

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 wurden 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

Course MV-LTD-86081-K-7

Data evaluation and design of experiments (2V, 3.0 LP)

Course Type

SWS	Type	Course Form	CP (Effort)	Presence-Time / Self-Study
2	V	Lecture with integrated exercises	3.0 CP	28 h 62 h
(2V)			3.0 CP	28 h 62 h

Basedata

SWS	2V
CP, Effort	3.0 CP = 90 h
Position of the semester	1 Sem. in SuSe
Level	[7] Master (Advanced)
Language	[DE] German
Lecturers	Bortz, Michael, Dr.-Ing. habil. (EXT DEPT: MV)
Area of study	[MV-LTD] Engineering Thermodynamics
Additional informations	Informations about the course
Lifecycle-State	[NORM] Active

Possible Study achievement

- Verification of study performance: **tests / audited elaborations**
- Details of the examination (type, duration, criteria) will be announced at the beginning of the course.

Contents

- Basics of statistics:
 - Hypothesis testing
 - Analysis of variance
- Data analysis:
 - Correlation analysis
 - Principal Component Analysis (PCA)
- Data-based modeling:
 - linear regression
 - partial least squares
 - non-linear regression
 - model evaluation and discrimination
- Design of experiments:
 - factorial experiments
 - model-based experimental design
- independent application of theory in practical computer exercises

Competencies / intended learning achievements

1. Lecture

The students are able to

- describe basic methods of statistics, parameter estimation and experimental design
- estimate parameters
- evaluate models using statistical methods

2. Exercise

The students are able to

- apply the methods discussed in the lecture independently in small groups

- estimate parameters for process engineering models
- evaluate the developed models by statistical means
- create statistical experimental designs and identify optimal experimental conditions

Literature

- D. C. Montgomery, Design and Analysis of Experiments, Wiley
- A. Rasmuson et al., Mathematical Modeling in Chemical Engineering, Cambridge University Press
- Peter Goos, Bradley Jones; Optimal Design of Experiments: A Case Study Approach

Materials

Electronic blackboard, slides, interactive computer exercise (Matlab)

Requirements for attendance (informal)

Previous knowledge of higher mathematics

Requirements for attendance (formal)

None

References to Course [MV-LTD-86081-K-7]

Module	Name	Context	
[MV-LTD-M187-M-7]	Data evaluation and design of experiments	P: Obligatory	2V, 3.0 LP