

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-SAM-B129-M-4

Introduction to Energy Technology (M, 5.0 LP)

Module Identification

Module Number	Module Name	CP (Effort)
MV-SAM-B129-M-4	<i>Introduction to Energy Technology</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	Reviol, Thomas, Dr.-Ing. (WMA DEPT: MV) (/staff/266/)
Lecturers	Reviol, Thomas, Dr.-Ing. (WMA DEPT: MV) (/staff/266/)
Area of study	[MV-SAM] Fluid Mechanics and Turbomachinery
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.
3V+1U	MV-SAM-86416-K-4 (/mhb/courses/MV-SAM-86416-K-4/)	P	-	PL1	5.0	SuSe

- About **[MV-SAM-86416-K-4]**: Title: "Introduction to Energy Technology"; Presence-Time: 56 h; Self-Study: 94 h

Examination achievement PL1

- Form of examination: **written or oral examination**
- Examination Frequency: each semester
- Examination number: 10416 ("Introduction in Energy Technology")

Written (120 minutes) or oral (30 minutes) examination, to be announced at the beginning of the lecture.

Evaluation of grades

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

Contents

From **[MV-SAM-86416-K-4] Introduction to Energy Technology** (/mhb/courses/MV-SAM-86416-K-4/):

- Forms of energy conversion and basic definitions
- Thermal efficiency and thermodynamics of heat engines and heat pump processes and their optimisation
- Combustion (systems of combustion and flue gas treatment)
- Nuclear fission (physical principles and relevant reactor types)
- Geothermal energy: fundamentals and power plant processes
- Geothermal energy with heat pumps
- Solar thermal energy: fundamentals and concentrated solar power
- Structure of low-temperature collectors
- Geostrophic flow, planetary boundary layer, Weibull distributions, european wind atlas
- Aerodynamics, construction and control of wind turbines

Competencies / intended learning achievements

From [MV-SAM-86416-K-4] Introduction to Energy Technology (/mhb/courses/MV-SAM-86416-K-4/):

- The students are able to describe relevant thermodynamic cycles and compare them with each other as well as to select a suitable cycle for a given application case.
- They can name and describe the optimisations of cycles and calculate and create specific examples or proposals.
- They are able to list different methods of combustion and compare them with each other.
- They know relevant methods of flue gas treatment.
- The students know variants of nuclear reactions, compare them with each other and they know the technically usable one.
- They are able to enumerate and describe the steps for the utilisation of this nuclear reaction and to combine them if necessary.
- They know the area relevant for geothermal energy, and they can explain the origin of heat generation and the transport of heat to the surface.
- The student can list and compare the deposits of geothermal heat and the power plant processes for its utilisation and they can select the appropriate development method or type of power plant.
- They describe the energy flow and losses of concentrating solar thermal power plants and analyse the efficiency of different concentrating systems.
- The students explain the formation of geostrophic wind and describe the influences on the planetary boundary layer.
- They know and explain the operating concepts of modern wind turbines.
- They know the importance of Weibull distributions and the European Wind Atlas and they know the relevant basics.
- They know the aerodynamics of modern wind turbines.

Literature

From [MV-SAM-86416-K-4] Introduction to Energy Technology (/mhb/courses/MV-SAM-86416-K-4/):

- Baehr, H. D. & Kabelac, S., Thermodynamik - Grundlagen und technische Anwendungen, Springer, 2009
- Strauss, K., Kraftwerkstechnik - zur Nutzung fossiler, nuklearer und regenerativer Energiequellen, Springer, 2006

Requirements for attendance (informal)

Modules:

- [MV-TD-18-M-4] Thermodynamics I (M, 5.0 LP) (/mhb/modules/MV-TD-18-M-4/)

Requirements for attendance (formal)

None

References to Module / Module Number [MV-SAM-B129-M-4]

Course of Study	Section	Choice/Obligation
[MV-82.B10-SG] B.Sc. Energy and Process Engineering (/mhb/FB-MV/cos-528/)	Ingenieurwissenschaftliche Grundlagen II	[P] Compulsory