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 wuden 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-MTS-B102-M-4

Electrical Engineering for Mechanical Engineering (M, 7.0 LP)

Module Identification

Module Number	Module Name	CP (Effort)
MV-MTS-B102-M-4	*Electrical Engineering for Mechanical Engineering*	7.0 CP (210 h)
MV-PAK-B102-M-4	*Electrical Engineering for Mechanical Engineering*	7.0 CP (210 h)
MV-BEMT-3-M-4	*Electrical Engineering for Mechanical Engineering*	7.0 CP (210 h)

Hint concerning Module MV-PAK-B102-M-4:

Number is still listed in examination regulations.

Hint concerning Module MV-BEMT-3-M-4:
Number for Bachelor of Education of Metals Technology

Basedata

CP, Effort	7.0 CP = 210 h
Position of the semester	**2** Sem. from WiSe
Level	[4] Bachelor (Specialization)
Language	[DE] German
Module Manager	Seewig, Jörg, Prof. Dr.-Ing. (PROF | DEPT: MV) (/staff/326/)
Lecturers	Seewig, Jörg, Prof. Dr.-Ing. (PROF | DEPT: MV) (/staff/326/)
Area of study	[MV-MTS] Measurement and Sensor Technology
Reference course of study	[MV-82.103-SG] B.Sc. Mechanical Engineering (/mhb/FB-MV/cos-508/)
Livecycle-State	[NORM] Active

Courses

Type/SWS	Course Number	Choice in Module-Part	SL	PL	CP	Sem.
2V+1U	**MV-MTS-86556-K-4** (/mhb/courses/MV-MTS-86556-K-4/)	P	-	PL1	4.0	WiSe
2V+1U	**MV-MTS-86551-K-4** (/mhb/courses/MV-MTS-86551-K-4/)	P	-	PL1	3.0	SuSe

- About **[MV-MTS-86556-K-4]**: Title: "Electrical Engineering for Mechanical Engineers I"; Presence-Time: 42 h; Self-Study: 78 h
- About **[MV-MTS-86551-K-4]**: Title: "Electrical Engineering for Mechanical Engineers II"; Presence-Time: 42 h; Self-Study: 48 h

Examination achievement PL1

- Form of examination: **written exam (Klausur) (180-210 Min.)**
- Examination Frequency: each semester
- Examination number: 20108 ("Electrical Engineering for Mechanical Engineers I, II")

Evaluation of grades

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

Contents

From [MV-MTS-86556-K-4] Electrical Engineering for Mechanical Engineers I (/mhb/courses/MV-MTS-86556-K-4/)**:**

- System of units
- Physical principles
- Direct current circuits
- Analysis of simple networks

- Measuring bridges
- Electrical field
- (Electro)magnetic field
- Alternating current circuits
- Three-phase current
- Transformers
- Filters
- Quadripoles
- Oscillating circuits

From [MV-MTS-86551-K-4] Electrical Engineering for Mechanical Engineers II (/mhb/courses/MV-MTS-86551-K-4/):

- Non-linear resistances and semiconductor diodes
- Bipolar transistors, field-effect transistors, thyristors
- Circuits with bipolar transistors
- Structural design technology
- Operational amplifier
- Electrical measurement technology
- Logical circuits and microcomputer technology
- Digital-analog converter and analog-digital converter
- Electrical drives
- Introduction to electrical simulations (PSPICE)

Competencies / intended learning achievements

From [MV-MTS-86556-K-4] Electrical Engineering for Mechanical Engineers I (/mhb/courses/MV-MTS-86556-K-4/):

1. Lecture

Students are able to

- Implement basic terminology of electronics
- Name and explain the passive components
- Name different methods for the analysis of electrical networks
- Explain the properties of electrical and electromagnetic fields
- Explain the application of periodic voltages and currents
- Explain the application of three-phase systems
- Explain the mode of operation and mathematical description of transformers
- Describe the networks with the aid of impedances
- Derive amplitude and phase responses of filters
- Explain and design oscillation circuits

2. Practice

Students are able to

- Calculate electrical networks on the basis of different procedures
- Determine electrical and electromagnetic fields
- Calculate impedances in any electrical network
- Analyze strains in a three-phase system
- Design oscillation circuits
- Determine the transmission ratios of a transformer
- Derive amplitude and phase responses of filters
- Describe networks with quadripole matrices

From [MV-MTS-86551-K-4] Electrical Engineering for Mechanical Engineers II (/mhb/courses/MV-MTS-86551-K-4/):

1. Lecture

Students are able to

- Deal with and apply non-linear resistances and ordinary semiconductor diodes
- Understand and use different types of diodes Refer to the contents for the different types of diodes
- Work with bipolar transistors in the large and small signal range Refer to the contents for the circuits with bipolar transistors
- Work with field-effect transistors (J-FET and MOS-FET) in the large and small signal range
- Apply the principle of negative feedback with the operational amplifier and its applications. The same applies to the principle of positive feedback
- Set up and understand logical circuits with combinational circuits and sequential circuits
- Explain the process of digital-analog implementation and analog-digital implementation. The students will also be able to apply the Nyquist's and Shannon's scan theorem

2. Practice

Students are able to

- Calculate Z diodes and other diode types applying non-linear resistances and ordinary semiconductors as well as to set up and analyze electrical circuits
- Work with and calculate bipolar transistors in the large and small signal range. The students will also be able to create their own circuits with bipolar transistors.
- Work with field-effect transistors (J-FET and MOS-FET) in the large and small signal range. The students will also be able to create their own circuits with FET
- Calculate and apply the principle of negative feedback with the operational amplifier and its applications. The students will also be able to derive differential equations from electrical circuits and recreate differential equations with operational amplifiers
- Set up logical circuits with combinational circuits and create the simplest possible circuit with the aid of a KV map. The students will also be able to explain how synchronous flip-flop circuits work
- Calculate electrical circuits with a digital-analog converter and an analog-digital converter and apply them

For Bachelor students majoring in education for metallurgy vocational-technical schools:

The students understand the essential fundamentals of electrical engineering and its application in technology, particularly in the fields relevant for vocational-technical schools, and they can apply the fundamental methodology of electrical engineering.

Literature

From [MV-MTS-86556-K-4] Electrical Engineering for Mechanical Engineers I (/mhb/courses/MV-MTS-86556-K-4/):

- Tietze, Schenk: Halbleiterschaltungstechnik
- Schrüfer: Elektrische Messtechnik
- Lerch: Elektrische Messtechnik

From [MV-MTS-86551-K-4] Electrical Engineering for Mechanical Engineers II (/mhb/courses/MV-MTS-86551-K-4/):

- Tietze, Schenk: Halbleiterschaltungstechnik
- Schrüfer: Elektrische Messtechnik
- Lerch: Elektrische Meßtechnik

Requirements for attendance (informal)

Modules:

- [MAT-00-01-M-1] Higher Mathematics I (M, 8.0 LP) (/mhb/modules/MAT-00-01-M-1/)
- [MAT-00-02-M-1] Higher Mathematics II (M, 8.0 LP) (/mhb/modules/MAT-00-02-M-1/)

Requirements for attendance (formal)

None

References to Module / Module Number [MV-BEMT-3-M-4]

Course of Study	Section	Choice/Obligation
[MV-47.108-SG] B.Ed. LaBBS Metals Technology (/mhb/FB-MV/cos-599/)	Lehramt an berufsbildenden Schulen	[P] Compulsory
[MV-B5.108-SG] ZEP LaBBS Metals Technology (/mhb/FB-MV/cos-666/)	Lehramt an berufsbildenden Schulen	[P] Compulsory

References to Module / Module Number [MV-MTS-B102-M-4]

Course of Study	Section	Choice/Obligation
[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

References to Module / Module Number [MV-PAK-B102-M-4]

Course of Study	Section	Choice/Obligation
[MV-82.103-SG] B.Sc. Mechanical Engineering (/mhb/FB-MV/cos-508/)	Ingenieurwissenschaftliche Grundlagen I (IWG I)	[P] Compulsory
[MV-82.814-SG] B.Sc. Mechanical Engineering with a minor in Economics (/mhb/FB-MV/cos-525/)	Ingenieurwissenschaftliche Grundlagen I	[P] Compulsory
[MV-82.B10-SG] B.Sc. Energy and Process Engineering (/mhb/FB-MV/cos-528/)	Ingenieurwissenschaftliche Grundlagen I	[P] Compulsory
[WIW-82.?-SG#2021] B.Sc. Business Administration and Engineering specialising in Mechanical Engineering 2021 [2021] (/mhb/FB-WIW/cos-690/)	Engineering	[WP] Compulsory Elective