



Computational Modeling in Engineering (CME)

Kurzvorstellung – 14.01.2026

Übersicht

Organisation: Fakultätsübergreifend, MACH & CIW (+ BGU & ETIT)

Initiatoren: Prof. T. Böhlke, ITM, Fakultät für Maschinenbau
Prof. S. Enders, ITTK, Fakultät für Chemieingenieurwesen, Verfahrenstechnik

„State of the Art“: Ingenieurstudium nach Branchen (Verfahrenstechnik, Elektrotechnik, Maschinenbau, Chemie- und Bioingenieurwesen, Fahrzeugtechnik, Werkstofftechnik, Produktionstechnik und viele andere)

Idee CME:

- 1) Stark vertiefte Grundlagen in den Naturwissenschaften, der Informatik und der numerischen Mathematik unabhängig vom späteren Anwendungsgebiet
- 2) Fakultäts- und Bereichsübergreifend → Große Flexibilität bei Studienplanung
- 3) Englischsprachig → Zugang zum internationalen Arbeitsmarkt (Industrie & Wissenschaft)
- 4) Forschungsorientiert

Vergleichbare Studiengänge

- 1) M.Sc. Computational Mechanics, TU München
- 2) M.Sc. Computational Modeling and Simulation, TU Dresden
- 3) M.Sc. Computational Science and Engineering, ETH Zürich
- 4) M.Sc. Computational Mechanics of Materials and Structures, University of Stuttgart
- 5) B.Sc. Mechanik, TU Darmstadt
- 6) M.Sc. Physikalische Ingenieurwissenschaft, TU Berlin
- 7) M.Sc. Computational Engineering, Ruhr-Universität Bochum

ETH zürich



University of Stuttgart
Computational Mechanics of Materials and Structures

**TECHNISCHE
UNIVERSITÄT
BERLIN**



**TECHNISCHE
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DRESDEN**

**TECHNISCHE
UNIVERSITÄT
DARMSTADT**

**RUHR
UNIVERSITÄT
BOCHUM** **RUB**

KIT

Modulplan (Allgemein)

Exemplary curriculum: Master's degree program CME

1st Semester	2nd Semester	3rd Semester	4th Semester
Core Competencies/ 24 CR		Project/ 6 CR	Master's Thesis/ 30 CR
Mechanics / 6 CR Resp: Böhlke CMM (4 CR) Tutorial CMM (2 CR) WE CW	Thermodynamics / 6 CR Resp: Enders Advanced Thermodynamics OE	Project / 6 CR Resp: various Project EOK	Master's Thesis / 30 CR Resp: Böhlke Master's Thesis EOK
Comp Methods / 6 CR Resp: Betsch Basic of FE (5 CR) HW: Basics of FE (1 CR) OE CW	Data Science / 6 CR Resp: Freitag UMANNOSA OE	Comp Engineering and Applications/ 24 CR Individual choice of modules from catalogue	
Methods/ 24 CR Individual choice of modules from catalogue			
Module 1 / 6 CR Resp: various Examinations: 1 (WE or OE or EOK, doic)	Module 2 / 6 CR Resp: various Examinations: 1 (WE or OE or EOK, doic)	Module 1 / 6 CR Resp: various Examinations: 1 (WE or OE or EOK, doic)	Abbreviations Comp: Computational CMM: Comp Mechanics of Materials CR: credits CW: Coursework doic: depending in individual choice FE: Finite Elements EOK: examination of other kind HW: Homework OE: oral examination Resp: Responsible Technol: Technology UMANNOSA: Uncertainty Modeling, Artificial Neural Networks and Optimization in Structural Analysis WE: written examination
Module 3 / 4 CR Resp: various Examinations: 1 (WE or OE or EOK, doic)	Module 4 / 4 CR Resp: various Examinations: 1 (WE or OE or EOK, doic)	Module 2 / 6 CR Resp: various Examinations: 1 (WE or OE or EOK, doic)	
Module 5 / 4 CR Resp: various Examinations: 1 (WE or OE or EOK, doic)	The number of credits of the individual modules is only an example, other combinations are possible.	Module 3 / 4 CR Resp: various Examinations: 1 (WE or OE or EOK, doic)	
Interdisciplinary Electives / 12 CR Subject is ungraded	Economics and Law / 4 CR Resp: Böhlke Individual choice (4 CR) (WE or OE or EOK, doic)	Module 4 / 4 CR Resp: various Examinations: 1 (WE or OE or EOK, doic)	
Technol and Society / 4 CR Resp: Böhlke Individual choice (4 CR) (CW)	Key Competencies / 4 CR Resp: Böhlke Individual choice (4 CR) (CW, WE or OE or EOK, doic, mod ungr)	Module 5 / 4 CR Resp: various Examinations: 1 (WE or OE or EOK, doic)	
30 CR ∑: 6 examinations	30 CR ∑: 6 examinations	30 CR ∑: 6 examinations	30 CR ∑: 1 examination
		Module Structure Module Name / Credits Responsible Person Partial Achievement(s) Name(s) Exam Type(s)	

Modulplan (Beispiel)

Exemplary curriculum: Master's degree program CME

1st Semester	2nd Semester	3rd Semester	4th Semester	
Core Competencies/ 24 CR		Project/ 6 CR	Master's Thesis/ 30 CR	
Mechanics / 6 CR Resp: Böhlke CMM (4 CR) Tutorial CMM (2 CR) WE CW	Thermodynamics / 6 CR Resp: Enders Advanced Thermodynamics OE	Project: Model Development and Simulation in Thermal Process Engineering, Resp: Zeiner	Master's Thesis / 30 CR Resp: Böhlke Master's Thesis EOK	
Comp Methods / 6 CR Resp: Betsch Basic of FE (5 CR) HW: Basics of FE (1 CR) OE CW	Data Science / 6 CR Resp: Freitag UMANNOSA OE	Comp Engineering and Applications/ 24 CR Individual choice of five modules from catalogue		
Methods/ 24 CR Individual choice of four modules from catalogue				
Mathematische Methoden der Thermodynamik/ 6 CR Maas, Schießl (T-MACH-113704) Examinations: Oral Exam	Mathematische Methoden in der Strömungslehre/ 6 CR Frohnappel (T-MACH-105295) Examinations: Written Exam	Seminar Werkstoffsimulation/ 6 CR Resp: Nestler (T-MACH-107660) Examinations: Exam of another type	Abbreviations Comp: Computational CMM: Comp Mechanics of Materials CR: credits CW: Coursework doic: depending in individual choice FE: Finite Elements EOK: examination of other kind HW: Homework mod ungr: Module ist ungraded OE: oral examination Resp: Responsible Technol: Technology UMANNOSA: Uncertainty Modeling, Artificial Neural Networks and Optimization in Structural Analysis WE: written examination	
Introduction to Numerical Simulation of Reacting Flows / 8 CR Stein (M-CIWVT-106676) Examinations: 1. Examination of another type 2. Oral Exam	Grenzflächenthermodynamik/ 4 CR Enders (M-CIWVT-103063) Examinations: 1 (Oral Exam)	Wärmeübertragung II/ 6 CR Resp: Wetzel (M-CIWVT-103051) Examinations: Oral Exam		
Interdisciplinary Electives / 12 CR Subject is ungraded		Systemintegration in der Mikro- und Nanotechnik/ 4 CR Gengenbach (T-MACH-105555) Examinations: 1 (WE or OE or EOK, doic)		
		Maschinendynamik II/ 4 CR Resp: Proppe (T-MACH-105224) Examinations: Oral Exam		
Economics and Law / 4 CR Resp: Böhlke Individual choice (4 CR) (WE or OE or EOK, doic)	Computer Aided Reactor Design/ 4 CR Wehinger (M-CIWVT-106809) Examinations: Exam of another type	Module Structure		
Technol and Society / 4 CR Resp: Böhlke Individual choice (4 CR) (CW)	Key Competencies / 4 CR Resp: Böhlke Individual choice (4 CR) (CW, WE or OE or EOK, doic, mod ungr)			Module Name / Credits Responsible Person Partial Achievement(s) Name(s) Exam Type(s)
30 CR Σ: 5 examinations	30 CR Σ: 6 examinations	30 CR Σ: 6 examinations	30 CR Σ: 1 examination	

