Module title		SM Code
Mechanical Engineering		**TM**
Module lecturer	**Faculty**	
N.N.	Electrical Engineering and Information Technology	
Module language	**Number of SWS / WSH**	**ETCS credits**
English	4 SWS / WSH	5
Teaching format		
Seminar-based teaching with approx. 25% - 30% exercises		

Semester according to the study plan	
2nd semester (Bachelor)	
Attendance/classroom hours	**Additional independent study**
56 hours	Preparation and follow-up work: 62 hours Exam preparation: 32 hours
Type of examination / Requirements for the award of the credit points	
Written exam: 90 minutes	

Teaching content

Stereostatics:

- Basic concepts, fundamental axioms and principles, section principle
- Force systems on rigid bodies, center of force, center of gravity
- Equilibrium
- Support and joint reactions in flat structures
- Shear reactions in ropes, rods, beams, frames, and arches
- Coulomb friction
- Stresses, deformations, distortions, Hooke's law

Elastostatics:

- Stresses and deformations under tensile and compressive loading
- Thermal expansion and thermal stress
- Stresses and deformations in straight bending, shear, and torsion of straight components
- Statically indeterminate systems
- Stress superposition, equivalent stress, and strength hypotheses

Kinematics:

- Linear and general motion of a point
- General motion of rigid bodies
- Coupled motion of systems Rigid bodies, constraints

Kinetics:

- Fundamental law of dynamics
- Law of momentum, law of angular momentum, law of work, and law of energy for the mass point
- Rotation of rigid bodies, moments of inertia
- Law of momentum, law of angular momentum, law of work, and law of energy for rigid bodies
- Principle of d'Alembert
- Introduction to mechanical oscillations

Learning objective: Professional competence

After successfully completing this module, students will be able to

- describe the basic principles of stereo- and elastostatics, the motion of mass points and rigid bodies (1)
- specify the scope of validity of the developed solutions defined by assumptions and prerequisites (2)
- create simple static equivalent models and use them to determine unknown variables (e.g., bearing and section reactions) with the help of equilibrium conditions (2)
- scale simple, statically loaded structures with regard to deformation and strength (2)
- to deal with dynamic problems by formulating and solving the basic kinematic and kinetic equations (2)

- solve simple mechanical problems independently (3)
- understand, evaluate, and discuss complex mechanical tasks (3)

Literature

Recommended reading

- Hahn, H. G. (1993). *Technische Mechanik*. Hanser-Verlag
- Gross, D., Hauger, W., Schröder, J., & Wall, W. A. (2013). *Technische Mechanik*. Springer-Verlag
- Altenbach, H. (2014). *Holzmann/Meyer/Schumpich Technische Mechanik Festigkeitslehre*. Springer-Verlag

The numbers in brackets indicate the levels to be achieved: (1)-know | (2)-can | (3)-understand and apply