

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-TD-298-M-4

Modeling, simulation and optimization in process engineering (M, 3.0 LP)

Module Identification

Module Number	Module Name	CP (Effort)
MV-TD-298-M-4	<i>Modeling, simulation and optimization in process engineering</i>	3.0 CP (90 h)

Basedata

CP, Effort	3.0 CP = 90 h
Position of the semester	1 Sem. in WiSe
Level	[4] Bachelor (Specialization)
Language	[DE] German
Module Manager	Hasse, Hans, Prof. Dr.-Ing. (PROF DEPT: MV) (/staff/314/)
Lecturers	Bortz, Michael, Dr.-Ing. habil. (EXT DEPT: MV) (/staff/286/)
Area of study	[MV-LTD] Engineering Thermodynamics
Reference course of study	[MV-88.B10-SG] M.Sc. Energy and Process Engineering (/mhb/FB-MV/cos-573/)
Lifecycle-State	[NORM] Active

Courses

Type/SWS	Course Number	Choice in Module-Part	SL	PL	CP	Sem.
1V+1U	MV-TD-86062-K-4 (/mhb/courses/MV-TD-86062-K-4/)	P	-	PL1	3.0	WiSe

- About **[MV-TD-86062-K-4]**: Title: "Modeling, simulation and optimization in process engineering"; Presence-Time: 28 h; Self-Study: 62 h

Examination achievement PL1

- Form of examination: **oral examination (60 Min.)**
- Examination Frequency: each semester
- Examination number: 10062 ("Modeling, simulation and optimization in process engineering")

Evaluation of grades

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

Contents

From **[MV-TD-86062-K-4] Modeling, simulation and optimization in process engineering** (/mhb/courses/MV-TD-86062-K-4/):

- Balance equations
- Algebraic systems
- Differential equations
- Simulation of ODEs
- Flow sheet simulation
- Linear and nonlinear optimization
- Mixed integer optimization
- Pareto optimization

Competencies / intended learning achievements

From **[MV-TD-86062-K-4] Modeling, simulation and optimization in process engineering** (/mhb/courses/MV-TD-86062-K-4/):

1. Lecture

Students will be able to

- compare modeling, simulation and optimization
- enumerate basic principles of modeling
- explain simulation techniques
- identify optimization problems and explain optimization approaches

2. Exercise:

Students will be able to

- apply the methods discussed in the lecture independently
- describe process engineering problems with models and implement them in suitable software
- implement problem specific simulation techniques
- implement and solve optimization problems
- solve problems independently and in teamwork
- present and discuss results in small groups

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/)
- [MAT-00-03A-M-1] Higher Mathematics: Vector Analysis and Differential Equations (for Engineering Students) (M, 8.0 LP) (/mhb/modules/MAT-00-03A-M-1/)
- [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-TD-298-M-4]

Course of Study	Section	Choice/Obligation
[EIT-88.-SG#2021] M.Sc. Automation and Control (A&C) [2021] (/mhb/FB-EIT/cos-676/)	Elective Modules	[W] Elective Module
[MV-88.A29-SG] M.Sc. Biological and Chemical Engineering (/mhb/FB-MV/cos-567/)	Studienschwerpunkt II	[WP] Compulsory Elective
Module-Pool	Name	
[MV-ALL-MPOOL-6 (/mhb/modulepools/MV-ALL-MPOOL-6/)]	Wahlpflichtmodule allgemein	
[MV-BioVT-MPOOL-6 (/mhb/modulepools/MV-BioVT-MPOOL-6/)]	Wahlpflichtmodule Bioverfahrenstechnik	
[MV-CE-MPOOL-6 (/mhb/modulepools/MV-CE-MPOOL-6/)]	Wahlpflichtmodule Computational Engineering	
[MV-EVT-MPOOL-6 (/mhb/modulepools/MV-EVT-MPOOL-6/)]	Wahlpflichtmodule Energie- und Verfahrenstechnik	