Environemental Engineer

Master’s Programme

Modulhandbuch

Academic Year 2013-2014

Hydrological and Environmental River Basin Modelling

1. General Information

Module Number
BGU54008

Module Name
Hydrological and Environmental River Basin Modelling

Module Level (Bachelor or Master)
Master

Abbreviation
-

Subheading
-

Duration
Wintersemester

Language
English

Frequency
One semester

2. Workload

Contact hours per week:

Lecture: 15 weeks 2 hours per week	30 hours
Exercises: 14 weeks 2 hours per week	28 hours

Independent study time:

Lecture preparation and follow-up work	27 hours
Homework (ca. 3 hours per week)	45 hours
Preparation for examination(s) (ca. 3 – 4 weeks)	50 hours
Total	**120 hours**

Total Study Time:
Contact hours per term (58 hours) + independent study time (122 hours) = 180 hours

Credits
1 credit corresponds to 30 working hours (180 hours/30)
This module carries 6 credits

Total Workload
180 hours

Course Attendance Time
60 hours

Independent Study Time
120 hours

3. Examination

The Assessment will be divided in two parts.
In the first part the Student has to write a small document in which the resulting model, including input and results is described at the end of the term.
The second part is a written exam. The theoretical part contains 33,3 % and the calculation part 66,6 % of the total points.

Examination Type
Written and Project

Examination Duration
90 minutes

Homework No
Term Paper Yes
Oral Presentation No
Discussion No

Supplementary / Repeat Examinations
Examination(s) can be repeated in the following semester

4. Description

(Recommended) Prerequisites

Intended Learning Outcomes
At the end of the module, students are able to understand the transfer of process flows from natural hydrologic- and nutrient cycles to an ecohydrological software-model. In addition to that they will be able to understand different methods for the calculation of single components of ecohydrological cycles and their interplay. Moreover students will be able to use an ecohydrological model and to analyse model outputs. The students will be able to identify different influencing factors and to evaluate the meaningfulness of model results.

Course Contents
The main goal in this module is to give an comprehensive overview in the main aspects of ecohydrological modeling.
Structure and interaction of different components of an ecohydrological model will be explained as well as associated calculation methods.

Water quality aspects and influencing factors from land use and land management practices will be discussed. Additionally, mathematical descriptions for crop growth and the related water and nutrient demand of different plants will be introduced.

In addition to lectures, students will apply their theoretical knowledge in guided exercises. Using an ecohydrological software model (SWAT) they will setup, calibrate and validate a model for a real catchment.

Teaching and Learning Methods
Lectures (PowerPoint presentations), Exercises

Teaching Aids Employed
PowerPoint presentations, Technical Manuals

Literature

Neitsch, S., J. Arnold, J. Kiniry, and J. Williams (2011). Soil and water assessment tool- theoretical documentation version 2009. Report, Grassland, Soil andWater Research Laboratory – Agricultural Reserach Service, Blackland Research Center - Texas AgriLife Research.

Winchell, M., R. Srinivasan, M. diLuzio, and J. Arnold (2007). ArcSWAT Interface for SWAT2005
- User's Guide http://www.geology.wmich.edu/sultan/5350/Labs/ArcSWAT_ Documentation.pdf: Blackland Research Center and Grassland, Soil and Water Research Laboratory (USDA Agricultural Research Service)

Arnold, J., J. Kiniry, R. Srinivasan, J. Williams, E. Haney, and S. Neitsch (2011). Soil and Water Assessment Tool- Input/Output File Documentation Version 2009. http://swat.tamu.edu/media/19754/swat-io-2009.pdf: Grassland, Soil and Water Research Laboratory, Agricultural Reserach Service, Blackland Research Center Texas AgriLife Research.

5. Organizational Information

Contact Person
Jochen Scholtes MSc, jochen.scholtes@tum.de
Fuad Yassin Msc, ga38yaf@mytum.de

Lecturer (s)
Prof. Dr.-Ing. Markus Disse, markus.disse@tum.de
Jochen Scholtes MSc, jochen.scholtes@tum.de
Fuad Yassin Msc, ga38yaf@mytum.de

Examiner (s)
Prof. Dr.-Ing. Markus Disse, markus.disse@tum.de

Courses

Nature of Instruction:	lecture
Name:	**Hydrological and Environmental River Basin Modelling**
SWS:	**2**
Nature of Instruction:	exercises
Name:	**Hydrological and Environmental River Basin Modelling**
SWS:	**2**

Module Appropriation
Master Environmental Engineer, Field of study 2 and 3