

## 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) ([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) ([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) ([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) ([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) ([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) ([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-LTD-M199-M-7

Interfacial Thermodynamics (M, 3.0 LP)

### Module Identification

Module Number	Module Name	CP (Effort)
MV-LTD-M199-M-7	<i>Interfacial Thermodynamics</i>	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	Hasse, Hans, Prof. Dr.-Ing. (PROF   DEPT: MV) (/staff/314/)
Lecturers	Hasse, Hans, Prof. Dr.-Ing. (PROF   DEPT: MV) (/staff/314/)
Area of study	[MV-LTD] Engineering Thermodynamics
Reference course of study	[MV-88.A29-SG] M.Sc. Biological and Chemical Engineering (/mhb/FB-MV/cos-567/)
Lifecycle-State	[NORM] Active

## Courses

Type/SWS	Course Number	Choice in Module-Part	SL	PL	CP	Sem.
2V	<a href="/mhb/courses/MV-LTD-86082-K-7/">MV-LTD-86082-K-7</a>	P	-	PL1	3.0	SuSe

- About **[MV-LTD-86082-K-7]**: Title: "Interfacial Thermodynamics"; Presence-Time: 28 h; Self-Study: 62 h

## Examination achievement PL1

- Form of examination: **oral examination (30 Min.)**
- Examination Frequency: each semester
- Examination number: 10082 ("Interfacial Thermodynamics")

## Evaluation of grades

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

### Contents

From **[MV-LTD-86082-K-7] Interfacial Thermodynamics** (/mhb/courses/MV-LTD-86082-K-7/):

- Importance and function of interfaces in nature and technology with special emphasis on challenges in process engineering and mechanical engineering.
- Introduction to the thermodynamics of interfaces with special emphasis on their application in technology.
- Properties of different pairings of phases at interfaces (combinations of solid, liquid, gas) and their technical relevance.
- Properties of different three-phase interfacial contacts (e.g. solid-liquid-gas or liquid-liquid-gas) as well as their technical relevance.
- Experimental determination of interfacial properties (e.g. interfacial tension and wetting behavior) for different phase pairings (e.g. gas-liquid and solid-liquid).
- Theoretical methods for determining interfaces properties: Density functional theory and molecular simulation

### Competencies / intended learning achievements

From **[MV-LTD-86082-K-7] Interfacial Thermodynamics** (/mhb/courses/MV-LTD-86082-K-7/):

- Students are familiar with interfacial phenomena and processes relevant in technology, e.g. the wetting behavior, interfacial tension and adsorption.

- Students have a general understanding of interfacial properties and their importance in technology and nature. Students can distinguish between properties of curved and planar interfaces as well as technical surfaces and (idealized) surfaces in a laboratory.
- Students are able to describe and characterize experimental and theoretical methods for the determination and description of interface properties. They will be able to explain the basics of the methods and their limitations.
- They will be able to select the appropriate experimental or theoretical method for a specific problem in interfacial thermodynamics.
- The students are able to use modeling tools for selected problems and to evaluate the results with respect to the applied assumptions and simplifications.

## Literature

From [MV-LTD-86082-K-7] **Interfacial Thermodynamics** (/mhb/courses/MV-LTD-86082-K-7/):

- J. S. Rowlinson and B. Widom, *Molecular Theory of Capillarity*, Oxford University Press, Oxford, 1989.
- A.I. Rusanov, V.A. Prokhorov: *Interfacial Tensiometry*, Elsevier, Amsterdam, 1996.
- J. Lyklema, *Fundamentals of interface and Colloid Science*, Academic Press Ltd., London, 1991.
- M. Kahlweit, *Grenzflächenerscheinungen*, Steinkopff Verlag, Darmstadt, 1981.
- R. Evans, *Fundamentals of Inhomogeneous Fluids*, Dekker, New York, 1992, Chap. 3

## Requirements for attendance (informal)

### Modules:

- [MV-SAM-M123-M-4] Algorithms and Programming (M, 6.0 LP) (/mhb/modules/MV-SAM-M123-M-4/)
- [MV-TD-56-M-4] Thermodynamics of Mixtures (M, 5.0 LP) (/mhb/modules/MV-TD-56-M-4/)

## Requirements for attendance (formal)

None

## References to Module / Module Number [MV-LTD-M199-M-7]

Course of Study	Section	Choice/Obligation
[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	