

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-142-M-4

Continuum Mechanics (M, 6.0 LP)

Module Identification

Module Number	Module Name	CP (Effort)
MV-TM-142-M-4	<i>Continuum Mechanics</i>	6.0 CP (180 h)

Basedata

CP, Effort	6.0 CP = 180 h
Position of the semester	1 Sem. in WiSe
Level	[4] Bachelor (Specialization)
Language	[DE] German
Module Manager	Müller, Ralf, Prof. Dr.-Ing. (PROF DEPT: MV) (/staff/83/) 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-82.103-SG] B.Sc. Mechanical Engineering (/mhb/FB-MV/cos-508/)
Lifecycle-State	[NORM] Active

Courses

Type/SWS	Course Number	Choice in Module-Part	SL	PL	CP	Sem.
3V+1U	MV-TM-86005-K-4 (/mhb/courses/MV-TM-86005-K-4/)	P	-	PL1	6.0	WiSe

- About **[MV-TM-86005-K-4]**: Title: "Continuum Mechanics"; Presence-Time: 56 h; Self-Study: 124 h

Examination achievement PL1

- Form of examination: **oral examination (45-60 Min.)**
- Examination Frequency: each semester
- Examination number: 10005 ("Continuum Mechanics")

Evaluation of grades

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

Contents

From **[MV-TM-86005-K-4] Continuum Mechanics** (/mhb/courses/MV-TM-86005-K-4/):

- Basic concepts of (linear) continuum mechanics
- Stress and Equilibrium
- Deformation and Strains
- Material Behaviour (Linear Elastic Solid)
- Two-Dimensional Problems (Plane Strain / Plane Stress / Airy Stress Function / Problem Solution)
- Plate Theory
- Three-Dimensional Problems
- Variational Principles and Energy Methods

Competencies / intended learning achievements

From **[MV-TM-86005-K-4] Continuum Mechanics** (/mhb/courses/MV-TM-86005-K-4/):

1. Lecture
 - Students are familiar with basic concepts and fundamental quantities of continuum mechanics

- Students are able to explain concepts of Stresses and Strains
- Students are familiar with the material behaviour of (linear) elastic materials
- Students are able to formulate boundary value problems
- Students are able to explain the deformational behaviour of plane and plate problems
- Students are able to explain and use variational principles and energy methods in order to solve boundary value problems of elastic materials

2. Assignments

- Students are familiar with basic concepts and fundamental quantities of continuum mechanics
- Students are able to explain concepts of Stresses and Strains
- Students are familiar with the material behaviour of (linear) elastic materials
- Students are able to formulate boundary value problems
- Students are able to analyse the stress and strain states of plane and plate problems
- Students are able to explain and use variational principles and energy methods in order to solve boundary value problems of elastic materials
- Students are able to explain and discuss their results and implementations to other participants

Literature

From [MV-TM-86005-K-4] Continuum Mechanics (/mhb/courses/MV-TM-86005-K-4/):

- Becker, Gross: Mechanik elastischer Körper und Strukturen, Springer
- Eschenauer, Schnell: Elastizitätstheorie I, B.I. Wissenschaftsverlag
- Gurtin: The linear theory of elasticity, Truesdell, Clifford A.
- Holzapfel: Nonlinear Solid Mechanics – A Continuum Approach for Engineering, Wiley
- Kienzler, Schröder: Einführung in die Höhere Festigkeitslehre, Springer
- Fung Tong: Classical and Computational Solid Mechanics, World Scientific
- R. Ogden: Non-linear elastic deformations, Dover Publications 1984

Requirements for attendance (informal)

Basic knowledge of higher mathematics and

Modules:

- [MV-TM-7-M-1] Applied Mechanics I (M, 5.0 LP) (/mhb/modules/MV-TM-7-M-1/)
- [MV-TM-8-M-4] Applied Mechanics II (M, 5.0 LP) (/mhb/modules/MV-TM-8-M-4/)

Requirements for attendance (formal)

None

References to Module / Module Number [MV-TM-142-M-4]

Course of Study	Section	Choice/Obligation
[MV-82.103-SG] B.Sc. Mechanical Engineering (/mhb/FB-MV/cos-508/)	KF5: Computational Engineering (if chosen)	[P] Compulsory