

Simulation and Modeling I

WS 2017/2018

Contents and Organization

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Informatik 7 (Rechnernetze und Kommunikationssysteme)



Audience, Language, Lecturer

■ Audience

- computational engineering, bachelor/master
- computer science (Informatik)
- mechanical engineering (Maschinenbau)
- ...

■ Language

- lectures (Vorlesungen) and exercise classes (Übungen) are given in English (individual conversation in German always possible)
- all material is in English

■ Lecturer

- Prof. Dr.-Ing. Reinhard German
- exercise classes + supervised computer hours:
Vitali Schneider and Jonas Schlund

■ Link: <http://www7.cs.fau.de/en/teaching/sm1-2017w/>

Contents

■ Lectures

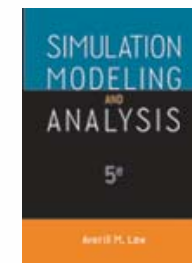
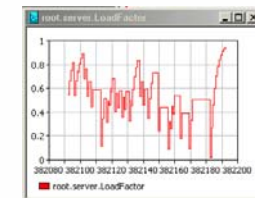
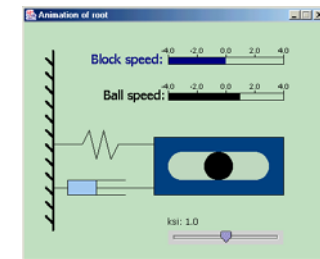
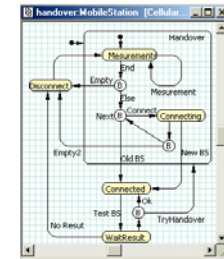
- Introduction to Simulation
- Discrete Simulation
- Analytical Modeling
- Modeling Paradigms (e.g., event/process oriented, queueing systems, Petri nets, UML statecharts)
- Input Modeling (e.g., Distribution Fitting)
- Random Number Generation
- Output Analysis
- Continuous and Hybrid Simulation
- Simulation Software

■ Exercises

- Refresher on Probability Theory (as needed for Simulation)
- Practical experience with various simulation tools

■ Sources

- Averill Law: "Simulation Modeling and Analysis", 5th ed., McGraw Hill, 2014
- Additional material can be found on the homepage



Contents (cont.)

- Exercise classes, supervised computer hours
 - exercises on Tuesday
 - practice of theory, usage of various tools
 - exercise classes for preparation of assignments
 - partly used as supervised computer hours
 - work on assignments in teams
- 7 Assignments
 - Computing with probabilities I, II
 - Modeling in UML with AnyLogic / Coding simulation with SSJ
 - Petri net modeling
 - Data measurements and distribution fitting with ExpertFit
 - Simulation control in AnyLogic
 - Hybrid simulation with AnyLogic
- Supervised computer hours
 - you may practice yourself or in teams
 - in case of questions you may contact the teaching assistant

Organization

- Lectures: **Friday, 10:15-11:45, H16** (Cauerstraße 7/9)
- Exercise classes, computer hours
 - exercise classes: (start on October 24)
Tuesday, 12:15 - 13:45 or 14:15-15:45, room 01.153-113
 - supervised computer hours: (start on October 30)
Monday, 14:00-16:00, room 01.153-113
 - please register yourself for the course via StudOn until October 23, 12 AM
 - registration begins today at 12 AM (equal chances until 14 AM)
 - when registered please also subscribe for an exercise class

Organization (Access data)

■ StudOn registration

- first, register for the course using the password below,
link: https://www.studon.fau.de/crs1952099_join.html
- thereafter, follow "Subscribe for a class" to set your priorities for classes
- places will be filled by lot after registration period is closed

■ Lecture's website

- lecture slides, exercise notes, assignments, news, examination questions
- link: <http://www7.cs.fau.de/en/teaching/sm1-2017w>
- to access downloadable content use:
 - login: **sm1**
 - password: *********

Organization (cont.)

■ Examinations

- all assignments successfully completed
- oral (30 minutes)/written (90 minutes) examination after semester
- and on demand written certifications with or without grade

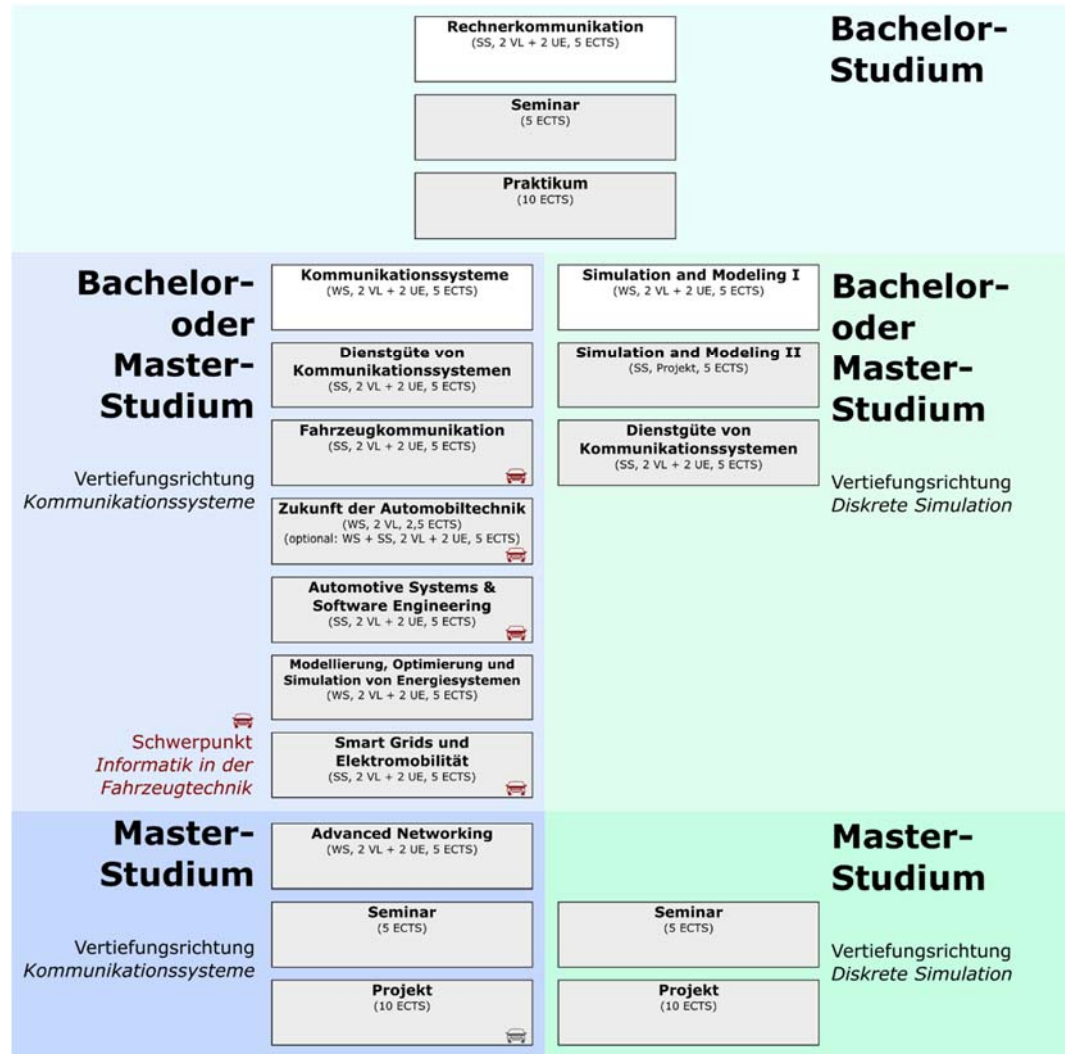
Questions?

Combination with other lectures at Informatik 7

■ Simulation and Modeling II in summer semester

- Project-oriented: teams of three/four
 - project management, presentation, documentation, case studies
 - advanced topics: parallel and distributed simulation, variance reduction techniques, rare event simulation
- Simulation projects
 - former projects: traffic intersection, gas station, bus line, street/garden cafe, university cafeteria, supermarket, drinks terminal, Ferris wheel at Bergkirchweih, ambulance station, smartphone energy management, energy costs for houses with photovoltaics and battery, energy demand of plug-in-hybrid vehicles, industrial Ethernet ...
 - own project ideas are possible

Combination with other lectures at Informatik 7



Furthermore ...

- ... please do not use laptops or smartphones during my lecture – thank you!