

Module Name	Kinematics and Strength of Materials Advanced
Module Number	Eul-MT-C-VKF
Responsible Lecturer	Prof. Dr.-Ing. Michael Beitelschmidt michael.beitelschmidt@tu-dresden.de
Qualification Objectives	Students master the fundamentals of the structure, composition, and kinematic analysis of simple planar mechanisms. They are proficient in describing spatial kinematics of coordinate systems and rigid bodies using transformation matrices and vectors. Students can formulate and apply equations of motion for spatial rigid body movements. Upon completion of the module, students are proficient in spatial statics and the general bending theory of beams. They are familiar with general stress and strain states, can apply energy methods such as Castigliano's theorem, and have an understanding of the finite element method. Additionally, they can calculate rotationally symmetric stress states and evaluate them using strength hypotheses. Furthermore, they are familiar with the general fundamental equations of linear elasticity theory.
Contents	The module includes an introduction to mechanism technology, advanced topics in spatial kinematics and kinetics of rigid bodies, as well as in-depth topics in strength of materials, particularly energy methods, multi-axial stress states, and linear elastic global problems.
Teaching and Learning Forms	2 hours per week of lectures, 2 hours per week of exercises, and self-study.
Prerequisites for Participation	The competencies acquired in the modules Introduction to Analysis and Algebra, Multidimensional Differential and Integral Calculus, Materials, Engineering Mechanics, Physics, and Fundamentals of Kinematics and Kinetics are required.
Usability	The module is a compulsory module of the main study program in the diploma program Mechatronics. It creates the prerequisites for the modules that list this module in the field "Prerequisites for Participation."
Prerequisites for the Award of Credit Points	Credit points are awarded when the module examination is passed. The module examination consists of a written exam lasting 180 minutes.
Credit Points and Grades	5 credit points can be earned through the module. The module grade corresponds to the grade of the examination performance.
Frequency of the Module	The module is offered every winter semester.
Workload	The total workload is 150 hours.
Duration of the Module	The module lasts one semester.