

Module description: Computer Science Tools			
Module Code	t.BA.XXI.TOOLS.19HS		
ECTS Credits	2		
Language of Instruction/Examination	German		
Organizational Unit	IEFE		
Module Coordinator	Andreas Heinzlmann		
Legal Framework	The module description is part of the legal basis in addition to the general academic regulations. It is binding. During the first week of the semester a written and communicated supplement can specify the module description in more detail.		
Module Characteristic	Type 1a 2 lecture lessons per semester week and class		
Module Description	Students learn to solve technical and numerical problems scientifically using MATLAB software, to prepare, analyze and present data and to document them. They will be able to visualize mathematical relationships, prepare graphics for technical documentation, graphically represent and simulate systems with differential equations and solve symbolic equation systems. This course includes an introduction to Boolean algebra with logical variables and state machines. An overview of common open source software tools for simulation is given.		
Module Content	<ul style="list-style-type: none"> • 1. MATLAB • - Variables, operations and functions • - scripts and live scripts • - In/Out-operations • - Matrix and vector operations • - Data preparation and graphics functions • 2. Simulink • - Block diagram • - Set up of a simulation from the differential equations • - Fcn-Block • - Practical examples from the Mechanics, Environment and Energy, Aviation • 3. Interaction MATLAB / Simulink • - Data transfer between MATLAB and Simulink • - Simulationen iteration • 4. MATLAB-Programing • - Procedures • - Functions • 5. Symbolic Calculations • 6. Introduction to the Boolean Algebra • - logical Variables and Stateflow • 7. Introduction to the Open Source Tools 		
Prerequisite Knowledge			
Learning Objectives (Competences)	Students...	Competencies	Taxonomies
	can carry out numerical, symbolic and Boolean calculations with MATLAB	M, F	K2, K3
	can prepare and graphically display data.	F, M	K2, K3, K4
	can program functions and procedures in MATLAB	F	K2, K3
	can model and simulate systems in MATLAB SIMULINK	F, M	K2, K3, K4, K5
	are able to realize the interaction between MATLAB and SIMULINK	F	K2, K3

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Performance Assessment	End-of-module exam	Assessment	Length (min.)	Weighting	Form	
	written exam	Grade	90	70	acc. to module agreement	
	Performance assessment during the semester					
	written exam	Grade	20	15	acc. to module agreement	
	written exam	Grade	20	15	acc. to module agreement	
Classroom Attendance Requirement	None					
Learning material	<ul style="list-style-type: none"> • Angermann, A. (2021). MATLAB – Simulink – Stateflow Grundlagen, Toolboxen, Beispiele. 10 Edition. Berlin / Germany: De Gruyter Studium. ISBN 9783110636420. • Collection of videos on the various teaching topics 					
Comments						