Technische Hochschule Nürnberg
Fakultät Maschinenbau und Versorgungstechnik

Ref. **6033.33**

Technische Hochschule Nürnberg Georg Simon Ohm

Faculty of Mechanical Engineering and Building Services Engineering

Curriculum

for the Master's programme in Computational Mechanical Engineering (M-CME) at Technische Hochschule Nürnberg – Georg Simon Ohm University of Applied Sciences

Validity: for all students who commenced their studies in the winter semester 2026/2027 at the Technische Hochschule Nürnberg Georg Simon Ohm

Issued for the Faculty of Mechanical Engineering and Building Services Engineering by resolution of the Faculty Council of the Faculty of Mechanical Engineering and Building Services Engineering at Technische Hochschule Nürnberg – Georg Simon Ohm University of Applied Sciences on 22 April 2026

Prof. Dr Michael Koch, Dean

The curriculum is issued on the basis of

- Section 84(3), sentences 1 and 2 of the Bavarian Higher Education Innovation Act (BayHIG) of 5 August 2022 (GVBl. p. 414, BayRS 2210-1-3-WK), as last amended by Section 1 of the Act of 23 July 2024 (GVBl. p. 257),
- Section 16(1) sentence 1, (2) sentence 1 of the General Study and Examination Regulations of the Technische Hochschule Nürnberg Georg Simon Ohm dated 29 June 2023 (Official Gazette of the Technische Hochschule Nürnberg Georg Simon Ohm 2023, serial no. 18; www.th-nuernberg.de),
- the Study and Examination Regulations for the Master's programme in Computational Mechanical Engineering (M-CME) at the Technische Hochschule Nürnberg Georg Simon Ohm University of Applied Sciences dated 9 December 2025 (Official Gazette of the Technische Hochschule Nürnberg Georg Simon Ohm University of Applied Sciences 2025, serial no. 48; www.th-nuernberg.de).

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Abbreviations and explanations

List of abbreviations	
,	and
/	or
;	and / or
Kol	Colloquium
ECTS	Credit points under the European Credit Transfer and Accumulation System (ECTS)
LV	Course
Nr.	Module number
MA	Master's thesis
PM	Compulsory module
PoP	Portfolio assessment
Pr	Project
Prakt	Practical
PrA	Project work
Prä	Presentation
Ref	Presentation
S	Seminar
schrP	Written examination
Sem	Semester
SoSe	Summer semester
SPO	Study and Examination Regulations
StA	Coursework
SU	Seminar-based teaching
SWS	Hours per week per semester
Ü	Practical
WiSe	Winter semester
WM	Elective module
WPM	Compulsory elective module
ZV-M	Entry requirements for the module
ZV-P	Entry requirements for the examination

- ECTS credits are shown according to the following scheme: ECTS credits printed in brackets represent the number of credits per sub-module or sub-exam and are used for calculation purposes. ECTS credits not shown in brackets indicate the total number of ECTS credits that can be earned within the module in question.

- Please note: The study plan serves to supplement and elaborate on the Study and Examination Regulations (SPO) underlying the degree programme. It is specified and supplemented by the relevant module handbook in its current version.

1 Overview

1.1 Structure of the programme in accordance with the Study and Examination Regulations Ref. 6033.33

The programme has a standard duration of three academic semesters. Lectures, tutorials and university placements take place during the first two semesters of the programme. The Master's thesis is to be completed during the third academic semester.

Admission to the programme is possible in both the winter semester (WiSe) and the summer semester (SoSe), as all modules offered can be completed within a single semester.

The curriculum is structured into three module blocks:

Compulsory modules (PM)	30 ECTS
Compulsory elective modules (WPM)	30 ECTS
Master's thesis and seminar	30 ECTS
Total:	90 ECTS

Upon completion of the compulsory modules and compulsory elective modules, each totalling at least 30 ECTS credits, as well as the Master's thesis, the programme leads to the academic degree of 'Master of Science' (M.Sc.).

Key
- PM
- WPM
- Master's thesis

1.2 Study plan

The programme is tailored to individual students in terms of language choice and the selection of modules in the compulsory elective area. Examples of study pathways are provided below.

Possible study plan with exclusively English-language modules (starting in the winter semester)

Semester 1	Selected Topics in Mathematics and Numerical Analysis	Advanced Engineering Mechanics	Machine Learning	Bio-inspired Engineering	Noise, Vibration and Harshness	WPM
Semester 2	The Finite Element Method	Advanced Mechanics of Materials	Computational Fluid Dynamics	Simulation Methods	Multi-Physics Simulation	Project (5 / 10 / 15 ECTS), other WPM
Semester 3	Master's Thesis and Master's Seminar					

Possible study plan with exclusively German-language modules (starting in the winter semester)

Semester 1	Theory of Finite Element Method	Advanced Strength of Materials	Numerical Fluid Mechanics	Simulation techniques	Bionics – Advanced Study and Application	WPM
Semester 2	Selected Topics in Mathematics and Numerical Analysis	Advanced Engineering Mechanics	Machine learning	New metallic materials and systematic material selection	Practical Product Development	Project work (5 / 10 / 15 ECTS) or WPM
Semester 3	Master's thesis and Master's seminar					

2 Programme Objectives

The aim of the consecutive postgraduate Master's programme in Mechanical Engineering is to award a degree that qualifies graduates for research and is application-oriented. The programme's key objectives are based on the following competencies.

2.1 Subject-specific competences

Students acquire the following skills and knowledge:

- In-depth knowledge of the fundamentals of mathematics, natural sciences and engineering
- Advanced knowledge of technical systems and processes
- Subject-specific knowledge in computer-aided mechanical engineering
- An understanding of how to assess applicable techniques and their limitations
- The ability to independently develop solutions, including for unusual and interdisciplinary problems
- The ability to plan and carry out analytical, modelling and experimental investigations, as well as to critically evaluate data and draw conclusions from it
- Ability to carry out scientifically sound research and development tasks
- Application of engineering methods in scientific and industrial contexts

2.2 Methodological skills

Students acquire the following skills and knowledge:

- Ability to analyse and solve mechanical engineering problems in a practical manner
- Application of numerical, analytical and/or innovative procedures and methods in research, development and practice
- Ability to acquire skills independently beyond the scope of the degree programme

2.3 Personal and social skills

Students acquire the following skills and knowledge:

- Teamwork and communication skills to take on leadership responsibilities
- Taking on coordination tasks in research, development and application
- Consideration of international and intercultural aspects

- A sense of responsibility in scientific and industrial contexts
- Independence and initiative in acquiring skills and working on projects

3 Compulsory Modules Catalogue

The advanced foundation modules of the programme are compulsory for all students. Successful completion of these modules is a prerequisite for the successful completion of the programme, in accordance with the relevant study and examination regulations.

The advanced foundation modules are offered alternately each semester in both English and German. Students may choose whether to take the compulsory modules exclusively in one language, English or German, or in a combination of both. Each of the six compulsory modules must be completed in one of the languages offered.

3.1 English-language compulsory modules (PM)

Sem	No.	Module name	Module type	Type of course	SWS	ZV-M	ZV-P	Examination		ECTS	Language
								Type	Duration in minutes		
WiSe	**P1-e**	Selected Topics of Mathematics and Numerics	PM	SU, Ü	4	-	-	schrP	90	5	English
SoSe	**P2-e**	The Finite Element Method	PM	SU, Ü	4	-	-	schrP	90	5	English
WiSe	**P3-e**	Advanced Engineering Mechanics	PM	SU, Ü	4	-	-	schrP	90	5	English
SoSe	**P4-e**	Advanced Mechanics of Materials	PM	SU, Prakt	4	-	-	schrP	90	5	English
SoSe	**P5-e**	Computational Fluid Dynamics	PM	SU, Prakt	4	-	-	schrP	90	5	English
WiSe	**P6-e**	Machine Learning	PM	SU	4	-	-	schrP	90	5	English

3.2 Compulsory modules in German (PM)

SoSe	**P1-d**	Ausgewählte Kapitel der Mathematik und Numerik	PM	SU, Ü	4	-	-	schrP	90	5	German
WiSe	**P2-d**	Theorie der Finiten Element Methode	PM	SU, Ü	4	-	-	schrP	90	5	German
SoSe	**P3-d**	Höhere Technische Mechanik (M-MB – G1)	PM	SU, Ü	4	-	-	schrP	90	5	German
WiSe	**P4-d**	Höhere Festigkeitslehre (M-MB – G2)	PM	SU, Prakt	4	-	-	schrP	90	5	German
WiSe	**P5-d**	Numerische Strömungsmechanik (M-MB – G4)	PM	SU, Prakt	4	-	-	schrP	90	5	German
SoSe	**P6-d**	Maschinelles Lernen	PM	SU	4	-	-	schrP	90	5	German

4 Catalogue of compulsory elective modules

Elective modules are subject-specific modules that are offered individually as alternatives. Each student must select a specific set of these modules in accordance with the relevant study and examination regulations. The selected modules are treated as compulsory modules.

The quality of teaching and safety requirements mean that the number of places for students in selected courses must be limited. Places are allocated via registration before the start of the semester. Upon registration for a module with limited places that includes a practical component, attendance at the course is compulsory.

All courses can only be offered if a minimum number of participants is reached. If this number is not reached, the course must be cancelled without replacement.

Students must register in advance of the start of the semester for modules in the coming semester that have a limited number of places. The registration procedures and the registration period will either be published on the MB/VS Faculty website or sent to students by email.

4.1 Catalogue of English-language subject-specific compulsory elective modules (WPM)

Sem	No.	Module name	Module type	Type of course	SWS	ZV-M	ZV-P	Exam		ECTS	Language
								Type	Duration in minutes		
SoSe	**W1-e**	Simulation Methods	WPM	SU, Ü	4	-	-	schrP	90	5	English
WiSe	**W2-e**	Bio-inspired Engineering	WPM	SU, Prakt	4	**1)**	-	StA, Kol		5	English
SoSe	**W3-e**	Multi-Physics Simulation	WPM	SU, Prakt	4	-	-	schrP	90	5	English
WiSe	**W4-e**	Noise Vibration Harshness	WPM	SU, Prakt	4	-	-	StA, Kol		5	English
SoSe	**W5-e**	Statistics (M-IAS)	WPM	SU, Ü	4	-	-	schrP	90	5	English
WiSe	**W7-e**	Product Development Practice	WPM	SU, Ü	4	-	-	StA		5	English

4.2 Catalogue of German-language specialist elective modules (WPM)

WiSe	**W1-d**	Simulationstechniken (M-MB W12)	WPM	SU, Ü	4	-	-	schrP	90	5	German
SoSe	**W2-d**	Bionik - Vertiefung und Anwendung (M-MB W33)	WPM	SU, Prakt	4	**1)**	-	StA, Kol		5	German
SoSe	**W6-d**	Neue metallische Werkstoffe und systematische Werkstoff-auswahl (M-MB W8)	WPM	SU, Prakt	4	**1)**	-	schrP, StA[1]	90	5	German
SoSe	**W7-d**	Praxis der Produktentwicklung	WPM	SU, Ü	4	-	-	StA		5	German
WiSe	**W8-d**	Vertiefungen der technischen Thermodynamik – Wasser-stofftechnik (M-MB G3)	WPM	SU	4	-	-	schrP	90	5	German

4.3 Catalogue of subject-specific compulsory elective modules (WPM) as project work

WiSe, SoSe	**W9**	Kleine Projektarbeit	WPM	Pr	-	-	-	PrA		5	German / English
WiSe, SoSe	**W10**	Große Projektarbeit	WPM	Pr	-	-	-	PrA		10	German / English
WiSe, SoSe	**W11**	Forschungsprojektarbeit	WPM	Pr	-	-	-	PrA		15	German / English

1) Course with limited enrolment.

5 Master's thesis

The second stage of the programme lasts one academic semester and is intended for the completion of the Master's thesis. The Master's thesis concludes the programme. It is an academic piece of work to be completed independently by the student in the form of an application-oriented research and/or development project. Topics are assigned by the faculty's professors; it is possible to carry out the work externally. The results of the Master's thesis must be presented at an internal university colloquium (Master's seminar).

Sem	No.	Module name	Module type	Type of course	SWS	ZV-M	ZV-P	Examination		ECTS	Language
								Type	Scope in minutes		
WiSe / SoSe	**M**	Masterarbeit	PM		-	§ 17 Abs. 2 SPO M-CME	-	MA		28	German/ English
WiSe / SoSe	**M**	Masterseminar	PM	Kol	-	-	-	Kol[2]	20	2	German/ English

6 Notes on calculating the overall examination mark

The Master's examination is passed if 90 ECTS credits have been earned. The overall examination mark is calculated as the arithmetic mean of the module marks, weighted by the corresponding credit points. For the weighting of the Master's thesis, the credit points from the Master's thesis and the Master's seminar are added together.

1 Grade: mE/oE, required for the module

Grade 2: mE/oE, pass required for the module