Courses in English
Course Description

Department
09 Engineering and Management

Course title
Simulation Technology with MATLAB/SIMULINK

Hours per week (SWS)
3

Number of ECTS credits
4

Course objective
After the completion of this module, students will be capable to
* apply the typical methodology of simulations, i.e. the formulation of real problems in mathematical
models that are solved via appropriate approximation methods
* transfer simplified practical problems to a mathematical model and will be able to compute the solution
of the mathematical problem by a suitable simulation on a computer
* compose and test programs in Matlab/Simulink
* explain selected methods of numerical mathematics that are necessary for different simulations
Furthermore, students will enhance their presentation skills, i.e. they will be able to present
mathematical subjects in an understandable manner.

Prerequisites
Priority to exchange students that are enrolled at the department of Engineering and Management!

Recommended reading
- ALBRIGHT, S. Christian, Wayne L. WINMSTON and Christopher J. ZAPPE, 2010. Data analysis and
- MOLER, B. Cleve, 2008: Numerical computing with MATLAB. 2 edition. Society for Industrial and
Applied Mathematics.
- PIETRUSZKA, Wolf Dieter, 2012. Matlab und Simulink in der Ingenieurpraxis: Modellbildung,
Berechnung und Simulation. 3., bearbeitete und erweiterte Auflage. Wiesbaden: Vieweg+Teubner
ISBN 978-3-8348-1764-9
- STEIN, Ulrich, 2015: Programmieren mit MATLAB: Programmiersprache, Grafische
Benutzeroberflächen, Anwendungen. 5., neu bearbeitete Auflage. München: Hanser. ISBN 978-3-446-
4299-3

Web-Ressources:
- THE MATHWORKS, INC., 2016. MATLAB and Simulink for technical computing: MathWorks
Deutschland. München: The MathWorks GmbH [Zugriff am 27.01.2016]. Available via:
  http://de.mathworks.com/
- THE MATHWORKS, INC., 2016.: MathWorks : MATLAB and Simulink for technical computing. Natick:

Teaching methods
Lectures with PC based exercises (in MATLAB/SIMULINK), work on case studies and presentation of
the results

Assessment methods
assignment and presentation, class participation during presentation part (70%)

Language of instruction
English

Name of lecturer
Prof. Dr. rer. nat. Thomas Stumpp

Email

Link

Course content
Part 1: Lecture
* Introduction to Matlab and Simulink
* Introduction to numerical mathematics via concrete case studies
* Modeling and methodology in simulations of dynamic systems with ordinary differential equations
* Simulation by Monte Carlo Methods
* Modeling and methodology in discrete optimization (on the example of linear programming)

Part 2: Presentations
* Students chose a topic from the previously named areas
* Topics must be problems that cannot be solved by standard spread sheet methodologies
* Allowed group sizes for the work on one topic are one, two or three persons.

Remarks