

Course number: SET 11430 Machine Dynamics Study Level: Bachelor / Undergraduate

Prof. Dr. Burkhard Lege Language of Instruction: English ECTS Credits: 5

Subject-specific competencies:

- The students know the basics of dynamics, in particular the calculation of accelaration, speed and forces or moments of moving objects.
- They are able to aply this knowledge to engineering problems and thus determine dimensions for the design of components and drives.

Methodological competencies:

- The students will learn to model real systems, in particular systems that have to be described physically and mathematically with differential equations.
- They will learn to interpret them and to solve or simulate them with respect to selected problems.

Personal competencies:

- The students will understand how dynamics (subject of this module) and statics, strength of materials theory and drive technology, as well as design technology (contents of related modules) are interlinked in order to design machines or components in a functionally appropriate manner.
- Some of the examples examined concern future-oriented technologies, e.g. from electromobility or experimental transportation systems (e.g. Hyperloop), thus broadening the students' knowledge horizon.

Teaching content:

- Basic concepts
- Kinematics in Cartesian coordinates and polar coordinates
- Moment of inertia
- Kinetics, in particular Newton's laws
- Modeling of systems with one degree of freedom with differential equations
- Modeling systems with multiple degrees of freedom with differential equations
- Solving these problems with various constraints