

Module Handbook (<https://modhb.uni-kl.de/>)

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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 verabschiedet.

Ausnahmen:

- BSc. Bio- und Chemieingenieurwissenschaften (Stand WS 20/21): https://www.mv.uni-kl.de/fileadmin/mv/Studium_Lehre/Modulhandbuecher/MH_BSc_BCI.pdf (https://www.mv.uni-kl.de/fileadmin/mv/Studium_Lehre/Modulhandbuecher/MH_BSc_BCI.pdf)
- BEd. Lehramt Metalltechnik (Stand WS 19/20): https://www.mv.uni-kl.de/fileadmin/mv/Studium_Lehre/Modulhandbuecher/MHB_Bachelor_Lehramt_Metalltechnik.pdf (https://www.mv.uni-kl.de/fileadmin/mv/Studium_Lehre/Modulhandbuecher/MHB_Bachelor_Lehramt_Metalltechnik.pdf)
- MSc. Bio- und Chemieingenieurwissenschaften (Stand WS 20/21): https://www.mv.uni-kl.de/fileadmin/mv/Studium_Lehre/Modulhandbuecher/MH_Msc_BCI.pdf (https://www.mv.uni-kl.de/fileadmin/mv/Studium_Lehre/Modulhandbuecher/MH_Msc_BCI.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 (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 (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 (https://www.mv.uni-kl.de/fileadmin/mv/Studium_Lehre/Modulhandbuecher/MHB_Master_Lehramt_Metalltechnik_-_Verfahrenstechnik.pdf)

Module MV-TM-55-M-4

Elements of Applied Mechanics II (M, 5.0 LP)

Module Identification

Module Number	Module Name	CP (Effort)
MV-TM-55-M-4	<i>Elements of Applied Mechanics II</i>	5.0 CP (150 h)

Basedata

CP, Effort	5.0 CP = 150 h
Position of the semester	1 Sem. in SuSe
Level	[4] Bachelor (Specialization)
Language	[DE] German
Module Manager	Sator, Christian, Dr.-Ing. (WMA DEPT: MV) (/staff/84/)
Lecturers	Sator, Christian, Dr.-Ing. (WMA DEPT: MV) (/staff/84/)
Area of study	[MV-LTM] Applied Mechanics
Reference course of study	[MV-82.B10-SG] B.Sc. Energy and Process Engineering (/mhb/FB-MV/cos-528/)
Lifecycle-State	[NORM] Active

Courses

Type/SWS	Course Number	Choice in Module-Part	SL	PL	CP	Sem.
2V+1U	MV-TM-86021-K-4 (/mhb/courses/MV-TM-86021-K-4/)	P	-	PL1	5.0	SuSe

- About **[MV-TM-86021-K-4]**: Title: "Elements of Applied Mechanics II"; Presence-Time: 42 h; Self-Study: 108 h

Examination achievement PL1

- Form of examination: **written exam (Klausur) (75-105 Min.)**
- Examination Frequency: each semester
- Examination number: 10021 ("Elements of Applied Mechanics II")

Evaluation of grades

The grade of the module examination is also the module grade.

Contents

From **[MV-TM-86021-K-4] Elements of Applied Mechanics II** (/mhb/courses/MV-TM-86021-K-4/):

- kinetics of particles and rigid bodies
- velocity and acceleration (Cartesian, polar, and natural coordinates)
- plane motion of rigid bodies (instantaneous center of rotation)
- relative motion (kinematics)
- 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)

Competencies / intended learning achievements

From **[MV-TM-86021-K-4] Elements of Applied Mechanics II** (/mhb/courses/MV-TM-86021-K-4/):

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
- analyze motion in moving frames of reference

2. Tutorial

Students are able to

- compute velocity and acceleration states in different coordinate systems
- compute velocity and acceleration states with respect to moving frames of reference
- 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
- 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

From [MV-TM-86021-K-4] Elements of Applied Mechanics II (/mhb/courses/MV-TM-86021-K-4/):

- 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

Requirements for attendance (informal)

Modules:

- [MV-TM-54-M-4] Elements of Applied Mechanics I (M, 6.0 LP) (/mhb/modules/MV-TM-54-M-4/)

Requirements for attendance (formal)

None

References to Module / Module Number [MV-TM-55-M-4]

Course of Study	Section	Choice/Obligation
[EIT-82.781-SG#2019] B.Sc. Electrical and Computer Engineering [2019] (/mhb/FB-EIT/cos-523/)	Major-Specific Advanced Subjects	[P] Compulsory
[EIT-82.781-SG#2019] B.Sc. Electrical and Computer Engineering [2019] (/mhb/FB-EIT/cos-523/)	Major-Specific Advanced Subjects	[P] Compulsory
[EIT-82.?-SG#2021] B.Sc. Electrical and Computer Engineering [2021] (/mhb/FB-EIT/cos-685/)	Major-Specific Advanced Subjects	[P] Compulsory
[EIT-82.?-SG#2021] B.Sc. Electrical and Computer Engineering [2021] (/mhb/FB-EIT/cos-685/)	Major-Specific Advanced Subjects	[P] Compulsory
[MV-82.B10-SG] B.Sc. Energy and Process Engineering (/mhb/FB-MV/cos-528/)	Ingenieurwissenschaftliche Grundlagen I	[P] Compulsory
[WIW-82.789-SG] B.Sc. Business Studies with Technical Qualifications (/mhb/FB-WIW/cos-524/)	Field of study Mechanical Engineering	[P] Compulsory
[WIW-82.179-SG] B.Sc. Business Administration and Engineering specialising in Mechanical Engineering (/mhb/FB-WIW/cos-515/)	Field of study Mechanical Engineering	[P] Compulsory
[WIW-82.?-SG#2021] B.Sc. Business Studies with Technical Qualifications 2021 [2021] (/mhb/FB-WIW/cos-682/)	Technical Profile Area	[P] Compulsory
[WIW-82.?-SG#2021] B.Sc. Business Administration and Engineering specialising in Mechanical Engineering 2021 [2021] (/mhb/FB-WIW/cos-690/)	Engineering	[P] Compulsory
Module-Pool	Name	
[MV-BCI-BSc-MV-MPOOL-4 (/mhb/modulepools/MV-BCI-BSc-MV-MPOOL-4/)]	Wahlpflichtmodule MV für Bachelor BCI	