

Module Name	2.2.2 Modelling of Aquatic Ecosystems – Practical Exercises
Identification code	AEF295, EM2.2.5, AE-CAU-306 Modul 2.2.5 (QIS-registration for examination) 75200
Subtitle	
Courses embedded	
Term	Summer
Coordinator	Prof. Dr. K. Wirtz
Teachers	Prof. Dr. K. Wirtz
Tuition language	English
Programme involvement	Elective M.Sc. Environmental Management Elective M.Sc. European Master in Applied Ecology
Teaching form, contact time per week class size	Lecture: Modelling Aquatic Ecosystems – (22h/66h) Prof. Dr. K. Wirtz Exercises: Modelling Aquatic Ecosystems – (38h/114h) Prof. Dr. K. Wirtz mit Dr. Carsten Lemmen 25
Workload overall	180h
Contact time	60h
ECTS credit points	6
Preconditions prescribed	
Prerequisites recommended	ground knowledge in environmental/biological sciences basic skills in mathematics (e.g. exponential function) experience with a programming language (e.g., „R“)
Learning outcomes	major learning objectives of this course are: <ul style="list-style-type: none"> ● to understand basic modelling concepts ● to be able to evaluate models and their applications ● to build and run a simple model yourself to document/present a scientific or applied study
Content	Models generate new knowledge from data and link fundamental to applied research. Whether they are good for predictions, however, is still under debate... This module conveys the basic elements and application types of environmental models. It illustrates how the modelling process is subdivided into single phases that proceed from problem identification towards communication of results. A central component is the development of conceptual models, followed by their implementation using computer software. The 2 nd part of the course is dedicated to a selected problem of env. sciences (e.g. biodiversity or eutrophication). Students will explore and evaluate existing models, but also build their own ones. They will create scenarios and learn to assess the potentials and limitations of models. These practical (group) exercises will make use of standard model approaches such as differential equations or individual based models, which will be implemented and analyzed using R (altern. MATLAB), or NETLOGO.
Assessment	Project 100%
Teaching media	Slides, NETLOGO, R
References	- Soetaert, K & and PMJ Herman (2009): A Practical Guide to Ecological Modelling. - Haefner, J.W. (2005): Modelling biological systems: principles and applications. 2 nd edition.
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