Course Handbook Mechanical Engineering Bachelor

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Head of Studies	Prof. Dr. Matthias Faust
Deputy Head of Studies	Prof. Dr. Andrea Bohn
Chairman of Examination	Prof. Dr. Moritz Habschied
Deputy Chairman of Examination	Prof. Dr.-Ing. Ramona Hoffmann

Qualifikation Goals of Study Programme

ID	short description	qualification goal	last change
Q1	Vermittlung einer grundständigen Ingenieursausbildung mit klassischen, unverzichtbaren Inhalten von Maschinenbau und Verfahrenstechnik	Formale und analytische Kompetenzen werden entwickelt mit Fokus auf die Arbeitsfähigkeit in den Berufsfeldern der angewandten Maschinen- und Verfahrenstechnik und die Kommunikationsfähigkeit mit anderen Ingenieursdisziplinen.	04.01.2024
	HQR-Bezug Qualifikationsziel Q1 **Wissen und Verstehen** X **Einsatz, Erzeugung und Anwendung von Wissen** X **Kommunikation und Kooperation** X **wissenschaftliches Selbstverständnis / Professionalität**		
Q2	Verknüpfung der Ingenieursinhalte mit Soft Skills und Sprachkenntnissen, um Grundlagen für Teamfähigkeit, Präsentationstechniken und Internationalität zu schaffen	Durch die Anreicherung des Studienprogramms mit sprachlichen Inhalten, mit projektmanagementbezogenen Kenntnissen und Prasentationstechniken, der Fähigkeit zur Teamarbeit sind die Absolventen in der Lage, ihre fachlichen Beiträge in interdisziplinären Arbeitsgruppen zu leisten.	04.01.2024
	HQR-Bezug Qualifikationsziel Q2 **Wissen und Verstehen** X **Einsatz, Erzeugung und Anwendung von Wissen** **Kommunikation und Kooperation** X **wissenschaftliches Selbstverständnis / Professionalität**		
Q3	Erlernen des Fachwissens in Maschinenbau und Verfahrenstechnik	Die Absolvent(inn)en verfügen über grundlegende Kenntnisse, Fähigkeiten und Arbeitsmethoden für die Berufsfelder Maschinenbau und Verfahrenstechnik.	04.01.2024
	HQR-Bezug Qualifikationsziel Q3 **Wissen und Verstehen** X **Einsatz, Erzeugung und Anwendung von Wissen** X **Kommunikation und Kooperation** **wissenschaftliches Selbstverständnis / Professionalität**		
Q4	Englische Sprachkompetenz in internationalen Projekten	Die Absolvent(inn)en können interdisziplinären Projekte aus den Bereichen Maschinenbau und Verfahrenstechnik im globalen Umfeld planen und durchführen. Hierbei stellen sie sie ihre englische Sprachkompetenz und die Verwendung einschlägiger Fachbegriffe und überzeugender Präsentationstechniken unter Beweis	04.01.2024

ID	short description	qualification goal	last change

HQR-Bezug Qualifikationsziel Q4			
Wissen und Verstehen	**Einsatz, Erzeugung und Anwendung von Wissen**	**Kommunikation und Kooperation**	**wissenschaftliches Selbstverständnis / Professionalität**
X		X	

Learning Outcomes of Study Programme

ID	Lernergebnis	Module
L1	Mathematische und physikalische Verfahren als Werkzeug zur Beschreibung technischer Fragestellungen anwenden können	
L2	Fähigkeit zur Analyse technischer Systeme: Kenntnis der Methodik zur Beschreibung und Verhaltensmodellierung technischer Systeme durch mathematische Verfahren und Anwendung physikalischer Gesetze	
L3	Wesentliche Bauelemente und Komponenten benennen, ihre Wirkungsweise erklären und sie auslegen können	
L4	Grundlegendes Basiswissen anwenden können und Beherrschen der wesentlichen Verfahren zur Berechnung und Auslegung mechanischer und verfahrenstechnischer Systeme	
L5	Selbstständige, methodische, zielgerichtete Entwicklungsarbeit durchführen	
L6	Erlernte Methoden in der technischen Praxis anwenden.	
L7	Vorhandenes Wissen auf neue Fragestellungen transferieren können	
L8	Vertieftes Fachwissen in gewählter Studienrichtung/Schwerpunkt besitzen und deren fachspezifische Techniken anwenden können	
L9	Inhalte abstrahieren und auf andere Problemstellungen übertragen können; Konzeptionelle und strukturierte Problemlösungen erarbeiten	
L10	Ergebnisse von Untersuchungen und Projekten systematisch zusammenfassen und verständlich schriftlich oder mündlich darstellen können	
L11	Projekte im Zeit- und Kostenrahmen planen, durchführen und abschließen können durch Methoden von Zeitmanagement, Festlegen von Meilensteinen, Erfassen von Schnittstellen, Teamarbeit, Kommunikation	
L12	Englisch als Arbeitssprache im ingenieurtechnischen Bereich professional verwenden können	

Mechanical Engineering Bachelor - mandatory courses (overview)

Module name (EN)	Code	SAP-P	Semester	Hours per semester week / Teaching method	ECTS	Module coordinator
Academic English Writing	MEB_24_A_4.12.AEW	P241-0434	4	2SU	2	Dr. Julia Frisch
Applied Metrology	MEB_24_A_5.02.MTE	P241-0435, P241-0436	5	4V	5	Prof. Dr.-Ing. Jochen Gessat
Applying	MEB_24_A_4.01.ANM	P241-0431	4	4V	5	Prof. Dr.

Module name (EN)	Code	SAP-P	Semester	Hours per semester week / Teaching method	ECTS	Module coordinator
Numerical Methods						Marco Günther
Automation Technology in Mechanical Engineering	MEB_24_M_5.17.AUM	P241-0437, P241-0438	5	3V+1P	5	N.N.
Bachelor Thesis with Colloquium	MEB_24_A_6.02.BAK	S241-0393, T241-0390	6	-	15	Professor/innen des Studiengangs
Basics of Component Dimensioning	MEB_24_A_2.03.GBD	P241-0423	2	3V+1U	5	Prof. Dr.-Ing. Ramona Hoffmann
CAD 3D-Modeling and Simulation	MEB_24_A_3.07.CAD	P241-0430	3	2V+2P	5	Prof. Dr. Bernd Heidemann
Dimensioning Components	MEB_24_M_3.06.BTD	P241-0429	3	3V+1U	5	Prof. Dr.-Ing. Ramona Hoffmann
Electrical Engineering for Mechanical Engineering und Process Engineering	MEB_24_A_2.07.ELT	P241-0467, P241-0468	2	3V+1P	5	Prof. Dr. Wenmin Qu
Engineering Basics with Intercultural Management	MEB_24_A_1.07.ENB	P241-0455, P241-0456	1	1V+3P	6	Prof. Dr. Matthias Faust
Engineering Design (with Project)	MEB_24_M_4.04.MK2	P241-0433	4	1V+3PA	4	Prof. Dr. Bernd Heidemann
Engineering Fluid Mechanics, Piston Engines, Compressors and Turbines	MEB_24_A_3.04.SKS	P241-0427	3	4V	5	Prof. Dr. Marco Günther
	MEB_24_M_2.01.TMD	P241-0422	2	4V	4	

Module name (EN)	Code	SAP-P	Semester	Hours per semester week / Teaching method	ECTS	Module coordinator
Engineering Mechanics - Dynamics						Prof. Dr.-Ing. Heike Jaeckels
Engineering Mechanics - Statics	MEB_24_A_1.02.TMS	P241-0418	1	4V	5	Prof. Dr.-Ing. Heike Jaeckels
Environmental and Bioprocess Engineering with Lab	MEB_24_V_4.08.BUV	P241-0471, P241-0472	4	2V+2S	5	Prof. Dr. Timo Gehring
Gear Technology with Lab Sessions	MEB_24_PE_5.09.GTL	P241-0440, P241-0441	5	2V+1U+1P	4	Prof. Dr. Andrea Bohn
Heat Transfer and Fluid Mechanics	MEB_24_A_5.18.WFL	P241-0439	5	2V+2U+1P	6	Prof. Dr. Marco Günther
Industrial Placement	MEB_24_A_6.01.PRA	S241-0392	6	-	15	Studienleitung
Machine Elements and Design 1	MEB_24_M_3.05.MK1	P241-0428	3	3V+1U	5	Prof. Dr. Bernd Heidemann
Machine Elements and Design 2	MEB_24_M_4.03.MK2	P241-0432	4	3V+1U	5	Prof. Dr. Bernd Heidemann
Manufacturing Process Technology (with Lab Course)	MEB_24_A_2.02.TFL	P241-0457, P241-0458	2	4V+1U	5	Prof. Dr. Jürgen Griebsch
Materials Science and Technology 1	MEB_24_A_1.03.WSK	P241-0447, P241-0448	1	4V+1P	5	Prof. Dr. Moritz Habschied
Materials Science and Technology 2	MEB_24_A_2.05.KWL	P241-0459, P241-0460	2	3V+1P	4	Prof. Dr. Moritz Habschied
Mathematics 1	MEB_24_A_1.04.MA1	P241-0419	1	4V	5	

Module name (EN)	Code	SAP-P	Semester	Hours per semester week / Teaching method	ECTS	Module coordinator
						Prof. Dr. Marco Günther
Mathematics 2	MEB_24_A_2.04.MA2	P241-0424	2	4V	5	Prof. Dr. Marco Günther
Mathematics 3 and Programming	MEB_24_A_3.01.MA3	P241-0425	3	4V	5	Prof. Dr. Marco Günther
Physical Process Engineering with Practical Case Studies	MEB_24_V_4.10.PVT	P241-0469, P241-0470	4	4V	5	Prof. Dr. Matthias Faust
Plant Planning and Project Execution	MEB_24_V_4.11.APP	P241-0473, P241-0474	4	3V+1PA	4	Prof. Dr. Matthias Faust
Principles of Engineering Drafting and the Representation of Machine Elements (with Machine Analysis Lab)	MEB_24_A_1.01.MDM	P241-0445, P241-0446	1	2V+1U+1P	5	Prof. Dr. Bernd Heidemann
Project in Mechanical or Process Engineering	MEB_24_A_5.19.PMP	P241-0443, P241-0444	5	2PA+1S	3	Prof. Dr. Bernd Heidemann
Technical English for Academic Purposes	MEB_24_A_1.06.TEA	P241-0420, P241-0421	1	2SU	2	Dr. Julia Frisch
The Finite Element Method	MEB_24_PE_5.11.FEM	P241-0442	5	1V+1P	2	Prof. Dr.-Ing. Ramona Hoffmann
Thermodynamics	MEB_24_A_3.02.THE	P241-0426	3	4V	5	Prof. Dr. Matthias Faust

(33 modules)

Mechanical Engineering Bachelor - optional courses (overview)

Module name (EN)	Code	SAP-P	Semester	Hours per semester week / Teaching method	ECTS	Module coordinator
French 1	MEB_24_A_1.05.FR1	P241-0453	1	2SU	2	Dr. Julia Frisch
French 2	MEB_24_A_2.06.FR2	P241-0465	2	2SU	2	Dr. Julia Frisch
French for Beginners 1	MEB_24_A_1.05.FB1	P241-0452	1	-	2	Dr. Julia Frisch
French for Beginners 2	MEB_24_A_2.06.FB2	P241-0464	2	-	2	Dr. Julia Frisch
German (Winter Semester)	MEB_24_A_1.05.INTBW	P241-0449, P241-0450, P241-0451	1	2U	2	Dr. Julia Frisch
German Summer Semester	MEB_24_A_2.06.INTBS	P241-0461, P241-0462, P241-0463	2	2U	2	Dr. Julia Frisch
Intercultural communication	MEB_24_A_5.21.PMP		5	-	0,5	N.N.
Spanish for Beginners 1	MEB_24_A_1.05.SP1	P241-0454	1	2SU	2	Dr. Julia Frisch
Spanish for Beginners 2	MEB_24_A_2.06.SP2	P241-0466	2	2SU	2	Dr. Julia Frisch
Study Success for International Engineers	MEB_24_A_1.08.SIE		1	2S	0	Prof. Dr.-Ing. André Miede
Technical Case Study	MEB_24_A_5.20.TCS		5	2F	2,5	Prof. Dr. Frank Kneip

(11 modules)

Mechanical Engineering Bachelor - mandatory courses

Academic English Writing

Module name (EN): Academic English Writing
Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024
Module code: MEB_24_A_4.12.AEW
Hours per semester week / Teaching method: 2SU (2 hours per week)
ECTS credits: 2
Semester: 4
Mandatory course: yes
Language of instruction: English
Assessment: Project Work (report) [*updated 22.01.2026*]
Applicability / Curricular relevance: MEB_24_A_4.12.AEW (P241-0434) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 4, mandatory course Suitable for exchange students (learning agreement)
Workload: 30 class hours (= 22.5 clock hours) over a 15-week period. The total student study time is 60 hours (equivalent to 2 ECTS credits). There are therefore 37.5 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): MEB_24_A_1.06.TEA Technical English for Academic Purposes   [*updated 22.01.2026*]
Recommended as prerequisite for:
Module coordinator: Dr. Julia Frisch
Lecturer: Sebastian Barth, M.A.

[*updated 22.01.2026*]

Learning outcomes:

The modules Technical English for Academic Purposes and English Academic Writing as well as the foreign language component Presenting in English of the Project in Mechanical or Process Engineering are to be seen in context. Starting out from the required entry level B2, these modules help students to progress from level B2 to C1 in English as a foreign language.

Upon successful completion of this module, students will be able to write coherent academic texts such as a laboratory report, project report or Bachelor s thesis. They will be able to express their ideas effectively and appropriately in academic writing, using suitable language structures, register as well as an appropriate range of vocabulary.
They will be able to research information, analyze the results critically, and cite the sources properly.

[*updated 26.04.2024*]

Module content:

Introduction to various types of academic texts: laboratory report, project report, Bachelor s thesis
Structure of academic texts
Researching information and analyzing results
Referencing and citation conventions
Writing process (brainstorming, drafting, revising)
Developing paragraphs (topic sentences, linking words, etc.)
Writing exercises
Academic language: structures, register and vocabulary (e.g. for describing experiments)

[*updated 26.04.2024*]

Teaching methods/Media:

Teaching methods:
The learning goals will be achieved through the integrated training of the four basic skills (listening comprehension, reading comprehension, speaking and writing) supported by multimedia, as well as the revision of basic grammar and vocabulary in self-study phases.

Media:
Teaching and learning materials (print, audio, video), multimedia teaching and learning software and WBTs for specific target groups.

[*updated 26.04.2024*]

Recommended or required reading:

Sowton, Chris. 50 Steps to Improving Your Academic Writing: Study Book. Garnet Publishing, 2014.
Rosenberg, Barry J. Spring into Technical Writing for Engineers and Scientists. Addison-Wesley Educational, 2005.
Northedge, Andrew, et. al. The Good Study Guide. The Open University Worldwide, 2005.

[*updated 26.04.2024*]

Applied Metrology

Module name (EN): Applied Metrology

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_5.02.MTE

Hours per semester week / Teaching method:
4V (4 hours per week)

ECTS credits:
5

Semester: 5

Mandatory course: yes

Language of instruction:
English

Required academic prerequisites (ASPO):
Lab participation and lab report

Assessment:
Written exam 120 min (grade)

[*updated 15.01.2024*]

Applicability / Curricular relevance:

MEB_24_A_5.02.MTE (P241-0435, P241-0436) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 5, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 150 hours (equivalent to 5 ECTS credits).
There are therefore 105 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr.-Ing. Jochen Gessat

Lecturer:
Prof. Dr.-Ing. Jochen Gessat

[*updated 28.02.2025*]

Learning outcomes:
After successfully completing this module, students will be familiar with the measurement methods for measuring displacement, strain, force, acceleration, speed, torque, pressure, flow, temperature, current, voltage, resistance and will be able to assess their properties. A brief insight into electronics will enable students to handle measuring amplifiers and simple filter circuits safely. Students will be familiar with the possibilities of modern signal analysis technology. They will be able to apply the measurement techniques they have learned in other disciplines.
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
Measurement sequence, measurement sequence components
Measurement errors and deviations
Measuring transducers and operational amplifiers
Wheatstone bridge
Strain gauges
Measuring amplifiers
Measuring lengths, distances and levels
Measuring force, torque, acceleration and pressure
Measuring rotational speed
Flow rate measurement
Measuring temperatures
Measuring electrical quantities
High-pass, low-pass filters
Analog-digital conversion methods
Reasons for and effects of aliasing effects
PC measurement technology
Measurement analysis in time and frequency domain

[*updated 15.01.2024*]

Teaching methods/Media:
Lecture with integrated exercises, lab experiments in small groups

[*updated 15.01.2024*]

Recommended or required reading:
Herbert Bernstein, Messelektronik und Sensoren, Springer Vieweg Profos/Pfeiffer: Handbuch der industriellen Messtechnik, Oldenburg

[*updated 15.01.2024*]

Applying Numerical Methods

Module name (EN): Applying Numerical Methods

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_4.01.ANM

Hours per semester week / Teaching method:

4V (4 hours per week)

ECTS credits:
5

Semester: 4

Mandatory course: yes

Language of instruction:
English

Assessment:
written exam 120 min

[*updated 13.11.2023*]

Applicability / Curricular relevance:

MEB_24_A_4.01.ANM (P241-0431) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 4, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 150 hours (equivalent to 5 ECTS credits).
There are therefore 105 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Marco Günther

Lecturer: Prof. Dr. Marco Günther

[*updated 10.10.2023*]

Learning outcomes:
After successfully completing this module, students will be familiar with important topics and application examples of numerical computing. They will be able to implement simple algorithms using the calculation tool Octave/Matlab and solve simple problems numerically. Students will understand central solution approaches from selected topics in numerical mathematics.
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
Numerical methods for solving linear systems of equations with application examples in engineering, Numerical methods for solving nonlinear equations, Octave/Matlab on the computer, Interpolation

(polynomial, spline interpolation), Equalization calculation, Numerical differentiation and integration, Numerical treatment of ordinary differential equations (initial value problems, boundary value problems), Introduction to Simulink on the computer (dynamic systems).

[*updated 15.01.2024*]

Teaching methods/Media:
Lecture, integrated exercises, exercises for self-study; Computer lab, interactive tablet, transparencies, exercises

[*updated 15.01.2024*]

Recommended or required reading:
A. Bosl: Einführung in Matlab/Simulink O. Beucher: Matlab und Simulink M. Knorrenschild: Numerische Mathematik H.R. Schwarz, N. Köckler: Numerische Mathematik

[*updated 15.01.2024*]

Automation Technology in Mechanical Engineering

Module name (EN): Automation Technology in Mechanical Engineering

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_M_5.17.AUM

Hours per semester week / Teaching method:
3V+1P (4 hours per week)

ECTS credits:
5

Semester: 5

Mandatory course: yes

Language of instruction:
English

Required academic prerequisites (ASPO):
Lab participation and lab report

Assessment:
written exam 120 min (grade)

[*updated 15.01.2024*]

Applicability / Curricular relevance:

MEB_24_M_5.17.AUM (P241-0437, P241-0438) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 5, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 150 hours (equivalent to 5 ECTS credits).
There are therefore 105 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
N.N.

Lecturer: N.N.

[*updated 10.10.2023*]

Learning outcomes:
After successfully completing this course, students will be able to handle, use and apply programmable logic controllers, as well as system-theoretical methods for solving practice-oriented control and regulation tasks in the field of mechanical engineering. They will be able to select controllers and their settings in a practice-oriented manner. Students will be familiar with the problems involved in selecting and setting control loops. Introduction of modern tools for problem solving, modeling and simulating automation tasks. Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
Boolean algebra and switching functions
Implementing switching functions and their simplification
Sequential control systems
Design and functionality of control systems
Introduction to control eingineering
Transfer functions
The static and dynamic behavior of control loops
Control loop elements and system behavior
PID controllers and derivable types
Tuning rules, optimization, experimental analysis
Modified control loop structures
Stability considerations
Introduction to simulation tools for control loop design

[*updated 15.01.2024*]

Teaching methods/Media:
Lecture with integrated exercises, lab experiments in small groups

[*updated 15.01.2024*]

Recommended or required reading:
Lutz/Wendt: Taschenbuch der Regelungstechnik, Schneider: Praktische Regelungstechnik, Wellenreuther/Zastrow: Automatisieren mit SPS - Theorie und Praxis

[*updated 15.01.2024*]

Bachelor Thesis with Colloquium

Module name (EN): Bachelor Thesis with Colloquium

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_6.02.BAK

Hours per semester week / Teaching method:
-

ECTS credits:
15

Semester: 6

Mandatory course: yes

Language of instruction:
English/German

Assessment:
project work + oral presentation

[*updated 13.11.2023*]

Applicability / Curricular relevance:

MEB_24_A_6.02.BAK (S241-0393, T241-0390) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 6, mandatory course

Workload:
The total student study time for this course is 450 hours.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Professor/innen des Studiengangs

Lecturer:
Professor/innen des Studiengangs

[*updated 15.01.2024*]

Learning outcomes:
After successfully completing this module, students will be able to work on complex mechanical engineering

tasks in an industrial or scientific environment. They will be able to present their approach, solutions and results using scientific methods.

[*updated 15.01.2024*]

Module content:
Solving mechanical engineering and related tasks scientifically - Project-related application of different principles in their interaction - Consolidation and further development of theoretical knowledge

[*updated 15.01.2024*]

Recommended or required reading:
Depends on topic

[*updated 15.01.2024*]

Basics of Component Dimensioning

Module name (EN): Basics of Component Dimensioning

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_2.03.GBD

Hours per semester week / Teaching method:
3V+1U (4 hours per week)

ECTS credits:
5

Semester: 2

Mandatory course: yes

Language of instruction:
English

Assessment:
written exam 180 min

[*updated 13.11.2023*]

Applicability / Curricular relevance:

MEB_24_A_2.03.GBD (P241-0423) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 2, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 150 hours (equivalent to 5 ECTS credits).
There are therefore 105 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr.-Ing. Ramona Hoffmann

Lecturer:
Prof. Dr.-Ing. Ramona Hoffmann

[*updated 28.02.2025*]

Learning outcomes:
After successfully completing this module, students will be familair with the basic load cases. They will be able to recognize, analyze and calculate the behavior of components under the effect of basic loads. Students will be able to abstract real components on the mechanical models. They will be able to dimension simple components under simple loads. Students will be able to formulate questions and speak in front of a large group.
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
Introduction and classification: Tasks of component dimensioning and elastostatic principles Basic load cases Tension and compression: tension, elongation, material law, thermal expansion, variable stresses, structures of equal strength The bar as a model for real components Statically determinate bar systems, statically indeterminate bar systems Surface contact under compressive force: Bearing stress/surface pressure Thrust/transverse shear/shearing Bending: Straight beam, moments per unit area, bending line, beam of equal strength, inclined bending, transverse shear The beam as a model for real components Torsion: Round, full cross sections, hollow cross sections, arbitrary cross sections, behavior of open cross sections Bending of straight bars

[*updated 15.01.2024*]

Recommended or required reading:
Groß, Hauger, Schröder, Wall: Technische Mechanik 2 Elastostatik, Springer-Verlag. Holzmann, Meyer, Schumpich: Technische Mechanik Festigkeitslehre, Springer Vieweg Verlag. Läpple: Einführung in die Festigkeitslehre, Vieweg+Teubner Verlag. Böge: Technische Mechanik, Springer Vieweg Verlag. Hibbeler: Technische Mechanik 2 Festigkeitslehre, Pearson Verlag. Kabus: Mechanik und Festigkeitslehre, Hanser Verlag.

[*updated 15.01.2024*]

CAD 3D-Modeling and Simulation

Module name (EN): CAD 3D-Modeling and Simulation

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_3.07.CAD

Hours per semester week / Teaching method:
2V+2P (4 hours per week)

ECTS credits:
5

Semester: 3

Mandatory course: yes

Language of instruction:
English

Assessment:
written exam 120 min

[*updated 13.11.2023*]

Applicability / Curricular relevance:

MEB_24_A_3.07.CAD (P241-0430) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 3, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 150 hours (equivalent to 5 ECTS credits).
There are therefore 105 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Bernd Heidemann

Lecturer: Prof. Dr. Bernd Heidemann

[*updated 10.10.2023*]

Learning outcomes:
After successfully completing this course, students will be able to model components using a CAD system with basic functions. Students will be aware of the importance of taking the production process into account when modeling components.
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
Fundamentals of 3D-CAD technology. Current state of the art and future developments. 3D-CAD technology´s use in mechanical and process engineering. Basic applications and functions: Components, assembly, drawing derivation, exploded-view drawings. Standardized designation of structural components,

elements and detailed surfaces (undercut, groove, chamfer, pocket, collar, heel, etc.) Consideration of the individual production steps suitable for manufacturing the resp. components with their detailed surfaces and rough planning of the sequences in terms of a production process.

[*updated 28.02.2025*]

Teaching methods/Media:
Course with seminaristic components

[*updated 15.01.2024*]

Recommended or required reading:

[*updated 26.06.2024*]

Dimensioning Components

Module name (EN): Dimensioning Components

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_M_3.06.BTD

Hours per semester week / Teaching method:
3V+1U (4 hours per week)

ECTS credits:
5

Semester: 3

Mandatory course: yes

Language of instruction:
English

Assessment:
written exam 180 min

[*updated 13.11.2023*]

Applicability / Curricular relevance:

MEB_24_M_3.06.BTD (P241-0429) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 3, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 150 hours (equivalent to 5 ECTS credits).
There are therefore 105 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr.-Ing. Ramona Hoffmann

Lecturer:
Prof. Dr.-Ing. Ramona Hoffmann

[*updated 28.02.2025*]

Learning outcomes:
After successfully completing this module, students will:
-- be able to distinguish between and describe static and dynamic stresses, especially on real components
-- be able to describe important procedures and tools for component dimensioning
-- be able to take the geometric and material parameters into account that influence the dynamic strength of components -- be able to dimension complex components under composite, multi-axial loads for static and dynamic load cases
-- be able to analyze components with regard to possible instabilities
-- be able to apply energy methods to solve simple problems in elastomechanics
-- be able to formulate questions and speak in front of a large group, as well as expertly justify their decisions in front of groups
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
Dynamic loads
-- Fatigue test according to Wöhler, Wöhler curves
-- Smith and Haigh fatigue strength diagrams
-- Influence of component size, surface, notches on fatigue strength
-- Static and dynamic strength analysis
Multi-axial stress state and distortion state
Linear elasticity Strength hypotheses
Dimensioning a shaft under bending and torsional loads
Instabilities Elastostatics energy methods

[*updated 15.01.2024*]

Recommended or required reading:
Groß, Hauger, Schröder, Wall: Technische Mechanik 2 Elastostatik, Springer-Verlag. Holzmann, Meyer, Schumpich: Technische Mechanik Festigkeitslehre, Springer Vieweg Verlag. Läpple: Einführung in die Festigkeitslehre, Vieweg+Teubner Verlag. Böge: Technische Mechanik, Springer Vieweg Verlag. Hibbeler: Technische Mechanik 2 Festigkeitslehre, Pearson Verlag. Kabus: Mechanik und Festigkeitslehre, Hanser Verlag.

[*updated 15.01.2024*]

Electrical Engineering for Mechanical Engineering und Process Engineering

Module name (EN): Electrical Engineering for Mechanical Engineering und Process Engineering
Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024
Module code: MEB_24_A_2.07.ELT
Hours per semester week / Teaching method: 3V+1P (4 hours per week)
ECTS credits: 5
Semester: 2
Mandatory course: yes
Language of instruction: English
Required academic prerequisites (ASPO): Lab participation and lab report
Assessment: written exam [*updated 13.11.2023*]
Applicability / Curricular relevance: MEB_24_A_2.07.ELT (P241-0467, P241-0468) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 2, mandatory course
Workload: 60 class hours (= 45 clock hours) over a 15-week period. The total student study time is 150 hours (equivalent to 5 ECTS credits). There are therefore 105 hours available for class preparation and follow-up work and exam preparation.
Recommended prerequisites (modules): None.
Recommended as prerequisite for:
Module coordinator: Prof. Dr. Wenmin Qu
Lecturer: Prof. Dr. Wenmin Qu (lecture) Dr.-Ing. Arthur Grün (practical training)

[*updated 28.02.2025*]

Learning outcomes:
After successfully completing this module, students will be familiar with the basic passive and active components of electrical engineering and understand their operating behavior and interaction. They will be familiar with the basics of electrical engineering and its connection to magnetism. They will observe the basic rules for handling electricity. Students will be able to perform basic electrical design tasks, understand electrical circuits and calculate simple networks. They will understand the differences between direct and alternating current systems. Furthermore, students will be familiar with the basic structure and function of electrical machines. Based on the example of synchronous and asynchronous machines in motor and generator operation, they will be able to explain the function and power electronics required and be able to select the appropriate machines.
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
Electrical quantities and basic laws
Kirchhoff´s rules
Measuring current, voltage, power
DC circuits, calculating networks
Electric field, capacitor, capacity
Magnetic field
Magnetic field strength, magnetic flux density, magnetic flux
Ampère´s circuital law
Forces in the magnetic field
Faraday´s law of induction, Lenz s law Self-induction, inductance
Generating stress by rotation and transformation
Eddy currents and applications
Alternating current circuits
Circuits with resistors, capacitors, inductors, resonant circuits
Active power, reactive power, apparent power, work
Three-phase systems
Semiconductor components Diodes, transistors and operational amplifiers
Electrical machines in motor and generator operation
Design and basic function of synchronous and asynchronous motors
Basic function of a frequency converter

[*updated 15.01.2024*]

Teaching methods/Media:
Lecture, descriptions of lab experiments; Lab experiments with assistance where required, Independently written lab reports in accordance with specifications on content and form

[*updated 15.01.2024*]

Recommended or required reading:
Hermann Linse, Rolf Fischer: Elektrotechnik für Maschinenbauer Rudolf Busch: Elektrotechnik für Maschinenbauer und Verfahrenstechniker Eckbert Hering, Jürgen Gutekunst, Rolf Martin: Elektrotechnik für Maschinenbauer Eckbert Hering, Jürgen Gutekunst, Rolf Martin: Elektrotechnik für Ingenieure G. Fliegel: : Elektrotechnik für Maschinenbauer

[*updated 15.01.2024*]

Engineering Basics with Intercultural Management

Module name (EN): Engineering Basics with Intercultural Management

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_1.07.ENB

Hours per semester week / Teaching method:
1V+3P (4 hours per week)

ECTS credits:
6

Semester: 1

Mandatory course: yes

Language of instruction:
English

Required academic prerequisites (ASPO):
presentation

Assessment:
project work (grade)

[*updated 15.01.2024*]

Applicability / Curricular relevance:

MEB_24_A_1.07.ENB (P241-0455, P241-0456) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 1, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 180 hours (equivalent to 6 ECTS credits).
There are therefore 135 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Matthias Faust

Lecturer:
Prof. Dr. Matthias Faust
B.Eng. Sebastian Georg

Professor/innen des Studiengangs

[*updated 28.01.2026*]

Learning outcomes:
Part Engineering Basics:
Students will be familiar with the curriculum and will be able to explain its structure and contribution to mechanical/process engineering education.
Students will be aware of the interdisciplinary connections between the individual courses in the study program (modules).
They will receive initial insight into practical engineering activities.
They will be able to integrate themselves into a group, organize projects and develop independent working methods.
Students will be able to approach simple technical problems, solve them, and reach a conclusion.
Students will be able to give a short presentation in front of an audience.

Part Intercultural Management:
Students will define and explain concepts and terms such as culture, stereotypes and perception of others.
Students will describe cultural differences in working life.
Students will explain and critically reflect on various models of cultural comparison.
Explain intercultural competence models and apply and transfer them to various professional activities and environments.
Students will be familiar with standard engineering work methodology.
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
Part Engineering Basics:
Informative, introductory lectures:
- Introduction to mechanical engineering" lecture (90 - 120 minutes)
- Introduction to process engineering" lecture (90 - 120 minutes)
-"Engineering activities in professional mechanical engineering practice" company lectures (90 - 120 minutes)
-"Engineering activities in professional process engineering practice" company lectures (90 - 120 minutes)
-Several short presentations (45 - 90 minutes) from faculty members outlining the content and importance of the subject/modules represented in the degree program for the students engineering education.
-If possible, further presentations.
-Project work / team work.

Part Intercultural Management:
Apply different cultural models and definitions
Recognize different levels of communication and their associated special features in an intercultural context (gestures, facial expressions, proxemics).
Perception of others, stereotypes and prejudices
At least two different models of cultural comparison in contrast (e.g. Hofstede, Lewis, Thomas, GLOBE)

[*updated 22.01.2026*]

Teaching methods/Media:
In small groups, students will work on projects described in a "guideline" by means of simple tasks that demonstrate the range of mechanical engineering/process engineering content and typical activities carried out in the fields. The projects promote creativity and analytical skills. They are designed to allow students to experience how much fun these activities are and the how rewarding it is to achieve results. With simple structures, built/developed by themselves, they will analyze engineering-relevant topics and thus, create connections to the curriculum s content. Students will be encouraged to actively seek any other knowledge they require from other teaching staff members at the htw saar. The projects will be accompanied and supervised by teachers who, as a point of reference, can also provide mentoring.

[*updated 15.01.2024*]

Recommended or required reading:

[*still undocumented*]

Engineering Design (with Project)

Module name (EN): Engineering Design (with Project)

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_M_4.04.MK2

Hours per semester week / Teaching method:
1V+3PA (4 hours per week)

ECTS credits:
4

Semester: 4

Mandatory course: yes

Language of instruction:
English

Assessment:
project work

[*updated 13.11.2023*]

Applicability / Curricular relevance:

MEB_24_M_4.04.MK2 (P241-0433) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 4, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 120 hours (equivalent to 4 ECTS credits).
There are therefore 75 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Bernd Heidemann

Lecturer:
Prof. Dr. Bernd Heidemann

[*updated 28.02.2025*]

Learning outcomes:
After successfully completing this module, students will be familiar with common rules for designing components, assemblies and machines. They will be able to construct a machine for a given task in a methodically planned procedure and assemble it in a functional manner. Students will be able to cooperate and communicate with other students in a team, and both present and defend their ideas. They will be able to discuss and evaluate the ideas of others objectively.
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
A methodical approach to design - From main functional components to standard parts Force flow-oriented and material-economical design Assembly-ready design Component design for additive, generative manufacturing processes X-Würfel project: Machine design and construction in a team according to a defined task. The task will be announced in an annual guideline with a specification sheet. The components designed within the framework of the project must also be suitable for production (see the "Fertigungsgerechte Bauteilgestaltung module).

[*updated 15.01.2024*]

Recommended or required reading:
Decker, K.-H.: Maschinenelemente. Carl Hanser Verlag, München. Hoenow, G., Meißner, T.: Entwerfen und Gestalten im Maschinenbau. Bauteile Baugruppen Maschinen. Carl Hanser Verlag, München. Hoischen, H., Hesser, W.: Technisches Zeichnen. Grundlagen, Normen, Beispiele, Darstellende Geometrie. Cornelsen Verlag Scriptor GmbH & Co. KG, Berlin. Jorden, W.: Form- und Lagetoleranzen. Carl Hanser Verlag, München. Muhs, D., e.a.: Roloff/Matek Maschinenelemente. Normung, Berechnung, Gestaltung. Vieweg + Teubner Verlag, Wiesbaden. Muhs, D., e.a.: Roloff/Matek Maschinenelemente. Tabellen. Vieweg + Teubner Verlag, Wiesbaden. Trumpold, H., Beck, Ch., Richter, G.: Toleranzsysteme und Toleranzdesign Qualität im Austauschbau. Carl Hanser Verlag, München Wien.

[*updated 15.01.2024*]

Engineering Fluid Mechanics, Piston Engines, Compressors and Turbines

Module name (EN): Engineering Fluid Mechanics, Piston Engines, Compressors and Turbines

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_3.04.SKS

Hours per semester week / Teaching method:
4V (4 hours per week)

ECTS credits:
5

Semester: 3

Mandatory course: yes

Language of instruction:
English

Assessment:
written exam 120 min

[*updated 13.11.2023*]

Applicability / Curricular relevance:

MEB_24_A_3.04.SKS (P241-0427) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 3, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 150 hours (equivalent to 5 ECTS credits).
There are therefore 105 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Marco Günther

Lecturer:
Prof. Dr. Marco Günther
Prof. Dr.-Ing. Thomas Heinze

[*updated 28.02.2025*]

Learning outcomes:
After successfully completing this module, students will be familiar with the basics of fluid mechanical quantities and laws. They will be able to apply the laws of fluid mechanics to simple practical problems in hydrostatics and hydrodynamics. Students will be able to describe well-known types of pistons and turbomachinery, including their basic structure, function, application possibilities and operating behavior. Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
Fluid Mechanics:
Fluid statics: fluid properties, state variables, pressure concept and distribution, effects of force on container walls, buoyancy and thermal lift
Frictionless flows (incompressible): current filament theory, equations of motion for a fluid element, conservation laws of the stationary current filament theory (conservation of mass, energy theorem), pressure and velocity measurement Flows with friction (incompressible): frictional influence, mechanical similarity and characteristics, laminar and turbulent flow, stationary pipe flow Piston engines and flow machines:
Piston engines: - Basics, mode of operation, operating behavior with regard to:
- Piston compressors
- Piston pumps
- Piston steam engines
- Internal combustion engines
Fluid flow machines: - Basics, mode of operation, operating behavior with regard to:
- Axial and radial compressors
- Axial and radial pumps
- Steam turbines
- Water turbines
- Gas turbines

[*updated 15.01.2024*]

Teaching methods/Media:
- Lecture with integrated exercises, exercises for self-study Blackboard, transparencies, lecture notes, exercises

[*updated 15.01.2024*]

Recommended or required reading:
Technical fluid mechanics: Bohl: Techn. Strömungslehre; v. Böckh: Fluidmechanik; Herwig: Strömungsmechanik; Herwig: Strömungsmechanik A-Z; Kümmel: Technische Strömungsmechanik; Oertel, Böhle, Dohrmann: Strömungsmechanik Piston engines and flow machines: Küttner: Kolbenmaschinen; Beitz, Grote - Hrsg.: Dubbel-Taschenbuch für den Maschinenbau, Kapitel Kolbenmaschinen, Kapitel Strömungsmaschinen; Urlaub: Verbrennungsmotoren; Bohl, Elmendorf: Strömungsmaschinen 1

[*updated 15.01.2024*]

Engineering Mechanics - Dynamics

Module name (EN): Engineering Mechanics - Dynamics

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_M_2.01.TMD

Hours per semester week / Teaching method:
4V (4 hours per week)

ECTS credits:
4

Semester: 2

Mandatory course: yes

Language of instruction:
English

Assessment:
Written exam 120 min

[*updated 13.11.2023*]

Applicability / Curricular relevance:

MEB_24_M_2.01.TMD (P241-0422) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 2, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 120 hours (equivalent to 4 ECTS credits).
There are therefore 75 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr.-Ing. Heike Jaeckels

Lecturer:
Prof. Dr.-Ing. Heike Jaeckels

[*updated 28.02.2025*]

Learning outcomes:
After successfully completing this course, students will be able to:
* describe plane motion of rigid bodies mathematically
* analyze and calculate dynamic rigid bodies
* model simple vibrating systems and calculate parameters
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
Kinematics of a rigid body
Kinematics of mass point
Kinetics of a rigid body, work and energy, collisions Introduction to mechanical vibrations

[*updated 26.06.2024*]

Recommended or required reading:
Berger J. : Technische Mechanik für Ingenieure 3, Vieweg Verlag, neueste Auflage Gloistehn H. H. : Lehr- und Übungsbuch der Technischen Mechanik 3, 1992 Gross D. et al. : Technische Mechanik, Bd.3, Springer Verlag, neueste Auflage Hibbeler et al. : Technische Mechanik , Pearson Verlag, München, neueste Auflage Holzmann G. et al. : Technische Mechanik, Kinematik und Kinetik, Teubner Verlag, neueste Auflage

[*updated 26.06.2024*]

Engineering Mechanics - Statics

Module name (EN): Engineering Mechanics - Statics

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_1.02.TMS

Hours per semester week / Teaching method:
4V (4 hours per week)

ECTS credits:
5

Semester: 1

Mandatory course: yes

Language of instruction:
English

Assessment:
written exam 120 min

[*updated 13.11.2023*]

Applicability / Curricular relevance:

MEB_24_A_1.02.TMS (P241-0418) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 1, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 150 hours (equivalent to 5 ECTS credits).
There are therefore 105 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr.-Ing. Heike Jaeckels

Lecturer: Prof. Dr.-Ing. Heike Jaeckels

[*updated 10.10.2023*]

Learning outcomes:
After successfully completing this course, students will be able to:
* describe the terms force and moment
* apply free body diagrams
* write down equilibrium conditions and solve systems of equations
* calculate and represent exteral and internal forces and moments in structures
* consider adhesion and friction in the analysis of static rigid body systems
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
Forces with a Common Point of Application
General Systems of Forces
Equilibrium of a Rigid Body
Multi-Part Structures
Internal Forces in Trusses
Stress Resultants in Beams
Static and Kinetic Friction

[*updated 17.10.2024*]

Teaching methods/Media:
Lecture with seminaristic elements
Inverted Classroom Method

[*updated 17.10.2024*]

Recommended or required reading:
Gross, D. et al., Engineering Mechanics 1, Springer, 2nd edition, 2013

[*updated 17.10.2024*]

Environmental and Bioprocess Engineering with Lab

Module name (EN): Environmental and Bioprocess Engineering with Lab

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_V_4.08.BUV

Hours per semester week / Teaching method:
2V+2S (4 hours per week)

ECTS credits:
5

Semester: 4

Mandatory course: yes

Language of instruction:
English

Required academic prerequisites (ASPO):
Lab participation and presentation

Assessment:
oral exam (grade)

[*updated 15.01.2024*]

Applicability / Curricular relevance:

MEB_24_V_4.08.BUV (P241-0471, P241-0472) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 4, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 150 hours (equivalent to 5 ECTS credits).
There are therefore 105 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Timo Gehring

Lecturer:
Prof. Dr. Timo Gehring

[*updated 28.02.2025*]

Learning outcomes:
After successfully completing this module, students will be familiar with and be able to understand and explain the basic principles of basic chemistry and genetic engineering and the microbial production of valuable substances. They will have an overview of the potential of microorganisms and their possible uses and be able to explain them. They will be familiar with and be able to explain methods for handling, preventing and mass producing microorganisms. Students will be familiar with and be able to explain essential methods of up and downstream processing.
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
Introduction to general chemistry and chemical terms, Upstream processing, bioreactors, ideal and real

stirred tank and tube reactors, CSTR, Q/D diagram, continuous reactors, batch reactors, methods of downstream processing; protein as a product Gene expression, gene regulation, plasmids, vectors, introduction to genetic engineering, genetic fingerprint, PCR, Southern and Northern blot, sequencing according to Sanger, restiction enzymes, expression vectors, expression of eukaryotic genes in prokaryotes, introduction to virology, production of monoclonal antibodies

Lab exercises on selected topics in biotechnology, Presentations on selected topics from food biotechnology, biotechnology and environmental technology

[*updated 25.01.2024*]

Teaching methods/Media:
Lecture mit blackboard and transparencies; practical lab exercises, class presentations, talks by external guests, study trip

[*updated 15.01.2024*]

Recommended or required reading:
Brock et.al.: Biology of Microorganisms, Prentice Hall Forst et al.: Chemie für Ingenieure Löwe: Biochemie, Benke Thiemann und Palladino: Biotechnologie, Pearson

[*updated 15.01.2024*]

Gear Technology with Lab Sessions

Module name (EN): Gear Technology with Lab Sessions

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_PE_5.09.GTL

Hours per semester week / Teaching method:
2V+1U+1P (4 hours per week)

ECTS credits:
4

Semester: 5

Mandatory course: yes

Language of instruction:
English

Required academic prerequisites (ASPO):
Lab participation and lab report

Assessment:
written exam 180 min (grade)

[*updated 15.01.2024*]

Applicability / Curricular relevance:

MEB_24_PE_5.09.GTL (P241-0440, P241-0441) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 5, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 120 hours (equivalent to 4 ECTS credits).
There are therefore 75 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Andrea Bohn

Lecturer: Prof. Dr. Andrea Bohn

[*updated 10.10.2023*]

Learning outcomes:
The students master the rules of systematic gearbox design and can classify and characterize gearbox types. They are able to identify and describe typical movements of working elements, dimension selected gearbox types for given kinematic requirements, and calculate them from a kinetostatic perspective.
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 12.11.2025*]

Module content:
Design and systematics of gearboxes
Gear drives
Traction gears
Mechanical linkage gears
Cam gears
Clutches and Brakes

Lab sessions
Exercises for the structural and kinematic analysis of unevenly geared transmissions on laboratory test stations

[*updated 12.11.2025*]

Teaching methods/Media:
Lecture with integrated exercises
lab work, exercises, laboratory test benches with real gearbox assemblies

[*updated 12.11.2025*]

Recommended or required reading:
/1/ Wittel, H.; Muhs, D.; Jannasch, D.; Voßiek, J.: Roloff/Matek - Maschinenelemente. 26.Auflage. Wiesbaden: Vieweg+Teuber Fachverlage 2023

/2/ Fricke, Günzel, Schäffer: Bewegungstechnik Konzipieren und Auslegen von mechanischen Getrieben. 3., überarbeitete Auflage. München: Carl Hanser Verlag 2021
/3/ Schlecht, B.: Maschinenelemente 2. Getriebe-Verzahnungen-Lagerungen. München: Pearson Studium 2017

[*updated 12.11.2025*]

Heat Transfer and Fluid Mechanics

Module name (EN): Heat Transfer and Fluid Mechanics

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_5.18.WFL

Hours per semester week / Teaching method:
2V+2U+1P (5 hours per week)

ECTS credits:
6

Semester: 5

Mandatory course: yes

Language of instruction:
German

Assessment:
Project

[*updated 22.02.2024*]

Applicability / Curricular relevance:

MEB_24_A_5.18.WFL (P241-0439) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 5, mandatory course

Workload:
75 class hours (= 56.25 clock hours) over a 15-week period.
The total student study time is 180 hours (equivalent to 6 ECTS credits).
There are therefore 123.75 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Marco Günther

Lecturer:
Prof. Dr. Marco Günther

[*updated 28.02.2025*]

Learning outcomes:
Field of study: Heat transfer
...to be done...

Field of study: Fluid mechanics
After successfully completing this part of the course, students will learn the extended physical basics for the calculation of incompressible and especially compressible flows. Students will be familiar with the essential elements of a flow calculation and have some basic experience in operating calculation tool. Through exercises, students will be able to classify fluid dynamic processes and their effects, taking into account the influencing variables, and to calculate them from an engineering perspective.
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 10.03.2026*]

Module content:
Field of study: Heat transfer

Fourier´s laws of heat conduction, thermal conductivity of fluids and solids, heat transfer coefficient.
- Steady-state problems:
Heat transfer through flat, cylindrical, and spherical walls (PÈCLET-Gin.)
Quasi-one-dimensional and quasi-stationary problems:
Cooling of flowing fluids in pipes, cooling of a fluid in a spherical reservoir, cooling of a wire passing through a liquid bath, fins (finned walls, finned tubes)
- Similarity theory:
Dimensionless parameters (Nu, Re, Pr, Gr, etc.)
- Heat transfer in single-phase media:
Forced convection: channel flows, bodies in cross flow, tube bundles, free convection: flat wall, horizontal cylinder
- Simple heat exchangers:
Recuperators, regenerators: parallel flow, counterflow, cross flow
- Heat transport by radiation:
Planck´s law of radiation, Lambert´s cosine law, Stefan-Boltzmann law, Kirchhoff´s law, radiation exchange between parallel walls, radiation screens, radiation exchange between enclosing surfaces.
- Application:
Exemplary applications of simulation software (like Ansys Fluent, Ansys CFX, Comsol Multiphysics)

Field of study: Fluid mechanics
- Incompressible fluids:
Steady flow in piping systems, outflow processes, principle of linear momentum, principle of angular momentum
- Compressible fluids:
Energy equation, outflow processes, supersonic flow
- Application:
Exemplary applications of simulation software (like Ansys Fluent, Ansys CFX, Comsol Multiphysics)

[*updated 10.03.2026*]

Teaching methods/Media:
Lecture guide, handouts, exercises, formula collection, computer calculation

[*updated 22.02.2024*]

Recommended or required reading:

[*still undocumented*]

Industrial Placement

Module name (EN): Industrial Placement

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_6.01.PRA

Hours per semester week / Teaching method:
-

ECTS credits:
15

Semester: 6

Mandatory course: yes

Language of instruction:
English

Assessment:
project work + oral presentation

[*updated 13.11.2023*]

Applicability / Curricular relevance:

MEB_24_A_6.01.PRA (S241-0392) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 6, mandatory course

Workload:
The total student study time for this course is 450 hours.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Studienleitung

Lecturer:
Professoren HTW

[*updated 15.01.2024*]

Learning outcomes:
After successfully completing this module, students will have experienced the practical working methods used in engineering professions by carrying out work independently and actively participating in various tasks.
In doing so, they will apply the theoretical and practical experience gained thus far and mirror it with their experience in concrete project work.
They will be able to present their approach, solutions and results in a colloquium.
They will get to know the many diferent interdependencies of the individual specialist areas and be able to integrate themselves into a team.

[*updated 15.01.2024*]

Module content:
Depends on the topic and institution in which the practical phase is completed.

[*updated 15.01.2024*]

Recommended or required reading:

[*still undocumented*]

Machine Elements and Design 1

Module name (EN): Machine Elements and Design 1

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_M_3.05.MK1

Hours per semester week / Teaching method:
3V+1U (4 hours per week)

ECTS credits:
5

Semester: 3

Mandatory course: yes

Language of instruction:
English

Assessment:
written exam 180 min

[*updated 13.11.2023*]

Applicability / Curricular relevance:

MEB_24_M_3.05.MK1 (P241-0428) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 3, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 150 hours (equivalent to 5 ECTS credits).
There are therefore 105 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Bernd Heidemann

Lecturer:
Prof. Dr. Bernd Heidemann

[*updated 28.02.2025*]

Learning outcomes:
After successfully completing this course, students will be able to classify technical systems into technical products and machines. Students will be able to analyze and justify technical systems in terms of function and element design. Students will be familiar with basic construction methods, joining techniques and elements and will be able to develop constructive solutions with these. They will be able to constructively design simple elements (e.g. grippers, pliers, presses, jigs and fixtures) for basic requirements (functional, manufacturable) and present them in handmade drawings. Students will be able to formulate questions and present constructive ideas in front of a large group.
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
Introduction: Definitions of machine and machine elements Classification: Constructing as an activity within a product development process. The basic requirements for a construction/technical product Systems engineering and systems engineering analysis (The input variables energy, material, information for a technical system, couplings in a technical system.) Form and position tolerances Housings and frames - construction methods and constructive designs Fixed couplings - fastenings and techniques: welding and construction suitable for welding. Bonding and adhesive construction. Rivets, bolts, pins and the design of typical connections. Screws and the design of prestressed bolt connections.

[*updated 15.01.2024*]

Recommended or required reading:
Decker, K.-H.: Maschinenelemente. Carl Hanser Verlag, München. Hoenow, G., Meißner, T.: Entwerfen und Gestalten im Maschinenbau. Bauteile Baugruppen Maschinen. Carl Hanser Verlag, München.

Hoischen, H., Hesser, W.: Technisches Zeichnen. Grundlagen, Normen, Beispiele, Darstellende Geometrie. Cornelsen Verlag Scriptor GmbH & Co. KG, Berlin. Jorden, W.: Form- und Lagetoleranzen. Carl Hanser Verlag, München. Muhs, D., e.a.: Roloff/Matek Maschinenelemente. Normung, Berechnung, Gestaltung. Vieweg + Teubner Verlag, Wiesbaden. Muhs, D., e.a.: Roloff/Matek Maschinenelemente. Tabellen. Vieweg + Teubner Verlag, Wiesbaden. Trumpold, H., Beck, Ch., Richter, G.: Toleranzsysteme und Toleranzdesign Qualität im Austauschbau. Carl Hanser Verlag, München Wien.

[*updated 15.01.2024*]

Machine Elements and Design 2

Module name (EN): Machine Elements and Design 2

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_M_4.03.MK2

Hours per semester week / Teaching method:
3V+1U (4 hours per week)

ECTS credits:
5

Semester: 4

Mandatory course: yes

Language of instruction:
English

Assessment:
written exam 180 min

[*updated 13.11.2023*]

Applicability / Curricular relevance:

MEB_24_M_4.03.MK2 (P241-0432) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 4, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 150 hours (equivalent to 5 ECTS credits).
There are therefore 105 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Bernd Heidemann

Lecturer:
Prof. Dr. Bernd Heidemann

[*updated 28.02.2025*]

Learning outcomes:
After successfully completing this module, students will be familiar with common rules for designing components, assemblies and machines. They will be able to construct a machine for a given task in a methodically planned procedure and assemble it in a functional manner. Students will be able to cooperate and communicate with other students in a team, and both present and defend their ideas. They will be able to discuss and evaluate the ideas of others objectively.
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
A methodical approach to design - From main functional components to standard parts Force flow-oriented and material-economical design Assembly-ready design Component design for additive, generative manufacturing processes X-Würfel project: Machine design and construction in a team according to a defined task. The task will be announced in an annual guideline with a specification sheet. The components designed within the framework of the project must also be suitable for production (see the "Fertigungsgerechte Bauteilgestaltung module).

[*updated 15.01.2024*]

Recommended or required reading:
Decker, K.-H.: Maschinenelemente. Carl Hanser Verlag, München. Hoenow, G., Meißner, T.: Entwerfen und Gestalten im Maschinenbau. Bauteile Baugruppen Maschinen. Carl Hanser Verlag, München. Hoischen, H., Hesser, W.: Technisches Zeichnen. Grundlagen, Normen, Beispiele, Darstellende Geometrie. Cornelsen Verlag Scriptor GmbH & Co. KG, Berlin. Jorden, W.: Form- und Lagetoleranzen. Carl Hanser Verlag, München. Muhs, D., e.a.: Roloff/Matek Maschinenelemente. Normung, Berechnung, Gestaltung. Vieweg + Teubner Verlag, Wiesbaden. Muhs, D., e.a.: Roloff/Matek Maschinenelemente. Tabellen. Vieweg + Teubner Verlag, Wiesbaden. Trumpold, H., Beck, Ch., Richter, G.: Toleranzsysteme und Toleranzdesign Qualität im Austauschbau. Carl Hanser Verlag, München Wien.

[*updated 15.01.2024*]

Manufacturing Process Technology (with Lab Course)

Module name (EN): Manufacturing Process Technology (with Lab Course)

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_2.02.TFL

Hours per semester week / Teaching method:
4V+1U (5 hours per week)

ECTS credits:
5

Semester: 2

Mandatory course: yes

Language of instruction:
English

Required academic prerequisites (ASPO):
Lab participation and lab report

Assessment:
written exam 120 min (grade)

[*updated 15.01.2024*]

Applicability / Curricular relevance:

MEB_24_A_2.02.TFL (P241-0457, P241-0458) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 2, mandatory course

Workload:
75 class hours (= 56.25 clock hours) over a 15-week period.
The total student study time is 150 hours (equivalent to 5 ECTS credits).
There are therefore 93.75 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Jürgen Griebsch

Lecturer:
Prof. Dr. Jürgen Griebsch

[*updated 31.03.2025*]

Learning outcomes:
After successfully completing this module, students will be familiar with important manufacturing processes and the machine tools used. - They will be familiar with the characteristics and possible applications of the manufacturing processes according to DIN 8550. - Students will be able to select a process based on technical criteria for a production task and by weighing up the advantages and disadvantages. - They will be able to outline manufacturing chains for simple tasks. - Students will be familiar with the practical application of selected manufacturing processes according to DIN 8550.
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
The quality and efficiency of industrial production depends on choosing the right manufacturing process and

understanding that process. That is why knowledge about the various technologies is an important tool for production engineers. The manufacturing processes will be divided into six categories according to DIN 8550: - Primary processing (e.g. casting) - Forming - Cutting - Joining - Coating - Modifying The basic approach to the processes in this module will be supplemented by content taught in more depth in subsequent semesters, such as the subject "CAX-based production" (5th semester).

[*updated 15.01.2024*]

Teaching methods/Media:
Lecture with exercises on the blackboard - Sample components and their assignment to resp. procedures according to DIN 8550, - Processing specific tasks - also in group work - Lab experiments conducted by students

[*updated 15.01.2024*]

Recommended or required reading:
- Spur, G.; Handbuch Fertigungstechnik in 5 Bänden; Hanser Verlag, 2016 - Fritz, A.-H.; Fertigungstechnik; Springer Verlag, 2018; ISBN: 978-3-662-56535-3 - Gebhardt, A.; Additive Fertigungsverfahren; Hanser Verlag, 2016; ISBN: 978-3-446-44539-0 - Geiger, Walter / Kotte, Willi; "Handbuch Qualität, Grundlagen und Elemente des Qualitätsmanagements: Systeme Perspektiven"; ISBN: 978-3-8348-0273-6 - Keferstein, Claus P. / Dutschke, Wolfgang; "Fertigungsmesstechnik Praxisorientierte Grundlagen, moderne Messverfahren"; ISBN: 978-3-8351-0150-0 - Tschätsch, Heinz; "Praxis der Zerspantechnik - Verfahren, Werkzeuge, Strahlquellen, Systeme, Fertigungsverfahren; ISBN: 978-3-8351-0005-3 - Ralf Berning; "Grundlagen der Produktion: Produktionsplanung und Beschaffungsmanagement (Taschenbuch)"; ISBN: 978-3464495131 - König, Klocke; "Fertigungsverfahren 1-5: Fertigungsverfahren 1. Drehen, Fräsen, Bohren: Drehen, Frasen, Bohren: Bd 1 (Gebundene Ausgabe)"; ISBN: 978-3540234586 - Fritz, Schulze; "Fertigungstechnik (VDI)"; ISBN: 978-3540766957 - Westkämper, Engelbert / Warnecke, Hans-Jürgen; "Einführung in die Fertigungstechnik"; ISBN: 978-3-8351-0110-4 - Habenicht, Gerd; "Kleben - erfolgreich und fehlerfrei - Handwerk, Praktiker, Ausbildung, Industrie"; ISBN: 978-3-8348-0019-0 - Hügel, Helmut / Graf, Thomas; "Laser in der Fertigung (Arbeitstitel)- Strahlquellen, Systeme, Fertigungsverfahren; ISBN: 978-3-8351-0005-3 - Ralf Berning; "Grundlagen der Produktion: Produktionsplanung und Beschaffungsmanagement (Taschenbuch)"; ISBN: 978-3464495131 - König, Klocke; "Fertigungsverfahren 1-5: Fertigungsverfahren 1. Drehen, Fräsen, Bohren: Drehen, Frasen, Bohren: Bd 1 (Gebundene Ausgabe)"; ISBN: 978-3540234586

[*updated 15.01.2024*]

Materials Science and Technology 1

Module name (EN): Materials Science and Technology 1

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_1.03.WSK

Hours per semester week / Teaching method:
4V+1P (5 hours per week)

ECTS credits:
5

Semester: 1

Mandatory course: yes

Language of instruction:
English

Required academic prerequisites (ASPO):
lab participation and lab report

Assessment:
written exam 120 min

[*updated 13.11.2023*]

Applicability / Curricular relevance:

MEB_24_A_1.03.WSK (P241-0447, P241-0448) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 1, mandatory course

Workload:
75 class hours (= 56.25 clock hours) over a 15-week period.
The total student study time is 150 hours (equivalent to 5 ECTS credits).
There are therefore 93.75 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Moritz Habschied

Lecturer:
Prof. Dr. Moritz Habschied

[*updated 28.02.2025*]

Learning outcomes:
After successfully completing this course, students will be familiar with the tensile test, hardness test methods and the charpy impact test and will be able to determine and interpret the corresponding characteristic values. They will be able to attribute specific material behavior to the respective microstructure. Students will be familiar with the basics of elastic and plastic deformation, the microstructure of metals and basic mechanisms for increasing strength. They can correlate these with the material entanglement observed. Students will be familiar with the basic types of phase diagrams in binary systems, as well as the iron-cementite diagram and the connection to cooling curves. They will be able to derive the evolution of a microstructure and correlate it with real structures. They will be able to calculate proportions and phases depending on the concentration. They will be able to select the annealing and hardening processes for steels required to achieve desired properties. They will also be able to select suitable surface hardening methods. Students will be able to determine the microstructure of steel structures. In practical exercises, they will learn to work in teams to acquire new knowledge and to work on interdisciplinary tasks. They will be able to reflect their opinions and defend them with factual arguments. Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
Content:
1.0 Tensile testing
1.1 Stresses and load types
1.2 Material behavior and characteristic values
2.0 Structure of metals
2.1 Grain structure and lattice types
2.2 Lattice defects and intermediary connections
2.3 Strengthening mechanisms
2.4 The relationship between structure and tensile testing
2.5 Notched bar impact test and hardness test
3.0. Basics of heat treatment
3.1 Diffusion
3.2 Recovery and recrystallization
4.0 Basics of alloying theory
4.1 The formation of a microstructure
4.2 State diagrams of binary systems (Zweistoffsysteme)
4.2.1 Complete solubility in the solid state
4.2.2 Complete insolubility in the solid state
4.2.3 Limited solubility in the solid state
5.0 Iron-carbon phase diagram
5.1 Difference between stable and metastable system
5.2 Iron-cementite phase diagram
6.0 Steel heat treatment
6.1 Annealing
6.2 Isothermal transformation diagram
6.2.1 Data in the isothermal transformation diagram
6.2.2 Microstructures in isothermal transformation diagrams
6.2.3 Influence of C-content and alloying elements
6.3 Hardening processes
6.3.1 Quenching
6.3.2 Tempering
6.3.3 Quenching & tempering
6.4 Surface hardening processes
6.4.1 Overview and classification
6.4.2 Case-hardening
6.4.3 Nitriding Lab work: - Tensile testing - Charpy impact test and hardness test - Thermal analysis - Iron-carbon phase diagram - Steel heat treatment - Jominy end-quench test

[*updated 15.01.2024*]

Teaching methods/Media:
Interactive, seminaristic lecture Practical training in the lab in small groups

[*updated 15.01.2024*]

Recommended or required reading:
Online and library Bargel/Schulze: Werkstoffkunde , Springer-Verlag, Berlin, Heidelberg, New York, 12. bearb. Auflage 2018 Weißbach W., Dahms M., Jaroschek C.: Werkstoffe und ihre Anwendungen: Metalle, Kunststoffe und mehr , Springer Vieweg; 20., überarb. Auflage 2018 Only library Läpple, V.: Wärmebehandlung des Stahls , Verlag Europa-Lernmittel, Haan-Gruiten, 11. aktualisierte Auflage 2014 Läpple, V., Kammer, C., Steuernagel, L.: Werkstofftechnik Maschinenbau , Verlag Europa-Lernmittel,

Haan-Gruiten, 6. Auflage 2017 Greven, E., Magin, W.: Werkstoffkunde und Werkstoffprüfung für technische Berufe , Verlag Handwerk und Technik; 18. Auflage 2015

[*updated 15.01.2024*]

Materials Science and Technology 2

Module name (EN): Materials Science and Technology 2

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_2.05.KWL

Hours per semester week / Teaching method:
3V+1P (4 hours per week)

ECTS credits:
4

Semester: 2

Mandatory course: yes

Language of instruction:
English

Required academic prerequisites (ASPO):
Lab participation and lab report

Assessment:
Written exam (120 min)

[*updated 13.11.2024*]

Applicability / Curricular relevance:

MEB_24_A_2.05.KWL (P241-0459, P241-0460) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 2, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 120 hours (equivalent to 4 ECTS credits).
There are therefore 75 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Moritz Habschied

Lecturer:
Prof. Dr. Moritz Habschied

[*updated 28.02.2025*]

Learning outcomes:
After successfully completing this module, students will be familiar with the production conditions, processing and properties of cast iron materials, various steels, light metal alloys, plastics and their possible applications. Their knowledge of microstructures will enable them to select suitable materials for given problems. Students will be able to estimate the influence of temperature on properties and select suitable heat treatments to achieve desired properties. In practical exercises, they will learn to work in groups to acquire new knowledge and to work on interdisciplinary test tasks. They will be able to reflect their opinions and defend them with factual arguments.
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
1.0 Cast iron materials
2.0 Material influence on manufacturing/non-ferrous metals
3.0 Material selection methods
4.0 Plastics
5.0 Cyclic material stress
Lab work: - Material designations - Influence of materials on production technology - Tensile test on polymeric materials

[*updated 15.01.2024*]

Teaching methods/Media:
Interactive, seminaristic lecture, practical training in the lab in small groups

[*updated 13.11.2024*]

Recommended or required reading:
Online and library Bargel/Schulze: Werkstoffkunde , Springer-Verlag, Berlin, Heidelberg, New York, 12. bearb. Auflage 2018 Weißbach W., Dahms M., Jaroschek C.: Werkstoffe und ihre Anwendungen: Metalle, Kunststoffe und mehr , Springer Vieweg; 20., überarb. Auflage 2018 Only library Läpple, V.: Wärmebehandlung des Stahls , Verlag Europa-Lernmittel, Haan-Gruiten, 11. aktualisierte Auflage 2014 Läpple, V., Kammer, C., Steuernagel, L.: Werkstofftechnik Maschinenbau , Verlag Europa-Lernmittel, Haan-Gruiten, 6. Auflage 2017 Greven, E., Magin, W.: Werkstoffkunde und Werkstoffprüfung für technische Berufe , Verlag Handwerk und Technik; 18. Auflage 2015

[*updated 15.01.2024*]

Mathematics 1

Module name (EN): Mathematics 1

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_1.04.MA1

Hours per semester week / Teaching method:
4V (4 hours per week)

ECTS credits:
5

Semester: 1

Mandatory course: yes

Language of instruction:
English

Assessment:
Written exam 120 min

[*updated 13.11.2023*]

Applicability / Curricular relevance:

MEB_24_A_1.04.MA1 (P241-0419) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 1, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 150 hours (equivalent to 5 ECTS credits).
There are therefore 105 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Marco Günther

Lecturer: Prof. Dr. Marco Günther

[*updated 10.10.2023*]

Learning outcomes:
After successfully completing this module, students will have a basic technical and methodological command of mathematics in order to understand engineering methods. They will be familiar with vector calculus and its applications to problems in geometry and mechanics. They will be able to carry out simple calculations using the methods of linear algebra and analysis with regard to applications in mechanical engineering/process technology. Students will be able to solve simple mathematical problems using a software tool.
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
Vector calculus, linear systems of equations, matrices, differential- integral calculus with a variable, Taylor series, curves, introduction to a mathematical software tool like Octave/Matlab, wxMaxima

[*updated 15.01.2024*]

Teaching methods/Media:
Lecture, tutorials, exercises; Blackboard, handouts, transparencies, examples, exercises

[*updated 15.01.2024*]

Recommended or required reading:
- Bartsch H.-J.: Taschenbuch Mathematischer Formeln Taschenbuch mathematischer Formeln für Ingenieure und Naturwissenschaftler L. Papula: Mathematik für Ingenieure und Naturwissenschaftler, Band 1+2 W.Preuß, G.Wenisch: Mathematik 1 J.Koch, M.Stämpfle: Mathematik für das Ingenieurstudium

[*updated 15.01.2024*]

Mathematics 2

Module name (EN): Mathematics 2

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_2.04.MA2

Hours per semester week / Teaching method:
4V (4 hours per week)

ECTS credits:
5

Semester: 2

Mandatory course: yes

Language of instruction:
English

Assessment:
Written exam 120 min

[*updated 13.11.2023*]

Applicability / Curricular relevance:

MEB_24_A_2.04.MA2 (P241-0424) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 2, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 150 hours (equivalent to 5 ECTS credits).

There are therefore 105 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Marco Günther

Lecturer: Prof. Dr. Marco Günther

[*updated 10.10.2023*]

Learning outcomes:
After successfully completing this module, students will have broadened their technical and methodological knowledge of mathematics with a view to a wider field of application in mechanical engineering/process engineering. They will understand the importance of coordinate transformations and will be able to apply them in a specific field, e.g. in the strength of materials field. Students will be able to handle complex numbers and have insight into a variety of applications, e.g. in electrical engineering. Students will be able to convert mathematical methods in the context of linear algebra and analysis involving functions with multiple variables and implement them using a mathematical tool.
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
Determinants, functions and coordinate systems, eigenwerte and eigenvectors, complex numbers, 2nd order curves and surfaces, arc length, curvature, differential and integral calculus for functions with multiple variables (e.g. moments of area, moments of inertia), use of a mathematical software tool such as Octave/Matlab, wxMaxima

[*updated 15.01.2024*]

Teaching methods/Media:
Lecture, exercises in the lecture, self-study exercises; Blackboard, handouts, transparencies, exercises

[*updated 15.01.2024*]

Recommended or required reading:
- Bartsch H.-J.: Taschenbuch Mathematischer Formeln Taschenbuch mathematischer Formeln für Ingenieure und Naturwissenschaftler L. Papula: Mathematik für Ingenieure und Naturwissenschaftler, Band 1+2
J.Koch, M.Stämpfle: Mathematik für das Ingenieurstudium

[*updated 15.01.2024*]

Mathematics 3 and Programming

Module name (EN): Mathematics 3 and Programming

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_3.01.MA3

Hours per semester week / Teaching method:
4V (4 hours per week)

ECTS credits:
5

Semester: 3

Mandatory course: yes

Language of instruction:
English

Assessment:
written exam 120 min

[*updated 13.11.2023*]

Applicability / Curricular relevance:

MEB_24_A_3.01.MA3 (P241-0425) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 3, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 150 hours (equivalent to 5 ECTS credits).
There are therefore 105 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Marco Günther

Lecturer: Prof. Dr. Marco Günther

[*updated 10.10.2023*]

Learning outcomes:
After successfully completing this module, students will be familiar with the basics of curve and surface theory and can apply the calculation methods covered in the course. They will understand the concepts of vector analysis and can apply them in connection with line, surface and volume integrals, e.g. for higher thermodynamics and fluid mechanics. Students will have experience in dealing with ordinary differential equations, as well as Laplace transforms with respect to control and regulation applications. They will understand the basic concepts of statistics and be able to make simple evaluations. Students will be able to solve simple mathematical problems with a mathematics tool and implement simple algorithms.
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
Introduction to surfaces, differential geometry, vector analysis (scalar, vector fields, coordinate systems, divergence, rotation, potential functions, line and surface integrals, volume integrals), ordinary differential equations, the Laplace transform, introduction to statistics, introduction to programming and basic programming techniques

[*updated 15.01.2024*]

Teaching methods/Media:
Lecture, exercises in the lecture, self-study exercises; Blackboard, handouts, transparencies, exercises

[*updated 15.01.2024*]

Recommended or required reading:
- Bartsch H.-J.: Taschenbuch Mathematischer Formeln Taschenbuch mathematischer Formeln für Ingenieure und Naturwissenschaftler L. Papula: Mathematik für Ingenieure und Naturwissenschaftler, Band 3 J.Koch, M.Stämpfle: Mathematik für das Ingenieurstudium M. Sachs: Wahrscheinlichkeitsrechnung und Statistik

[*updated 15.01.2024*]

Physical Process Engineering with Practical Case Studies

Module name (EN): Physical Process Engineering with Practical Case Studies

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_V_4.10.PVT

Hours per semester week / Teaching method:
4V (4 hours per week)

ECTS credits:
5

Semester: 4

Mandatory course: yes

Language of instruction:
English

Required academic prerequisites (ASPO):
Presentation

Assessment:
Written exam 90 min (grade)

[*updated 15.01.2024*]

Applicability / Curricular relevance:

MEB_24_V_4.10.PVT (P241-0469, P241-0470) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 4, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 150 hours (equivalent to 5 ECTS credits).
There are therefore 105 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
MEB_24_A_3.02.THE Thermodynamics

[*updated 28.02.2025*]

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Matthias Faust

Lecturer:
Prof. Dr. Matthias Faust

[*updated 28.02.2025*]

Learning outcomes:
After successfully completing this module, students will be able to draw up and calculate energy balances and material balances, know, understand, explain and calculate basic operations of mechanical process engineering, know, understand, explain and calculate selected basic operations of thermal and interface process engineering.
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
General basics:
Principle of basic operations
Balances and the transport of material, energy and impulse
Process evaluation
Parameters for process performance
Parameters for the quality of material separation Fundamentals of mechanical process engineering
Introduction and basic terms
Disperse systems, particle diameter, particle size distribution
Properties of solids, liquids and gases Fundamentals of mechanical process engineering
Storage, transport, fluid bed technology
Sedimentation
Centrifugation
Elutriation
Flow through packed beds
Filtration
Mixing/Stirring
Comminution Fundamentals of thermal process engineering, e.g.:

Introduction and basic terms
Dalton s, Raoult s and Henry s laws Basic operations of thermal process engineering, e.g.
Evaporation
Crystallization
Sublimation Basic operations of interfacial process engineering, e.g.
Gas separation
Extraction from solids

[*updated 15.01.2024*]

Teaching methods/Media:
Lecture with exercises and assignments, student presentations, lecture guide, formula collection, exercises for lecture, exercises for worksheets and presentation

[*updated 15.01.2024*]

Recommended or required reading:
Stieß, Matthias: Mechanische Verfahrenstechnik - Partikeltechnologie 1, Springer 2009
Cussler: Diffusion, mass transfer in fluid systems 1984;
Mulder: Basic Principles of Membrane Technology 1997

[*updated 15.01.2024*]

Plant Planning and Project Execution

Module name (EN): Plant Planning and Project Execution

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_V_4.11.APP

Hours per semester week / Teaching method:
3V+1PA (4 hours per week)

ECTS credits:
4

Semester: 4

Mandatory course: yes

Language of instruction:
English

Required academic prerequisites (ASPO):
Project Presentation

Assessment:
Written exam 90 min (grade)

[*updated 15.01.2024*]

Applicability / Curricular relevance:

MEB_24_V_4.11.APP (P241-0473, P241-0474) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 4, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 120 hours (equivalent to 4 ECTS credits).
There are therefore 75 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Matthias Faust

Lecturer:
Prof. Dr. Matthias Faust

[*updated 28.02.2025*]

Learning outcomes:
Plant design, planning and project execution: After successfully completing this course, students will be familiar with, understand and be able to explain the main steps of plant design from specification to detail engineering. Students will be familiar with, understand and be able to explain the exemplary project sequence, consisting of:
Phase 1: Project definition, brainstorming
Phase 2: Planning,
Decision-making: Order, execution, yes/no?,
Phase 3: Execution,
Phase 4: Project completion
They will be familiar with, understand and be able to explain calculations, cost tracking and different project types. Students will be familiar with, understand, and be able to explain and apply project management methods. Technical law in plant design: Students will understand and be able to explain the basics of technical law in plant design (e.g. Federal Immission Control Act). Team work: Students will be familiar with, understand, be able to explain and apply basic project teamwork methodology.
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
Plant design, planning and project execution: Brainstorming, defining the project, main phases of plant design, basic engineering, basic flow chart, process development and plant development, process flow diagram, process design and plant design, detailed engineering, P&I diagram, up-scaling plants and processes, dimensional analysis, executing a project, checklists, evaluation lists, commissioning and production, presenting requirements for the product, safety, comfort, durability, implementing product requirements, specifying requirements, specifying functions, comparing bids, recording customer requirements and constraints, generating ideas, project types, project cost tracking, pricing, project structure, project flowchart, project schedule, critical path, plant commissioning. Technical law in plant design: Federal Immission Control Act, risk management in plant construction and operation (e.g. HAZOP method)

Team work: Basic theory and methods of teamwork and team structuring. The content is enhanced by additional example projects on current process engineering issues.

[*updated 15.01.2024*]

Teaching methods/Media:
Lecture with exercises, student presentations, lecture guide, exercises for lecture, exercises for worksheets and presentations, transparencies as handouts, example projects

[*updated 15.01.2024*]

Recommended or required reading:
Towler, Gavin, Chemical Engineering Design 2008; Ullrich, Hansjürgen, Wirtschaftliche Planung und Abwicklung verfahrenstechnischer Anlagen 1996; Hirschberg, Hans Günther, Verfahrenstechnik und Anlagenbau 1999; Wagner, Walter, Planung im Anlagenbau 2018

[*updated 15.01.2024*]

Principles of Engineering Drafting and the Representation of Machine Elements (with Machine Analysis Lab)

Module name (EN): Principles of Engineering Drafting and the Representation of Machine Elements (with Machine Analysis Lab)

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_1.01.MDM

Hours per semester week / Teaching method:
2V+1U+1P (4 hours per week)

ECTS credits:
5

Semester: 1

Mandatory course: yes

Language of instruction:
German

Required academic prerequisites (ASPO):
Lab participation and lab report

Assessment:
written exam 120 min (grade)

[*updated 15.01.2024*]

Applicability / Curricular relevance:

MEB_24_A_1.01.MDM (P241-0445, P241-0446) Mechanical Engineering, Bachelor, SO 01.10.2024 ,

semester 1, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 150 hours (equivalent to 5 ECTS credits).
There are therefore 105 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Bernd Heidemann

Lecturer:
M.Eng. Oliver Müller

[*updated 28.02.2025*]

Learning outcomes:
After successfully completing this course, students will be familiar with techniques, standards and terms for the graphical representation of mechanical engineering components and structures. They will be able to draft and dimension individual components and assemblies by hand according to standards. Students will be able to transform spatial concepts into two-dimensional (component) views. They will be able to read more complex assembly drawings. Student will be able to disassemble a simple machine system in an organized manner, classify it in terms of system technology and explain the design of the components in terms of both function and production technology.
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
Motivation: Technical drafting as a means of communication (as a way to store and pass on technical information) in engineering practice. The benefits of a hand drawing in engineering practice Drafting everyday objects freehand Projection drawing everyday objects by hand and using a ruler Tasks and methods of descriptive geometry: Projection methods, multiview projection , spatial thinking
Standard-compliant representation (and reading) of individual technical (construction) components: Views, sections, breakouts The technical designation of constructive details (chamfer, groove, recess, heel, etc.) Standard-compliant dimensioning of components in technical drawings: component dimensions and dimensional tolerances, ISO tolerance system Production, test or function-oriented dimensioning Form and position tolerances, tolerance principles, surface specifications Standard-compliant display of individual machine and standard elements: Threads, gears, pins, bolts, axles, shafts, welding seams or connections. Standard-compliant display of assemblies: Views, sections The structure of a technical drawing: Sheet division, title block, scale, differences between individual part and assembly drawing, parts list. Standard-compliant dimensioning of components in technical drawings: component dimensions and dimensional tolerances, ISO tolerance system Production, test or function-oriented dimensioning Form and position tolerances, tolerance principles, surface specifications Machine lab: Diassembling and classifying (smaller) machine systems (e.g. electric hand machine tools) with regards to system technology Analyzing components in terms of function, geometry and production technology Drafting and dimensioning components by hand Developing and documenting assembly instructions

[*updated 15.01.2024*]

Teaching methods/Media:
Seminaristic instruction with integrated drafting exercises by hand with pencil on paper Manual-haptic laboratory exercise to "grasp" and "understand" real components in the literal sense

[*updated 15.01.2024*]

Recommended or required reading:
Bayer, W.K.: Technische Kommunikation, Technisches Zeichnen. Verlag Dr.-Ing. Paul Christiani GmbH & Co. KG, Konstanz. Fucke, R., Kirch, K., Nickel, H.: Darstellende Geometrie für Ingenieure. Methoden und Beispiele. Carl Hanser Verlag, München. Gräfer, Horst: Technisches Zeichnen für Maschinenbauer. Fachbuchverlag Leipzig im Carl Hanser Verlag. München, 2017. Hoenow, G., Meißner, T.: Entwerfen und Gestalten im Maschinenbau. Bauteile Baugruppen Maschinen. Carl Hanser Verlag, München. Hoischen, H., Hesser, W.: Technisches Zeichnen. Grundlagen, Normen, Beispiele, Darstellende Geometrie. Cornelsen Verlag Scriptor GmbH & Co. KG, Berlin. Jorden, W.: Form- und Lagetoleranzen. Carl Hanser Verlag, München. Kurz, U.: Wittel, H.: Böttcher/Forberg Technisches Zeichnen. Grundlagen, Normung, Darstellendes Geometrie und Übungen. Vieweg + Teubner Verlag, Wiesbaden. Muhs, D., e.a.: Roloff/Matek Maschinenelemente. Normung, Berechnung, Gestaltung. Vieweg + Teubner Verlag, Wiesbaden. Muhs, D., e.a.: Roloff/Matek Maschinenelemente. Tabellen. Vieweg + Teubner Verlag, Wiesbaden. Trumpold, H., Beck, Ch., Richter, G.: Toleranzsysteme und Toleranzdesign Qualität im Austauschbau. Carl Hanser Verlag, München Wien.

[*updated 15.01.2024*]

Project in Mechanical or Process Engineering

Module name (EN): Project in Mechanical or Process Engineering

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_5.19.PMP

Hours per semester week / Teaching method:
2PA+1S (3 hours per week)

ECTS credits:
3

Semester: 5

Mandatory course: yes

Language of instruction:
English

Assessment:
presentation + project work

[*updated 17.07.2024*]

Applicability / Curricular relevance:

MEB_24_A_5.19.PMP (P241-0443, P241-0444) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 5, mandatory course

Workload:
45 class hours (= 33.75 clock hours) over a 15-week period.
The total student study time is 90 hours (equivalent to 3 ECTS credits).
There are therefore 56.25 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Bernd Heidemann

Lecturer:
Sebastian Barth, M.A.

[*updated 17.07.2024*]

Learning outcomes:
After completing this module, students will be able to develop a topic-specific methodical approacvh to a technical problem in a team. They can work in a structured and timely manner, and develeo soluitions to a technical problem.

In the language component of this module "Presenting in English", students will improve und deepn the presentations skills acquired in the module "Technical English for Academemic Purposes".
This will enabel them to present their project results in a formal English presentation. For this purpose, students will be able to identify and reproduce different expressions, and stylistic devices used in technial texts.

[*updated 17.07.2024*]

Module content:
In teams of 2-4 students define a technical projecte topic that meets the requirements of the interdisciplinary field of mechanical and process engineering. Students develop a mechanical system or a procedures for processing.
In groups, they agree on a methodology, set up a schedule, define work tasks and organize their work packages.

To prepare the students for die English presentations, the following topics will be covered in the English part of the course "Presenting in English":
- Strategie for acquiring the technical vocabulary relevant to the respective projects
- Text work with the technical texts and videos relevant to the respective projects
- Review of the structure and language of English presentations
- Advanced presentations techniques (alternative openings, handling questions, body language, etc.)
- Using visual aids
- Decribing diagrams, tables, numbers, cause und effect correlations, and trends

[*updated 17.07.2024*]

Teaching methods/Media:
Supervised teamwork with regular work meetings in English. The learning goals will be achieved through the integrated training of the four basic skills (listening comprehension, reading comprehension, speaking and writing) supported by the use of multimedia. Group work and working in pairs, as well as peer review will play an important role. During the workshop-like phases, students will also have the opportunity to practice their presentations and receive appropriate feedback. Target group-specific teaching/learning materials (print, audio, video), as well as multimedia CALL and e&mLearning materials will be used.

[*updated 15.01.2024*]

Additional information:
Technical English for Acadmeci Purposes. English Academic Writing

[*updated 17.07.2024*]

Recommended or required reading:
- Various online resources, authentic texts and videos

[*updated 17.07.2024*]

Technical English for Academic Purposes

Module name (EN): Technical English for Academic Purposes

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_1.06.TEA

Hours per semester week / Teaching method:
2SU (2 hours per week)

ECTS credits:
2

Semester: 1

Mandatory course: yes

Language of instruction:
English

Assessment:
project work and presentation

[*updated 30.04.2024*]

Applicability / Curricular relevance:

MEB_24_A_1.06.TEA (P241-0420, P241-0421) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 1, mandatory course

Suitable for exchange students (learning agreement)

Workload:
30 class hours (= 22.5 clock hours) over a 15-week period.
The total student study time is 60 hours (equivalent to 2 ECTS credits).
There are therefore 37.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:
MEB_24_A_4.12.AEW Academic English Writing

[*updated 22.01.2026*]

Module coordinator:
Dr. Julia Frisch

Lecturer:
Sebastian Barth, M.A.

[*updated 30.04.2024*]

Learning outcomes:
The modules Technical English for Academic Purposes and English Academic Writing as well as the foreign language component Presenting in English of the Project in Mechanical or Process Engineering are to be seen in context. Starting out from the required entry level B2, these modules help students to progress from level B2 to C1 in English as a foreign language.
In the module Technical English for Academic Purposes , students train the four skills listening, reading, speaking and writing for academic purposes in an integrated way.

After successfully completing this course, students are able to understand technical information presented in academic talks and lectures. They will be able to apply the note-taking methods they have learned and can structure the information efficiently.

Students will also be able to understand academic texts from their field of studies. Using the reading strategies they have acquired, they will be able to research specific topics and examine the results critically.

They will have mastered strategies for producing professional presentations in English. They will be able to structure a presentation in English and use the typical language of presentations they have learnt to prepare and deliver a presentation.

Furthermore, students will be able to write technical texts, e.g. about the components and functions of mechanical systems.

Finally, students will be able to communicate efficiently and appropriately in the academic context both orally and in writing.

In doing so, they will have further developed their understanding of functional language use and expanded their technical English vocabulary.

[*updated 26.04.2024*]

Module content:
- Communicating efficiently and appropriately (formal vs informal) in the academic context: Writing emails, making appointments, etc.
- Listening comprehension of academic talks and lectures: Note-taking
- Reading comprehension of technical texts: Reading strategies (scanning, skimming)
- Introduction to English presentations (signposting language, structure, etc.) and mock presentations
- Introduction to technical writing: e.g. Describing parts and functions of simple mechanical systems
- Working correctly with sources (meaningful use, correct citation, creation of source and bibliography)
- Word processing and formatting
- Development of functional language use (e.g. describing cause and effect) and technical vocabulary

[*updated 26.04.2024*]

Teaching methods/Media:
Teaching methods:
The learning goals will be achieved through the integrated training of the four basic skills (listening comprehension, reading comprehension, speaking and writing) supported by multimedia, as well as the revision of basic grammar and vocabulary in self-study phases.

Media:
Teaching and learning materials (print, audio, video), multimedia teaching and learning software and WBTs for specific target groups.

[*updated 26.04.2024*]

Recommended or required reading:
- Christine Sick, unter Mitarbeit von Miriam Lange: TechnoPlus English 2.0. Ein multimediales Sprachlernprogramm für Technisches Englisch und Business English. EUROKEY.
- Christine Sick, unter Mitarbeit von Lisa Rauhoff und Miriam Wedig (seit 2016): Online Extensions zu TechnoPlus Englisch, EUROKEY.
Rosenberg, Barry J. Spring into Technical Writing for Engineers and Scientists. Addison-Wesley Educational, 2005.
Northedge, Andrew, et. al. The Good Study Guide. The Open University Worldwide, 2005.
- Various online resources and authentic texts, videos and audio recordings

[*updated 26.04.2024*]

The Finite Element Method

Module name (EN): The Finite Element Method

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_PE_5.11.FEM

Hours per semester week / Teaching method:
1V+1P (2 hours per week)

ECTS credits:
2

Semester: 5

Mandatory course: yes

Language of instruction:
English

Assessment:
project work (report)

[*updated 22.01.2026*]

Applicability / Curricular relevance:

MEB_24_PE_5.11.FEM (P241-0442) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 5, mandatory course

Workload:
30 class hours (= 22.5 clock hours) over a 15-week period.
The total student study time is 60 hours (equivalent to 2 ECTS credits).
There are therefore 37.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr.-Ing. Ramona Hoffmann

Lecturer:
Prof. Dr.-Ing. Ramona Hoffmann

[*updated 22.01.2026*]

Learning outcomes:
After successfully completing this module, students will be able to: -- describe the basics of the finite element method -- describe the limits and challenges of the finite element method -- investigate simple structural mechanics problems using a commercial FEM program -- verify the calculation results through analytical counter-calculations and estimations.
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 28.02.2025*]

Module content:
-- Introduction to the basics of the finite element method
-- Bar elements with implementation in Matlab and Ansys
-- Trusses with ANSYS APDL
-- Beam, slab and solid elements
-- Various practical examples from structural mechanics and strength of materials theory

[*updated 15.01.2024*]

Teaching methods/Media:
A practical course is a part of the module at the computer workstation in the ECC.

[*updated 15.01.2024*]

Recommended or required reading:
-- C. Gebhardt: Praxisbuch FEM mit ANSYS Workbench: Einführung in die lineare und nichtlineare Mechanik. Mit 25 Übungsbeispielen. Hanser Fachbuchverlag, 2018. -- W. Schnell, D. Gross, W. Hauger, und P. Wriggers: Technische Mechanik: Band 4. Springer Berlin Heidelberg, 2006. -- Klein, B.: FEM: Grundlagen und Anwendungen der Finite-Element-Methode im Maschinen- und Fahrzeugbau. Springer Fachmedien Wiesbaden, 2014. -- G. Müller: FEM für Praktiker. Expert Verlag, Renningen, 2007. -- K. Knothe und H. Wessels:Finite Elemente: Eine Einführung für Ingenieure. Springer Berlin Heidelberg, 2017.

[*updated 15.01.2024*]

Thermodynamics

Module name (EN): Thermodynamics

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_3.02.THE

Hours per semester week / Teaching method:
4V (4 hours per week)

ECTS credits:
5

Semester: 3

Mandatory course: yes

Language of instruction:
English

Assessment:
Written exam 120 min

[*updated 13.11.2023*]

Applicability / Curricular relevance:

MEB_24_A_3.02.THE (P241-0426) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 3, mandatory course

Workload:
60 class hours (= 45 clock hours) over a 15-week period.
The total student study time is 150 hours (equivalent to 5 ECTS credits).
There are therefore 105 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:
MEB_24_V_4.10.PVT Physical Process Engineering with Practical Case Studies

[*updated 28.02.2025*]

Module coordinator:
Prof. Dr. Matthias Faust

Lecturer:
Prof. Dr. Matthias Faust
Dr.-Ing. Gerhard Braun
Dipl.-Ing. Stefan Weißkircher

[*updated 04.02.2026*]

Learning outcomes:
After successfully completing this course, students will be able to:
explain the differences between state and process variables
draw up and calculate the energy balances for ideal processes
name the differences between ideal and real state changes
use and apply p-V, T-s and h-s diagrams and steam tables
explain and calculate the Carnot cycle
explain and calculate ither ideal gas processes
explain and calculate the ideal steam-power process
Students will improve their subject-related technical English skills. Students will know the subject-specific English terms.

[*updated 04.02.2026*]

Module content:
Introduction and basic terms
Thermodynamic systems and states
Pressure, temperature
Specific volume, density, molar mass
Internal state, external state, total state Equations of state and state changes
Equation of state for an ideal gas
Specific heat capacities for ideal gases, liquids and solids The first law of thermodynamics, introduction and definition
The first law for a closed system
Exchanged heat and work
Pressure-volume work
Friction or dissipation, external work
The first law for a steady flow process
Introduction to technical work and power
Definition, calculating technical work and power
Quasistatic state changes of homogeneous systems
State changes isobaric, isothermal, isochoric, adiabatic, isentropic, polytropic
The first law for a transient flow process The second law of thermodynamics, introduction and definition
Entropy change for ideal gases, liquids, solids

Entropy change for a steady flow process
State changes in the T-s and h-s diagram Efficiency and coefficient of performance in cycles
Fundamentals of cycles, clockwise and counterclockwise
Thermal efficiency, coefficient of performance
Idealized cycles with ideal gases
Exchanged heat and work Cycles
Idealized cycles with ideal gases
CARNOT process
Turbine processes (JOULE)
Constant volume process (OTTO)
Constant pressure process (DIESEL) Pure substances and their use
Water and steam
State variables of liquid water
State variables in the area wet steam
State variables of superheated steam
Steam power plant process (CLAUSIUS-RANKINE)
Ideal single-stage steam power process Mixtures of ideal gas
Mass, mole and volume fractions
State variables of mixtures
(Entropy of mixing)

[*updated 15.01.2024*]

Teaching methods/Media:
Lecture guide, exercises, group work, videos

[*updated 09.12.2025*]

Recommended or required reading:
- Cerbe&Hoffmann: Einführung in die Thermodynamik
- VDI Wärmeatlas

[*updated 15.01.2024*]

Mechanical Engineering Bachelor - optional courses

French 1

Module name (EN): French 1

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_1.05.FR1

Hours per semester week / Teaching method:
2SU (2 hours per week)

ECTS credits:
2

Semester: 1

Mandatory course: no

Language of instruction:
French

Assessment:
written exam

[*updated 22.09.2025*]

Applicability / Curricular relevance:

MEB_24_A_1.05.FR1 (P241-0453) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 1, optional course

Workload:
30 class hours (= 22.5 clock hours) over a 15-week period.
The total student study time is 60 hours (equivalent to 2 ECTS credits).
There are therefore 37.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Dr. Julia Frisch

Lecturer: Dr. Julia Frisch

[*updated 19.02.2024*]

Learning outcomes:

[*still undocumented*]

Module content:

[*still undocumented*]

Recommended or required reading:

[*still undocumented*]

French 2

Module name (EN): French 2

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_2.06.FR2

Hours per semester week / Teaching method:
2SU (2 hours per week)

ECTS credits:
2

Semester: 2

Mandatory course: no

Language of instruction:
German/French

Assessment:
written exam

[*updated 22.09.2025*]

Applicability / Curricular relevance:

MEB_24_A_2.06.FR2 (P241-0465) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 2, optional course

Workload:
30 class hours (= 22.5 clock hours) over a 15-week period.
The total student study time is 60 hours (equivalent to 2 ECTS credits).
There are therefore 37.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Dr. Julia Frisch

Lecturer: Dr. Julia Frisch

[*updated 19.02.2024*]

Learning outcomes:

[*still undocumented*]

Module content:

[*still undocumented*]

Recommended or required reading:

[*still undocumented*]

French for Beginners 1

Module name (EN): French for Beginners 1

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_1.05.FB1

Hours per semester week / Teaching method:
-

ECTS credits:
2

Semester: 1

Mandatory course: no

Language of instruction:
German

Assessment:

[*still undocumented*]

Applicability / Curricular relevance:

MEB_24_A_1.05.FB1 (P241-0452) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 1, optional course

Workload:
The total student study time for this course is 60 hours.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Dr. Julia Frisch

Lecturer: Dr. Julia Frisch

[*updated 26.04.2024*]

Learning outcomes:

[*still undocumented*]

Module content:

[*still undocumented*]

Recommended or required reading:

[*still undocumented*]

French for Beginners 2

Module name (EN): French for Beginners 2

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_2.06.FB2

Hours per semester week / Teaching method:
-

ECTS credits:
2

Semester: 2

Mandatory course: no

Language of instruction:
German

Assessment:

[*still undocumented*]

Applicability / Curricular relevance:

MEB_24_A_2.06.FB2 (P241-0464) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 2, optional course

Workload:
The total student study time for this course is 60 hours.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:
Module coordinator: Dr. Julia Frisch
Lecturer: Dr. Julia Frisch [*updated 26.04.2024*]
Learning outcomes: [*still undocumented*]
Module content: [*still undocumented*]
Recommended or required reading: [*still undocumented*]

German (Winter Semester)

Module name (EN): German (Winter Semester)
Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024
Module code: MEB_24_A_1.05.INTBW
Hours per semester week / Teaching method: 2U (2 hours per week)
ECTS credits: 2
Semester: 1
Mandatory course: no
Language of instruction: German
Assessment: Course-related work during the semester (presentations, homework, tests) + written exam (100%) [*updated 05.11.2025*]
Applicability / Curricular relevance:

INTB-101 (P200-0055) International Modules, Bachelor, ASPO 01.04.2017 , optional course
MEB_24_A_1.05.INTBW (P241-0449, P241-0450, P241-0451) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 1, optional course

Workload:
30 class hours (= 22.5 clock hours) over a 15-week period.
The total student study time is 60 hours (equivalent to 2 ECTS credits).
There are therefore 37.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended knowledge:
available for international students only (with university entrance qualifications from outside Germany)

[*updated 18.04.2017*]

Recommended as prerequisite for:

Module coordinator:
Dr. Julia Frisch

Lecturer: Dr. Julia Frisch

[*updated 10.10.2023*]

Learning outcomes:
The German (Winter Semester) module introduces students to the foreign language in the context of everyday and student life. The goal is to teach the linguistic skills and knowledge necessary for communication and reception in the everyday life of a student in a bachelor´s program.

[*updated 04.01.2025*]

Module content:
Topic: Everyday life and university small talk, simple conversations with the landlord, building manager, doctor, lecturers, secretary, etc.; asking polite questions and requests; asking for help, simple formal correspondence (including e-mail to lecturers)

[*updated 04.01.2025*]

Teaching methods/Media:
Language course with a communicative-pragmatic approach.
Different types of media are used to accommodate the different learning styles of the international target group. During the class, teaching and learning materials (print, audio, video) will be used that have been compiled specifically for the target group.
To achieve the learning objectives, students are required to actively participate during the classroom sessions. Students are therefore expected to attend at least 80% of the sessions. If attendance is not met without good reason, participation in the exam is not possible.

[*updated 04.01.2025*]

Recommended or required reading:

Authentic materials such as brochures, advertisements, short newspaper articles and radio reports
Basic level textbooks such as Tangram, Studio d, Encounters, Langenscheidt Intensivtrainer etc.
Exam training Start 1/2/B1
Videos: among others Deutsche Welle, Berliner Platz, Netzwerk, DaFür
Learning platform (Campus+/DaFür)

[*updated 04.01.2025*]

German Summer Semester

Module name (EN): German Summer Semester

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_2.06.INTBS

Hours per semester week / Teaching method:
2U (2 hours per week)

ECTS credits:
2

Semester: 2

Mandatory course: no

Language of instruction:
German

Assessment:
Semester-related preliminary work (presentation, assignments, tests) + exam (100%)

[*updated 05.11.2025*]

Applicability / Curricular relevance:

INTB-201 (P400-0007) International Modules, Bachelor, ASPO 01.04.2017 , optional course
MEB_24_A_2.06.INTBS (P241-0461, P241-0462, P241-0463) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 2, optional course

Workload:
30 class hours (= 22.5 clock hours) over a 15-week period.
The total student study time is 60 hours (equivalent to 2 ECTS credits).
There are therefore 37.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended knowledge:
available for international students only (with university entrance qualifications from outside Germany)

[*updated 18.04.2017*]

Recommended as prerequisite for:

Module coordinator:
Dr. Julia Frisch

Lecturer: Dr. Julia Frisch

[*updated 10.10.2023*]

Learning outcomes:
The German Summer Semester module introduces students to the foreign language in the context of everyday and work life. The goal is to teach the language skills and knowledge necessary for simple communication and comprehension in everyday situations and during an internship as part of a bachelor´s degree program.

[*updated 30.06.2025*]

Module content:
Topic: Everyday life and work Small talk, simple conversations with fellow students and colleagues, etc.; asking for information, providing information about your career, writing a short CV; simple formal correspondence (emails to colleagues)

[*updated 30.06.2025*]

Teaching methods/Media:
Language course with a communicative-pragmatic approach.
Different types of media are used to accommodate the different learning styles of the international target group. During the class, teaching and learning materials (print, audio, video) will be used that have been compiled specifically for the target group.
To achieve the learning objectives, students are required to actively participate during the classroom sessions. Students are therefore expected to attend at least 80% of the sessions. If attendance is not met without good reason, participation in the exam is not possible.

[*updated 30.06.2025*]

Recommended or required reading:
Authentic materials such as brochures, advertisements, short newspaper articles and radio reports
Basic level textbooks such as Tangram, Studio d, Encounters, Langenscheidt Intensivtrainer etc.
Exam training Start 1/2/B1
Videos: among others Deutsche Welle, Berliner Platz, Netzwerk, DaFür
Learning platform (Campus+/DaFür)

[*updated 30.06.2025*]

Intercultural communication

Module name (EN): Intercultural communication

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_5.21.PMP

Hours per semester week / Teaching method:
-

ECTS credits:
0,5

Semester: 5

Mandatory course: no

Language of instruction:
English

Assessment:

[*still undocumented*]

Applicability / Curricular relevance:

MEB_24_A_5.21.PMP Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 5, optional course

Workload:
The total student study time for this course is 15 hours.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
N.N.

Lecturer: N.N.

[*updated 10.10.2023*]

Learning outcomes:

[*still undocumented*]

Module content:

[*still undocumented*]

Recommended or required reading:

[*still undocumented*]

Spanish for Beginners 1

Module name (EN): Spanish for Beginners 1

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_1.05.SP1

Hours per semester week / Teaching method:
2SU (2 hours per week)

ECTS credits:
2

Semester: 1

Mandatory course: no

Language of instruction:
Spanish/German

Assessment:
written exam

[*updated 22.09.2025*]

Applicability / Curricular relevance:

MEB_24_A_1.05.SP1 (P241-0454) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 1, optional course

Workload:
30 class hours (= 22.5 clock hours) over a 15-week period.
The total student study time is 60 hours (equivalent to 2 ECTS credits).
There are therefore 37.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Dr. Julia Frisch

Lecturer: Dr. Julia Frisch

[*updated 19.02.2024*]

Learning outcomes:

[*still undocumented*]

Module content:

[*still undocumented*]

Recommended or required reading:

[*still undocumented*]

Spanish for Beginners 2

Module name (EN): Spanish for Beginners 2

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_2.06.SP2

Hours per semester week / Teaching method:
2SU (2 hours per week)

ECTS credits:
2

Semester: 2

Mandatory course: no

Language of instruction:
Spanish

Assessment:
written exam

[*updated 22.09.2025*]

Applicability / Curricular relevance:

MEB_24_A_2.06.SP2 (P241-0466) Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 2, optional course

Workload:
30 class hours (= 22.5 clock hours) over a 15-week period.
The total student study time is 60 hours (equivalent to 2 ECTS credits).
There are therefore 37.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:
Module coordinator: Dr. Julia Frisch
Lecturer: Dr. Julia Frisch [*updated 19.02.2024*]
Learning outcomes: [*still undocumented*]
Module content: [*still undocumented*]
Recommended or required reading: [*still undocumented*]

Study Success for International Engineers

Module name (EN): Study Success for International Engineers
Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024
Module code: MEB_24_A_1.08.SIE
Hours per semester week / Teaching method: 2S (2 hours per week)
ECTS credits: 0
Semester: 1
Mandatory course: no
Language of instruction: English
Assessment: [*updated 23.09.2025*]
Applicability / Curricular relevance:

MEB_24_A_1.08.SIE Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 1, optional course

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr.-Ing. André Miede

Lecturer: Prof. Dr.-Ing. André Miede

[*updated 16.05.2025*]

Learning outcomes:
After successfully completing this module, students will be able to identify and describe typical challenges that may arise during the course of study. They will be able to analyze the underlying causes and both explain and practically apply strategies for improvement.

[*updated 23.09.2025*]

Module content:
The module will help them develop effective study habits, time management strategies, teamwork and communication skills, as well as reflective learning techniques.

It emphasizes practical application and collaborative learning.

Students will be empowered to navigate their degree program confidently, mastering key academic habits and strategies in an intercultural environment.

[*updated 23.09.2025*]

Teaching methods/Media:
Short seminar presentations; individual reading/listening/viewing; group discussions; practical exercises.

[*updated 23.09.2025*]

Additional information:
Participation is voluntary and without ECTS credits (no exam).

[*updated 23.09.2025*]

Recommended or required reading:
- James Clear: Atomic Habits
- Stephen R. Covey: The 7 Habits of Highly Effective People Powerful Lessons in Personal Change
- Barbara Minto: The Pyramid Principle Logic in Writing and Thinking
- David Allen: Getting Things Done The Art of Stress-Free Productivity
- Joshua Foer: Moonwalking with Einstein. Penguin Books, 2011.
- Cal Newport: Deep Work Rules for Focused Success in a Distracted World
- Viktor E. Frankl: Man´s Search for Meaning
- Jordan B. Peterson: 12 Rules for Life An Antidote to Chaos
- Jocko Willink: Discipline Equals Freedom Field Manual
- Scott Adams: How to Fail at Almost Everything and Still Win Big Kind of the Story of My Life

- Tim Ferriss: Tools of Titans The Tactics, Routines, and Habits of Billionaires, Icons, and World-Class Performers

[*updated 23.09.2025*]

Technical Case Study

Module name (EN): Technical Case Study

Degree programme: Mechanical Engineering, Bachelor, SO 01.10.2024

Module code: MEB_24_A_5.20.TCS

Hours per semester week / Teaching method:
2F (2 hours per week)

ECTS credits:
2,5

Semester: 5

Mandatory course: no

Language of instruction:
German

Required academic prerequisites (ASPO):
German Language Level C1
The course serves as a replacement of the course German Intensive Course (IPS.GER), if German Language Level C1 is reached at the beginning of the IPS

Assessment:
Report and Presentation

[*updated 01.07.2022*]

Applicability / Curricular relevance:

EPS.TCS (P231-0160) European Project Semester, Bachelor, ASPO 01.10.2024 , semester 1, optional course
IPS.TCS International Project Semester, Bachelor, ASPO 01.10.2020 , semester 1, optional course
MEB_24_A_5.20.TCS Mechanical Engineering, Bachelor, SO 01.10.2024 , semester 5, optional course

Suitable for exchange students (learning agreement)

Workload:
30 class hours (= 22.5 clock hours) over a 15-week period.
The total student study time is 75 hours (equivalent to 2.5 ECTS credits).
There are therefore 52.5 hours available for class preparation and follow-up work and exam preparation.

Recommended prerequisites (modules):
None.

Recommended as prerequisite for:

Module coordinator:
Prof. Dr. Frank Kneip

Lecturer: Prof. Dr. Frank Kneip

[*updated 10.10.2023*]

Learning outcomes:
Students who have successfully completed this module...
...are able to structure a given topic independently
...are able to conduct independent literature research
...are able to independently write a report on current technical and/or economic topics
...are able to communicate the essential results of the scientific seminar paper in a short presentation

[*updated 01.07.2022*]

Module content:
Independent induction into a given topic and conduct of a (descriptive) study
Evaluation, preparation and written documentation of the study findings according to the principles of proper scientific work in the form of a seminar paper
argumentation and defence of one´s own point of view / research results in a short presentation

[*updated 01.07.2022*]

Teaching methods/Media:
Supervision of independent student resarch
Independently written report, presentation and defence of the results

[*updated 01.07.2022*]

Recommended or required reading:
Literature will be provided depending on case study

[*updated 01.07.2022*]