

Module Handbook

TUK MODHB Homepage

Notes on the module handbook of the department Mechanical and Process Engineering

Die hier dargestellten veröffentlichten Studiengang-, Modul- und Kursdaten des Fachbereichs Maschinenbau und Verfahrenstechnik ersetzen die Modulbeschreibungen im KIS und wurden mit Ausnahme folgender Studiengänge am 28.10.2020, bzw. am 13.01.2021 verabschiedet.

Ausnahmen:

- BEd. Lehramt Metalltechnik (Stand WS 19/20): https://www.mv.uni-kl.de/fileadmin/mv/Studium_Lehre/Modulhandbuecher/MHB_Bachelor_Lehramt_Metalltechnik.pdf
- MEd. Lehramt Metalltechnik Werkstoffe und Fertigung (Stand WS 19/20): https://www.mv.uni-kl.de/fileadmin/mv/Studium_Lehre/Modulhandbuecher/MHB_Master_Lehramt_Metalltechnik_-_Werkstoffe_und_Fertigung.pdf
- MEd. Lehramt Metalltechnik Maschinen- und Fahrzeugtechnik (Stand WS 19/20): https://www.mv.uni-kl.de/fileadmin/mv/Studium_Lehre/Modulhandbuecher/MHB_Master_Lehramt_Metalltechnik_-_Fahrzeugtechnik.pdf
- MEd. Lehramt Metalltechnik Verfahrenstechnik (Stand WS 19/20): https://www.mv.uni-kl.de/fileadmin/mv/Studium_Lehre/Modulhandbuecher/MHB_Master_Lehramt_Metalltechnik_-_Verfahrenstechnik.pdf

Course MV-TM-86003-K-4

Engineering Mechanics III (3V+1U, 5.0 LP)

Course Type

SWS	Type	Course Form	CP (Effort)	Presence-Time / Self-Study
-	K	Lecture with exercise classes (V/U)	5.0 CP	94 h
3	V			42 h
1	U			14 h
(3V+1U)			5.0 CP	56 h 94 h

Basedata

SWS	3V+1U
CP, Effort	5.0 CP = 150 h
Position of the semester	1 Sem. in WiSe
Level	[4] Bachelor (Specialization)
Language	[DE] German
Lecturers	Sator, Christian, Dr.-Ing. (WMA DEPT: MV)
Area of study	[MV-LTM] Applied Mechanics
Additional informations	Informations about the course
Lifecycle-State	[NORM] Active

Notice

In addition to lectures and exercises, the Chair of Applied Mechanics offers tutorials and student consultation hours. (Dates: see OLAT)

Contents

- kinetics of particles and rigid bodies
- velocity and acceleration (Cartesian, polar, and natural coordinates)
- plane motion of rigid bodies (instantaneous center of rotation)
- dynamics of particles and particle systems (principle of linear and angular momentum, principle of work and energy, impact, gravitation, planetary motion)
- dynamics of rigid bodies (principle of linear and angular momentum, principle of work and energy, mass moment of inertia, impact, Euler rotation equations)
- principles of mechanics (D'Alembert's principle)
- relative motion (kinematics and kinetics)

Competencies / intended learning achievements

1. Lecture

Students are able to

- define velocity and acceleration
- analyze the kinematics of particles and rigid bodies
- formulate the equations of motion for particles, system of particles and rigid bodies
- solve the equations of motion via integration
- formulate the equations of motion via d'Alembert's principle
- analyze motion in moving frames of reference

2. Tutorial

Students are able to

- compute velocity and acceleration states in different coordinate systems
- apply the principle of linear and angular momentum as well as the principle of work and energy to particles, particle systems, and rigid bodies
- formulate the equations of motion via free body diagrams or d'Alembert's principle
- compute motions by solving the equations of motion considering initial conditions

- analyze impacts
- formulate kinetic equations in moving frames of reference
- present and discuss their results among themselves

Literature

- Gross, Hauger, Schröder, Wall: Technische Mechanik 3 – Kinetik, Springer
- Gross, Ehlers, Wriggers, Schröder, Müller: Formeln und Aufgaben zur Technischen Mechanik 3 – Kinetik, Hydrodynamik, Springer
- Hagedorn: Technische Mechanik 3 – Dynamik, Verlag Harri Deutsch

Materials

For further information and course materials please consider the corresponding OLAT-course.

Registration

Registration for the tutorials in the corresponding OLAT course.

Requirements for attendance (informal)

Modules:

- [MV-TM-7-M-1] Engineering Mechanics I (M, 5.0 LP)

Requirements for attendance (formal)

None

References to Course [MV-TM-86003-K-4]

Module	Name	Context	
[MV-TM-9-M-4]	Engineering Mechanics III	P: Obligatory	3V+1U, 5.0 LP