TECHNISCHE UNIVERSITÄT KAISERSLAUTERN

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 wuden 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

Module MV-SAM-269-M-7

Renewable Energy II (M, 3.0 LP)

Module Identification

Module Number	Module Name	CP (Effort)
MV-SAM-269-M-7	*Renewable Energy II*	3.0 CP (90 h)

Basedata

CP, Effort	3.0 CP = 90 h
Position of the semester	1 Sem. in SuSe
Level	[7] Master (Advanced)
Language	[DE] German
Module Manager	Reviol, Thomas, Dr.-Ing. (WMA | DEPT: MV)
Lecturers	Reviol, Thomas, Dr.-Ing. (WMA | DEPT: MV)
Area of study	[MV-SAM] Fluid Mechanics and Turbomachinery
Reference course of study	[MV-88.B78-SG] M.Sc. Production Engineering in Mechanical Engineering
Livecycle-State	[NORM] Active

Courses

Type/SWS	Course Number	Choice in Module-Part	SL	PL	CP	Sem.
2V	MV-SAM-86364-K-7	P	-	PL1	3.0	SuSe

- About **[MV-SAM-86364-K-7]**: Title: "Renewable Energy II"; Presence-Time: 28 h; Self-Study: 62 h

Examination achievement PL1

- Form of examination: **written or oral examination**
- Examination Frequency: each semester
- Examination number: 10364 ("Renewable Energy II")

Written (90 minutes) or oral (30 minutes) examination

Evaluation of grades

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

Contents

From [MV-SAM-86364-K-7] Renewable Energy II:

- Geostrophic wind, planetary boundary layer, influences of the boundary layer, turbulence, Weibull distributions, wind atlas
- Fundamentals of wind energy use, classification, principle of lift and drag rotors
- Design methods: Betz, Schmitz and blade element momentum method
- Aerodynamics, construction and control of wind turbines
- Basics of water turbines, overview and classification with key figures
- Overview of Pelton, Francis and Kaplan turbines using selected examples

Competencies / intended learning achievements

From [MV-SAM-86364-K-7] Renewable Energy II:

- Students can explain the geostrophic wind model and the transition to the ground in terms of the planetary boundary layer.
- They are able to explain the influences on the atmospheric boundary layer.
- The students recognise that Weibull distributions are necessary to describe wind conditions and will be able to characterise them.
- They know the European Wind Atlas and understand it as a tool for describing wind conditions.
- Students will be able to compare lift and drag runners and select one of the principles for a given task.
- They are able to understand the aerodynamics of a modern wind turbine and can work out an example or analyse a given one.
- They can explain how to control wind turbines (on the basis of characteristic diagrams and/or for given operating points).
- Students will be able to describe and apply the basic aspects of energy conversion in water turbines.
- They will be able to list the different types of water turbines and to characterise them with the help of characteristic diagrams.

Literature

From [MV-SAM-86364-K-7] Renewable Energy II:

- K. Strauß, Kraftwerkstechnik, Springer Verlag, Berlin, 2006
- Gasch, Twele, Windkraftanlagen, Vieweg+Teubner Verlag, Wiesbaden 2011
- W. Bohl, Strömungsmaschinen, Vogel Verlag, Würzburg 1998
- H. Watter, Regenerative Energiesysteme, Vieweg+Teubner Verlag, Wiesbaden 2011

Requirements for attendance of the module (informal)

Modules:

- [MV-LAF-105-M-4] Energy Technology I (M, 3.0 LP)
- [MV-SAM-106-M-7] Energy Technology II (M, 3.0 LP)
- [MV-SAM-111-M-7] Turbomachinery II (M, 5.0 LP)
- [MV-SAM-24-M-4] Fluid Mechanics I (M, 5.0 LP)
- [MV-SAM-31-M-4] Turbomachinery I (M, 4.0 LP)
- [MV-TD-18-M-4] Thermodynamics I (M, 5.0 LP)

Requirements for attendance of the module (formal)

None

References to Module / Module Number [MV-SAM-269-M-7]

Module-Pool	Name
[MV-ALL-MPOOL-6]	Wahlpflichtmodule allgemein
[MV-BioVT-MPOOL-6]	Wahlpflichtmodule Bioverfahrenstechnik
[MV-EVT-MPOOL-6]	Wahlplichtmodule Energie- und Verfahrenstechnik
[MV-PE-MPOOL-6]	Wahlpflichtmodule Produktentwicklung im Maschinenbau