** Enrollment in the Master´s degree course “Biological Sciences” **Additional academic requirements** Previous attendance of the lecture module “Ecology, Evolution, and Environment (E)”. Knowledge on fundamental ecological principles is indispensable to participate in this module. In cases of doubt, please contact the module coordinator (see 10) before choosing this subject module.
6	**Type of Examination** The final examination consists of two parts: written examination on topics of lectures (1 hour; 50 % of the total module mark), oral presentation (20 min; 50 % of the total module mark)
7	**Credits Awarded** Regular and active participation Each examination part at least “sufficient” (see appendix of the examination regulations for details)
8	**Compatibility with other Curricula** None
9	**Proportion of Final Grade** 15 % of the overall grade (see also appendix of the examination regulations)
10	**Module Coordinator** Prof. Dr. Hartmut Arndt, phone 470-3100, e-mail: teach-ecology@uni-koeln.de

11	**Further Information** **Subject module** of the Master´s degree course "Biological Sciences", **Specialization:** (E) Ecology, Evolution, and Environment **Participating faculty**: Prof. Dr. H. Arndt, Prof. Dr. J. Borcherding, Dr. A. Scherwaß, Dr. G. Schoolmann, Prof. Dr. A.-M. Waldvogel **Literature:** Information about textbooks and other reading material will be given on the ILIAS representation of the course (https://www.ilias.uni-koeln.de/ilias/goto_uk_cat_2815610.html) **General time schedule:** First part (Partly on Helgoland): Week 1 (**Fri.-**Fri.): Lectures/practices/excursions at the Marine Biological Station on Helgoland Island (**1.04.!!** – 8.04.); Week 2 and 3 (Mon.-Fri.): Lectures/practices and data analysis in Cologne; Second part (partly in Ecological Research Station Rees-Grietherbusch): Week 4-6 (Mon.-Fri.): Lectures/practices/fieldwork/labwork and data analysis. **Location Week 1:** Marine Biological Station on Helgoland Island, **Week 2-3:** Köln, Biocenter **Location Week 4-5:** Ecological Research Station Rees, Grietherbusch 3a, D-46459 Rees Grietherbusch, Germany **Note:** The module contains hand-on laboratory work conducted in small groups and is taught in the field, in course rooms and in research laboratories. The module does not contain computer-based practicals/research as a main component. **Introduction to the module:** March 31, 2022 at 10:00 a.m., online (further information/link will be sent to your Smail-Account); for preparation to the module before this introduction see ILIAS link under literature. **Written examination:** May 20, 2022, 10:00; second/supplementary examination August 05, 2022; the latter date may vary if students and module coordinator agree. More details will be given at the beginning of the module.