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-TM-M135-M-7

Engineering Optimization (M, 3.0 LP)

Module Identification

Module Number	Module Name	CP (Effort)
MV-TM-M135-M-7	*Engineering Optimization*	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	Sator, Christian, Dr.-Ing. (WMA | DEPT: MV) (/staff/84/)
Lecturers	Sator, Christian, Dr.-Ing. (WMA | DEPT: MV) (/staff/84/)
Area of study	[MV-LTM] Applied Mechanics
Reference course of study	[MV-88.808-SG] M.Sc. Computational Engineering (/mhb/FB-MV/cos-559/)
Livecycle-State	[NORM] Active

Courses

Type/SWS	Course Number	Choice in Module-Part	SL	PL	CP	Sem.
2V	**MV-LTM-86009-K-7** (/mhb/courses/MV-LTM-86009-K-7/)	P	-	PL1	3.0	SuSe

- About **[MV-LTM-86009-K-7]**: Title: "Engineering Optimization"; Presence-Time: 28 h; Self-Study: 62 h

Examination achievement PL1

- Form of examination: **oral examination (30-45 Min.)**
- Examination Frequency: each semester
- Examination number: 10135 ("Engineering Optimization")

Evaluation of grades

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

Contents

From [MV-LTM-86009-K-7] Engineering Optimization (/mhb/courses/MV-LTM-86009-K-7/):

The basic concepts and fundamental quantities of mathematical optimization are presented, in which a focus is put on aspects which are of foremost importance for structural optimization problems. As part of an introduction, basic knowledge of mathematical terms and aspects of optimization is imparted. Afterwards optimization problems without constraints as well as problems with constraints are considered. Based on this, alternative formulations of an optimization problem (so-called Lagrange duality) are presented with the help of Lagrange functions. Subsequently approximation methods, optimality criteria methods and multi-criteria optimization are considered. Finally, outlooks on other areas such as shape optimization and topology optimization are given.

Competencies / intended learning achievements

From [MV-LTM-86009-K-7] Engineering Optimization (/mhb/courses/MV-LTM-86009-K-7/):

- Students are familiar with basic concepts and fundamental quantities of mathematical optimization
- Students are able to explain different optimization strategies
- Students are able to compare and rate different optimization strategies
- Students are able to formulate (primal and dual) optimization problems
- Students are able to implement and use numerical optimization techniques

Literature

From [MV-LTM-86009-K-7] Engineering Optimization (/mhb/courses/MV-LTM-86009-K-7/):

- Harzheimer, L.: Strukturoptimierung - Grundlagen und Anwendungen, Verlag Harri Deutsch 2008
- Spellucci, P.: Numerische Verfahren der nichtlinearen Optimierung, Birkhäuser Verlag 1993
- Reinhard, R.; Hoffmann, A.; Gerlach T.: Nichtlineare Optimierung, Springer Verlag 2013
- Schumacher, A.: Optimierung mechanischer Strukturen - Grundlagen und industrielle Anwendungen, Springer-Verlag 2005

Requirements for attendance (informal)

Basic knowledge in technical mechanics and higher mathematics

Requirements for attendance (formal)

None

References to Module / Module Number [MV-TM-M135-M-7]

Course of Study	Section	Choice/Obligation
[MV-88.808-SG] M.Sc. Computational Engineering (/mhb/FB-MV/cos-559/)	Pflichtmodule	[P] Compulsory

Module-Pool	Name
[MV-ALL-MPOOL-6 (/mhb/modulepools/MV-ALL-MPOOL-6/)]	Wahlpflichtmodule allgemein
[MV-MBINFO-MPOOL-6 (/mhb/modulepools/MV-MBINFO-MPOOL-6/)]	Wahlpflichtmodule Maschinenbau mit angewandter Informatik
[MV-PE-MPOOL-6 (/mhb/modulepools/MV-PE-MPOOL-6/)]	Wahlpflichtmodule Produktentwicklung im Maschinenbau