



Module name	<b>Simulation Methods for Mechanical Systems</b>
Module coordinator/ Responsible for the module	Prof. Dr.-Ing. G. Weidner
Qualification goals	<p>Students should be able to model the kinematic and dynamic behavior of machines and vehicles as well as their subsystems. They should understand how multi-body systems work and be able to apply them to typical problems in mechanical engineering and critically evaluate the simulation results.</p> <p>On completion of this course, the students should be able to model the kinematic and dynamic behavior of machines and vehicles. They should understand how Multy-Body-Systems are operating and apply them to typical problems of mechanical engineering and evaluate the simulation results critically.</p>
Module contents	<p>Fundamentals of modeling, numerical solution of an equation of motion, bodies (mass and inertia tensor), kinematic bonds, dynamic bonds, kinematic drives, dynamic drives, friction, damping, examples of computational and experimental analysis of linear and especially non-linear systems.</p> <p>Basic principles of modeling, numerical solution of equations of motion, bodies (mass and moment of inertia tensor), kinematic constraints, dynamic constraints, kinematic drives, dynamic drives, friction, damping, practical examples of calculative and experimental analysis of linear and non-linear systems.</p>
Teaching methods	Lecture: 2 SWS; exercises on the computer: 2 SWS; project work. Lecture: 2 h; computer Exercises: 2 h; individual project work
Requirements for participation	Basic knowledge of technical mechanics. In particular kinematics and dynamics of rigid bodies. Basic knowledge in technical mechanics, particularly kinematics and dynamics of rigid bodies.
Literature/ multimedia teaching and learning programs	Textbooks on kinematics, dynamics and machine dynamics Textbooks on kinematics, dynamics and machine dynamics.
Textbook author	
Usability	Master's degree program in Mechatronics & Robotics
Workload/ Total workload	150 h
ECTS and weighting of the grade in the overall grade	5 ECTS Weighting: 5/90
Proof of performance	Written examination with the aid of a multi-body program; a graded, individually prepared project work is a prerequisite for the examination. Written examination (with the use of a Multy-Body-System) and a graded individual project work
Semester	in the winter semester
Frequency of the offer	every academic year
Duration	one semester
Type of course (compulsory, optional, etc.)	Compulsory elective module
Special	