



# **Environmental Engineering**

## **Master's Programme**

### **Modulhandbuch**

Academic Year 2014/2015

**Seminar in Rainfall-Runoff Modelling,  
Seminar Niederschlags-Abfluss Modellierung**

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**1. General Information**

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**Module Number**  
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**Module Name**  
Seminar in Rainfall-Runoff Modelling,  
Seminar Niederschlags-Abfluss Modellierung

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**Module Level (Bachelor or Master)**  
Master

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**Abbreviation**  
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**Subheading**  
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**Duration**  
One semester

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**Language**  
English

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**Frequency**  
WS

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## 2. Workload

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### Total Workload

90 hours (3 ECTS x 30 hours)

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### Course Attendance Time

Approx. 9 lessons

- 1 introductory lesson
- 8 lessons with students presentation and discussion:
  - 25 min of presentation
  - 20 min of discussion, Q/A lead by students

= 2 hours \* 9 = 18 hours

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### Independent Study Time

total workload – attendance time = 72 hours

- Preparation time and homework for every lesson:  
16 topics x 3.5 hours = 56 hours
  - Preparation time for oral presentation:  
approx. 2 days = 16 hours
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## 3. Examination

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### Description of Achievement and Assessment Methods

The students are going to be evaluated on basis of the presentation with following discussion held during one of the lessons, as well as with an oral examination at the end of the semester. Delivery of accompanying homework can be required to pass the module.

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### Examination Type

Presentation

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### Examination Duration

45 min (presentation and discussion)+ 15 min (oral examination)

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<b>Homework</b>	Yes
<b>Term Paper</b>	No
<b>Oral Presentation</b>	Yes
<b>Discussion</b>	Yes

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### Supplementary / Repeat Examinations

The presentation part of the examination cannot be repeated in the following semester. The oral examination can be repeated in the following semester

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## 4. Description

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### (Recommended) Prerequisites

- hydrological fundamentals, e.g. Grundmodul Hydrologie (Bachelor Umweltingenieurwesen TUM)

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### Intended Learning Outcomes

At the end of the module, students are able to:

- Know the theory of different types of rainfall-runoff models
- Understand the concepts that underlie different modelling approaches
- Evaluate models and critically assess the assumptions made

Furthermore the students should learn to:

- Present a topic, as well as to facilitate and lead a discussion about it

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### Course Contents

The course contents are based on the book “Rainfall-Runoff Modelling: The Primer” by Keith Beven from Lancaster University:

“The book provides a primer for the novice and detailed descriptions of techniques for more advanced practitioners. [...] It gives a comprehensive summary of available techniques based on established practices and recent research, [offering] a thorough and accessible overview of the area.”

1. Runoff Processes and the Modelling Process
2. Evolution of Rainfall-Runoff Models
3. Data for Rainfall-Runoff Modelling
4. Predicting Hydrographs Using Models Based on Data
5. Predicting Hydrographs Using Distributed Models Based on Process Descriptions
6. Hydrological Similarity, Distribution Functions and Semi-Distributed Rainfall-Runoff Models
7. Parameter Estimation and Predictive Uncertainty
8. Models for Changing Risk
9. Next Generation Hydrological Models
10. Predictions in Ungauged Basins
11. Water Sources and Residence Times in Catchments
12. Hypotheses, Measurements and Models of Everywhere

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### Teaching and Learning Methods

The module consists of a seminar with an introductory lesson given by the lecturer. The students will form groups of two people and pick a topic they will present in the consecutive lessons. The activities comprise:

- Literature study
  - Summarizing and presenting a topic
  - Guiding and facilitating a discussion on the presented topic
  - Consecutive online tests
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### **Teaching Aids Employed**

- Power-Point-Presentation
  - Textbook
  - Scientific Papers
  - Blackboard
  - Moodle (online tests and forum discussions)
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### **Literature**

- Beven, K. J. Rainfall-Runoff Modelling: The Primer. 2nd ed. Chichester, West Sussex ; Hoboken, NJ: Wiley-Blackwell, 2012.

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## 5. Organizational Information

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### Contact Person

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### Lecturer (s)

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Axel Kasperek, M.Sc. [axel.kasperek@tum.de](mailto:axel.kasperek@tum.de)

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### Examiner (s)

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### Courses

**Nature of Instruction:** Seminar

**Name:** Seminar Rainfall-Runoff Modelling

**SWS:** 2

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### Module Appropriation

Environmental engineering, PhD students

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