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-MEGT-M163-M-4

Computational tribology (M, 3.0 LP)

Module Identification

Module Number	Module Name	CP (Effort)
MV-MEGT-M163-M-4	*Computational tribology*	3.0 CP (90 h)

Basedata

CP, Effort	3.0 CP = 90 h
Position of the semester	1 Sem. in WiSe/SuSe
Level	[4] Bachelor (Specialization)
Language	[DE] German
Module Manager	Sauer, Bernd, Prof. Dr.-Ing. (PROF | DEPT: MV) (/staff/323/)
Lecturers	Thielen, Stefan, Jun. Prof. Dr.-Ing. (PROF | DEPT: MV) (/staff/238/)
Area of study	[MV-MEGT] Machine Elements, Gears, and Transmissions
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-MEGT-86219-K-4** (/mhb/courses/MV-MEGT-86219-K-4/)	P	-	PL1	3.0	WiSe/SuSe

- About **[MV-MEGT-86219-K-4]**: Title: "Computational tribology"; Presence-Time: 28 h; Self-Study: 62 h

Examination achievement PL1

- Form of examination: **oral examination (30 Min.)**
- Examination Frequency: each semester
- Examination number: 10219 ("Computational Tribology")

Evaluation of grades

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

Contents

From [MV-MEGT-86219-K-4] Computational tribology (/mhb/courses/MV-MEGT-86219-K-4/):

- Derivation of the Reynolds equation
- Non-dimensionalization of the Reynolds equation
- Discretisation methods (Finite difference, finite volume)
- Numerical methods (Gaussian elimination, Jacobi method, Gauss-Seidel method)
- Method of the progressive mesh densification
- Calculation of the deformation in the half space
- Coupled elastohydrodynamic calculation

Competencies / intended learning achievements

From [MV-MEGT-86219-K-4] Computational tribology (/mhb/courses/MV-MEGT-86219-K-4/):

1. Lecture

The students are able to

- understand the assumptions necessary to derive the elasto-hydrodynamic equations

- understand the boundary conditions that arise from those assumptions
- de-dimensionalize PDEs
- choosing the right strategy for discretizing PDEs
- apply numerical solving strategies to EHL problems

2. Practical part

The students are able to

- set up a simple numerical EHL simulation of a specific problem

Literature

From [MV-MEGT-86219-K-4] Computational tribology (/mhb/courses/MV-MEGT-86219-K-4/)**:**

- Stachowiak, G.W.; Batchelor, A.W.: Engineering tribology. Butterworth-Heinemann: Oxford, Waltham, 2014.
- Venner, C.H.; Lubrecht, A.A.: Multi-Level Methods in Lubrication. Elsevier: Amsterdam, 2000.

Requirements for attendance (informal)

Modules:

- [MV-MEGT-M143-M-4] Tribology in Mechanical Engineering I (M, 3.0 LP) (/mhb/modules/MV-MEGT-M143-M-4/)

Requirements for attendance (formal)

None

References to Module / Module Number [MV-MEGT-M163-M-4]

Module-Pool	Name
[MV-ALL-MPOOL-6 (/mhb/modulepools/MV-ALL-MPOOL-6/)]	Wahlpflichtmodule allgemein
[MV-CE-MPOOL-6 (/mhb/modulepools/MV-CE-MPOOL-6/)]	Wahlpflichtmodule Computational Engineering