

Module Description Computer Simulation in Automotive Engineering

Name of module:	Computer Simulation in Automotive Engineering
Keywords:	Dynamic systems simulation, MATLAB/ SIMULINK,
Module number:	Not compulsory
Target groups:	3- 7 semester exchange students
ECTS Credits:	4
Language of instructions:	English
Module owner:	Prof. Dr.-Ing. Thomas Schirle
Last update:	17 January 2023

Extent of work (hours)

Workload	Contact hours	Self-Study	Exam Preparation
80	40	20	20

Prerequisites:	<ul style="list-style-type: none"> Mathematics (desirable but not mandatory): solution of systems of linear ODEs, eigenvalues and eigenvectors Engineering mechanics, linear vibration theory Basic Computer programming (desirable but not mandatory): any programming language
Total target:	<ul style="list-style-type: none"> To understand basic concepts, strength and weaknesses of dynamic systems simulation in the design process To apply software for programming and dynamic system simulation (MATLAB/ SIMULINK) To gain insight into possible numerical effects and suitable solver methods
Module contents:	<ul style="list-style-type: none"> Apply basic mathematical modeling techniques Learn about block oriented modeling Translate the mathematical models into e.g. Matlab scripts and Simulink models. Learn about various numerical solution methods for nonlinear differential system equations. Get valuable practical experience by applying this knowledge in multiple lab exercise projects covering e.g. vertical car body dynamics, automotive shock absorbers and active hydraulic suspension systems with road profile preview.
Reference material:	Lecture notes
Offered:	Winter semester
Relevance for other study programmes:	Electrical Engineering, Mechatronics

Submodules and assessments

Type of instruction/ form of learning:	Lectures, practices and exam preparation
Duration:	12 weeks: September/October – December
Hours per week:	4
Aims, learning outcomes:	See above
Estimated student workload:	40
Type of Assessment:	Written Midterm and Final exam (2x 60 min) (graded)
Number of participants:	Due to the limited number of participants, please register in advance by email to: kremena.daneva@hs-esslingen.de