Technik
Hauptcampus

HOCHSCHULE TRIER

Module manual for the course Bridging modules Master II

Examination regulations 2021

Version 01.00.SoSe2025

24.03.2025

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Abbreviations

RM	Required module
CEM	Compulsatory elective module
EM	Elective module

Explanations

Required module	Compulsory elective modules must be successfully completed to obtain a degree in a degree programme.
Compulsatory elective module	Depending on the degree programme, examinations must be taken in one or more compulsory elective modules. The compulsory elective modules must be selected from the current catalogue of compulsory elective modules.
Elective module	This is a bridging module for the Master's degree programme in Interdisciplinary Engineering or an extra-curricular module.

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General notes

- The timing of the modules can be found in the annexes of the examination regulations or the subject examination regulations.
- The overall grade is calculated in accordance with the examination regulations or subject examination regulations.
- If several alternative exam performances, depending on the number of participants, are specified for a module, the current exam performance for the semester will be announced at the beginning of the course. These are indicated by additions in brackets with reference to the number of participants. In all other cases in which several exam performances are specified for a module, these must be taken in order to successfully pass the module.
- The requirement for the awarding of ECTS credits is the successful completion of the listed exam and study performances. If a module consists of two courses (e.g. a laboratory with the courses Partial Laboratory 1 and Partial Laboratory 2), the ECTS credits shown in the respective courses are not awarded individually, but the sum of the ECTS credits of the associated courses is only awarded when the complete module is passed.
- The examination regulations or subject examination regulations in the currently valid version are legally binding.

Contents

Content	The lecture takes place in two parts in the same semester. In the first part (Prof. Heinrich), the basics of reciprocating engines are taught: In addition to a general introduction to energy supply, the contents of combustion and fuels, geometry and kinematics of reciprocating engines, working processes, components of the internal combustion engine and reciprocating engines are covered. The second part (Prof. König) deals with the fundamentals of the operating behavior of turbomachinery, the interaction of turbomachinery and systems, as well as the flow and energy conversion in impeller and stator components.
Competency goals	After successfully completing the module, students will be familiar with the main components of energy conversion machines and will be able to classify different types of energy conversion machines, describe the operating behavior of energy conversion machines and calculate their work processes thermodynamically in an analytical manner.
Teaching form	☒ Lecture
	☐ Exercise
	☐ Seminar/seminar exercise
	☐ Laboratory
	☐ Project
Recommended Prequesites	• Fluid mechanics •
Literature	• Vorlesungsskript • Energieumwandlung in Kraft- und Arbeitsmaschinen (Kalide, Sigloch, Hanser Verlag)
Study performance	☐ Exercise performance
	☐ Laboratory performance
	☐ Term paper
	☐ Presentation
	☐ Certificate
Exam performance	☒ Written exam
	☐ Oral exam
	☐ Term paper
	☐ Project paper
	☐ Laboratory performance
	☐ Final thesis and oral exam
	☐ presentation
Usability	Bachelor Automotive Engineering - (FPO 2023) ☒ RM Bachelor Engineering - (FPO 2023) ☒ RM Bachelor Sports and Rehabilitation Technologies - (FPO 2023) ☒ CEM Bachelor Mechanical Engineering (also Cooperative Study Programme) - General Mechanical Engineering (FPO 2023) ☒ CEM Bridging modules Master II - (PO 2021) ☒ CEM Bachelor Mechanical Engineering (also Cooperative Study Programme) - General Mechanical Engineering (FPO 2023) ☒ RM Bachelor Mechanical Engineering (also Cooperative Study Programme) - Safety Engineering (FPO 2023) ☒ RM Bachelor Mechanical Engineering (also Cooperative Study Programme) - Computational Engineering (FPO 2023) ☒ RM
Offer	☐ Winter semester ☒ Summer semester ☐ Irregular
Workload	Credit points: 5 / Contact time: 60 hours [4 hours per week] / Self-study: 90 hours
Language	German
Duration of the module	1 Semester
Approved aids for the exam performance	Will be announced in the lecture
Lecturer(s)	Mr. Prof. Dr.-Ing. Christoph Heinrich, Mr. Prof. Dr. Sven König

Responsible(s)	Mr. Prof. Dr.-Ing. Christoph Heinrich, Mr. Prof. Dr. Sven König
Comment	
Change date	07.03.2025

Automatic Control (B)			
Content			
Competency goals			
Teaching form	☒ Lecture		
	☐ Exercise		
	☐ Seminar/seminar exercise		
	☒ Laboratory		
	☐ Project		
Recommended Prequesites			
Literature	• Föllinger, O.: Regelungstechnik, Hüthig Buch Verlag, Heidelberg • Unterlagen zum regelungstechnischen Praktikum • Zimmernann, U.; Ortwig H.: Regelungstechnik I für Ingenieure und Praktiker, Shaker Verlag Aachen • Mann, Schiffelgen, Froriep: Einführung in die Regelungstechnik; Carl Hanser Verlag, München Wien • Rake, H.: Regelungstechnik A und Ergänzungen (Regelungstechnik B); Vorlesungsumdruck 14. Auflage 1990, Institut für Regelungstechnik, RWTH Aachen • Richard C. Dorf / Robert H. Bishop: Moderne Regelungssysteme, Pearson Studium		
Study performance	☐ Exercise performance		
	☒ Laboratory performance		
	☐ Term paper		
	☐ Presentation		
	☐ Certificate		
Exam performance	☒ Written exam		
	☐ Oral exam		
	☐ Term paper		
	☐ Project paper		
	☐ Laboratory performance		
	☐ Final thesis and oral exam		
	☐ presentation		
Usability	Bachelor Engineering - Automotive Engineering (PO 2015)	☒ CEM	
	Bachelor Engineering - Safety Engineering (PO 2015)	☒ CEM	
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - (PO 2015)	☒ RM	
	Bachelor Engineering - General Mechanical Engineering (PO 2015)	☒ RM	
	Bridging modules Master II - (PO 2021)	☒ CEM	
	Internet of Things - Digital Automation - (PO 2017)	☒ RM	
	Bachelor Safety Engineering - (PO 2015)	☒ RM	
Offer	☒ Winter semester ☐ Summer semester ☐ Irregular		
Workload	Credit points	Contact time	Self-study
	5	60 hours [4 hours per week]	90 hours
Language	German		
Duration of the module	1 Semester		
Approved aids for the exam performance	None		
Lecturer(s)	Mr. Prof. Dr.-Ing. Harald Ortwig, Mr. Prof. Dr.-Ing. Uwe Zimmermann		
Responsible(s)	Mr. Prof. Dr.-Ing. Uwe Zimmermann		
Comment			
Change date	21.11.2024		

Chassis (B)				
Content				
Competency goals				
Teaching form	☒ Lecture			
	☐ Exercise			
	☐ Seminar/seminar exercise			
	☐ Laboratory			
	☐ Project			
Recommended Prequesites				
Literature	• Vertikal-/Querdynamik von Kraftfahrzeugen (Fahrzeugtechnik II), Eckstein • Vorlesungsskript			
Study performance	☐ Exercise performance			
	☐ Laboratory performance			
	☐ Term paper			
	☐ Presentation			
	☐ Certificate			
Exam performance	☒ Written exam			
	☐ Oral exam			
	☐ Term paper			
	☐ Project paper			
	☐ Laboratory performance			
	☐ Final thesis and oral exam			
	☐ presentation			
Usability	Bachelor Mechanical Engineering (also Cooperative Study Programme) - General Mechanical Engineering (PO 2015)	☒ CEM		
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - Automotive Engineering (PO 2015)	☒ RM		
	Bachelor Safety Engineering - (PO 2015)	☒ CEM		
	Bachelor Engineering - General Mechanical Engineering (PO 2015)	☒ CEM		
	Bachelor Engineering - Automotive Engineering (PO 2015)	☒ RM		
	Bachelor Engineering - Safety Engineering (PO 2015)	☒ CEM		
	Bridging modules Master II - (PO 2021)	☒ CEM		
Offer	☒ Winter semester ☐ Summer semester ☐ Irregular			
Workload	Credit points	Contact time	Self-study	
	5	60 hours [4 hours per week]	90 hours	
Language	German and English			
Duration of the module	1 Semester			
Approved aids for the exam performance	None			
Lecturer(s)	Mr. Prof. Dr. Alexander Wohlers			
Responsible(s)	Mr. Prof. Dr. Alexander Wohlers			
Comment				
Change date	21.11.2024			

Computer Aided Design Tools	
Content	
Competency goals	
Teaching form	☒ Lecture
	☐ Exercise
	☐ Seminar/seminar exercise
	☐ Laboratory
	☐ Project
Recommended Prequesites	
Literature	• Hoefer, E. E. E., Nielinger, H. SPICE Analyseprogramm für elektronische Schaltungen Springer-Verlag Berlin 1985 ISBN 3-540-15160-5 • Siegl, J.; Eichele, H. Hardwareentwicklung mit ASIC Mikroelektronik Band 8 Hüthig Buch Verlag Heidelberg 1990 ISBN 3-7785-1990-5 • Ehrhardt, D., Schulte, J. Simulieren mit PSPICE Vieweg Verlag Braunschweig 1992 ISBN 3-528-04921-9 • Tuinenga, P. W. SPICE A Guide to Circuit Simulation Analysis Using PSPICE Prentice Hall Englewood Cliffs, New Jersey 07632 1992 (2. Edition) ISBN 0-13-747270-6 • Baumann, Möller Schaltungssimulation mit Design Center Fachbuchverlag Leipzig-Köln 1994 ISBN 3-343-00867-2 • Santen, Martin Das PSPICE Design Center 6.1 Arbeitsbuch Fächer Verlag Didaktik 1994 ISBN 3-980-4099-0-2 • Justus, Otto Berechnung linearer und nichtlinearer Netzwerke mit PSPICE-Beispielen Leipzig Buchverlag ISBN 3-343-00865-6 • Kosack, Peter ASIC im Überblick VDE-Verlag GmbH Berlin Offenbach 1993 ISBN 3-8007-1743-3
Study performance	☐ Exercise performance
	☐ Laboratory performance
	☐ Term paper
	☐ Presentation
	☐ Certificate
Exam performance	☐ Written exam
	☒ Oral exam
	☒ Term paper
	☐ Project paper
	☒ Laboratory performance
	☐ Final thesis and oral exam
	☐ presentation

<table>
<tr><td rowspan="11">Usability</td><td colspan="2">Electrical Engineering (-Cooperative Study Programme) - (PO 2017)</td><td>☒ CEM</td></tr>
<tr><td colspan="2">Bachelor Medical Engineering - (PO 2017)</td><td>☒ CEM</td></tr>
<tr><td colspan="2">Internet of Things - Digital Automation - (PO 2017)</td><td>☒ CEM</td></tr>
<tr><td colspan="2">Bachelor Industrial Electrical Engineering and Management - (PO 2017)</td><td>☒ CEM</td></tr>
<tr><td colspan="2">Bachelor Medical Engineering (-Cooperative Study Programme) - (FPO 2024)</td><td>☒ CEM</td></tr>
<tr><td colspan="2">Bachelor Electromobility - (FPO 2024)</td><td>☒ CEM</td></tr>
<tr><td colspan="2">Bachelor Electromobility - (PO 2017)</td><td>☒ CEM</td></tr>
<tr><td colspan="2">Bachelor Industrial Electrical Engineering and Management - (FPO 2024)</td><td>☒ CEM</td></tr>
<tr><td colspan="2">Electrical Engineering (-Cooperative Study Programme) - (FPO 2024)</td><td>☒ CEM</td></tr>
<tr><td colspan="2">Bridging modules Master II - (PO 2021)</td><td>☒ CEM</td></tr>
<tr><td></td><td colspan="3"></td></tr>
<tr><td>Offer</td><td colspan="3">☒ Winter semester ☐ Summer semester ☐ Irregular</td></tr>
<tr><td rowspan="2">Workload</td><td>Credit points</td><td>Contact time</td><td>Self-study</td></tr>
<tr><td>5</td><td>60 hours [4 hours per week]</td><td>90 hours</td></tr>
<tr><td>Language</td><td colspan="3">German</td></tr>
<tr><td>Duration of the module</td><td colspan="3">1 Semester</td></tr>
<tr><td>Approved aids for the exam performance</td><td colspan="3">None</td></tr>
<tr><td>Lecturer(s)</td><td colspan="3">Mr. Prof. Dr. Andreas R. Diewald</td></tr>
<tr><td>Responsible(s)</td><td colspan="3">Mr. Prof. Dr. Andreas R. Diewald</td></tr>
<tr><td>Comment</td><td colspan="3"></td></tr>
<tr><td>Change date</td><td colspan="3">21.11.2024</td></tr>
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Cyber Physical Systems (Industry 4.0)			
Content	The course “Cognitive Robotics” (formerly “Technical Cybernetics”) teaches the fundamentals and architectures of robotic systems. It further provides insights into the sensor-based perception and navigation of robots. The focus in this context is on methods of computer vision and photogrammetry, planning and pathfinding as well as robot behavior.		
Competency goals	After completing this module, you will be able to... - understand and describe the function and architectures of robotic systems - design system components in perception and navigation - implement algorithms and methods from the field of computer vision and photogrammetry as well as planning and pathfinding		
Teaching form	☒ Lecture		
	☒ Exercise		
	☐ Seminar/seminar exercise		
	☐ Laboratory		
	☐ Project		
Recommended Prequesites	• Sensorics		
Literature	• Siciliano, Khatib: ”Springer Handbook of Robotics 2nd Edition”, Springer, 2016.		
Study performance	☐ Exercise performance		
	☐ Laboratory performance		
	☐ Term paper		
	☐ Presentation		
	☐ Certificate		
Exam performance	☒ Written exam (in case of high number of participants)		
	☒ Oral exam (in case of low number of participants)		
	☐ Term paper		
	☐ Project paper		
	☐ Laboratory performance		
	☐ Final thesis and oral exam		
	☐ presentation		
Usability	Bachelor Medical Engineering - (PO 2017)	☒ CEM	
	Bachelor Medical Engineering (-Cooperative Study Programme) - (FPO 2024)	☒ CEM	
	Information Technology (-Cooperative Study Programme) - (FPO 2024)	☒ CEM	
	Electrical Engineering (-Cooperative Study Programme) - (FPO 2024)	☒ CEM	
	Bridging modules Master II - (PO 2021)	☒ CEM	
	Information Technology (-Cooperative Study Programme) - (FPO 2024)	☒ RM	
	Internet of Things - Digital Automation - (PO 2017)	☒ RM	
Offer	☒ Winter semester ☐ Summer semester ☐ Irregular		
Workload	Credit points	Contact time	Self-study
	5	75 hours [5 hours per week]	75 hours
Language	German or English		
Duration of the module	1 Semester		
Approved aids for the exam performance	Will be announced in the lecture		
Lecturer(s)	Mr. Prof. Dr. Volker Lücken		
Responsible(s)	Mr. Prof. Dr. Volker Lücken		
Comment			
Change date	21.11.2024		

Electric and magnetic fields		
Content	Electrostatic field and electric flow field Field strength, flux, flux density, current density, voltage Maxwell's equations: Gauss's law, Gauss's law for electrostatics Operators of vector analysis: Nabla (grad, div, curl) Simple line, surface, and volume integrals Field calculation for simple geometries: lines, spheres, surfaces Symmetry of Maxwell's equations in relation to the electric and magnetic fields.	
Competency goals	Knowledge of the fundamental concepts of electromagnetic field theory Application of mathematical methods of vector analysis for field calculation This includes: Specifying domain-specific parameters Solving domain-specific calculation problems Comparing calculation methods and selecting the optimal method Applying basic techniques in practice	
Teaching form	☒ Lecture	
	☒ Exercise	
	☐ Seminar/seminar exercise	
	☐ Laboratory	
	☐ Project	
Recommended Prequesites	• Fundamentals of Electrical Engineering - AC	
Literature	• Georg: Elektromagnetische Felder und Netzwerke, Fricke/Vaske: Grundlagen der Elektrotechnik I, Grafe, Loose, Kühn: Grundlagen der Elektrotechnik II	
Study performance	☐ Exercise performance	
	☐ Laboratory performance	
	☐ Term paper	
	☐ Presentation	
	☐ Certificate	
Exam performance	☒ Written exam	
	☐ Oral exam	
	☐ Term paper	
	☐ Project paper	
	☐ Laboratory performance	
	☐ Final thesis and oral exam	
	☐ presentation	
Usability	Internet of Things - Digital Automation - (PO 2017)	☒ CEM
	Electrical Engineering (-Cooperative Study Programme) - (PO 2017)	☒ RM
	Bachelor Industrial Electrical Engineering and Management - (PO 2017)	☒ RM
	Bachelor Industrial Electrical Engineering and Management - (PO 2017)	☒ RM
	Bachelor Industrial Electrical Engineering and Management - (PO 2017)	☒ RM
	Bridging modules Master II - (PO 2021)	☒ CEM
	Bachelor Electromobility - (FPO 2024)	☒ RM
	Bachelor Electromobility - (PO 2017)	☒ RM
	Information Technology (-Cooperative Study Programme) - (FPO 2024)	☒ RM
	Bachelor Industrial Electrical Engineering and Management - (FPO 2024)	☒ RM
	Electrical Engineering (-Cooperative Study Programme) - (FPO 2024)	☒ RM
	Bachelor Medical Engineering (-Cooperative Study Programme) - (FPO 2024)	☒ RM
	Bachelor Medical Engineering - (PO 2017)	☒ RM
Offer	☒ Winter semester ☐ Summer semester ☐ Irregular	

Workload	Credit points	Contact time	Self-study
	5	60 hours [4 hours per week]	90 hours
Language	German		
Duration of the module	1 Semester		
Approved aids for the exam performance	None		
Lecturer(s)	Mr. Prof. Dr. Andreas R. Diewald		
Responsible(s)	Mr. Prof. Dr. Andreas R. Diewald		
Comment	Electric and Magnetic Fields Vorlesungsunterlagen: ftp://ftp.vorlesung.fh-trier.de/georg/		
Change date	21.11.2024		

Environmental Management			
Content			
Competency goals			
Teaching form	☒ Lecture		
	☐ Exercise		
	☐ Seminar/seminar exercise		
	☐ Laboratory		
	☐ Project		
Recommended Prequesites			
Literature	• Schmid et al., Qualitätsmanagement: Arbeitsschutz und Umweltmanagement, Europa-Lehrmittel		
Study performance	☐ Exercise performance		
	☐ Laboratory performance		
	☐ Term paper		
	☐ Presentation		
	☐ Certificate		
Exam performance	☐ Written exam		
	☐ Oral exam		
	☐ Term paper		
	☒ Project paper		
	☐ Laboratory performance		
	☐ Final thesis and oral exam		
	☐ presentation		
Usability	Bachelor Safety Engineering - (PO 2015)	☒ CEM	
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - (PO 2015)	☒ CEM	
	Bachelor Engineering - (PO 2015)	☒ CEM	
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - (FPO 2023)	☒ CEM	
	Bachelor Automotive Engineering - (FPO 2023)	☒ CEM	
	Bachelor Engineering - (FPO 2023)	☒ CEM	
	Bachelor Sports and Rehabilitation Technologies - (FPO 2023)	☒ CEM	
	Bridging modules Master II - (PO 2021)	☒ CEM	
Offer	☒ Winter semester ☐ Summer semester ☐ Irregular		
Workload	Credit points	Contact time	Self-study
	5	60 hours [4 hours per week]	90 hours
Language	German		
Duration of the module	1 Semester		
Approved aids for the exam performance	None		
Lecturer(s)	Mr. Prof. Dr. rer. nat. Lars Draack		
Responsible(s)	Mr. Prof. Dr. rer. nat. Lars Draack		
Comment			
Change date	21.11.2024		

Finite Elements (B)			
Content	- Introduction to the Finite Element Method - Theory of Finite Elements using the example of truss structures or similar. - Optional: Transfer of the theory into the Python-based FEM simulation tool LSDT-StrucSim - Introduction to the simulation environment ANSYS Workbench or Abaqus/CAE		
Competency goals	Students can explain the basics of the finite element method, build simple FE models and use them to numerically calculate the static structural strength behavior of components. Supplementary information for use in dual studies can be found under Comments		
Teaching form	☒ Lecture		
	☒ Exercise		
	☐ Seminar/seminar exercise		
	☐ Laboratory		
	☐ Project		
Recommended Prequesites			
Literature	• Vorlesungsumdruck/Foliensatz • Müller, G., Groth, C.: FEM für Praktiker Expert, 2003 • Knothe,K., Wessels, H.: Finite Elemente Springer-Verlag, 2017 • Bathe, K.-J.: Finite-Elemente-Methoden Springer-Verlag, 2001		
Study performance	☐ Exercise performance		
	☐ Laboratory performance		
	☐ Term paper		
	☐ Presentation		
	☒ Certificate		
Note on study performance	The study performance is a prerequisite for taking the exam		
Exam performance	☒ Written exam		
	☐ Oral exam		
	☐ Term paper		
	☐ Project paper		
	☐ Laboratory performance		
	☐ Final thesis and oral exam		
	☐ presentation		
Usability	Bachelor Automotive Engineering - (FPO 2023)	☒ RM	
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - Safety Engineering (FPO 2023)	☒ CEM	
	Bachelor Sports and Rehabilitation Technologies - (FPO 2023)	☒ CEM	
	Bachelor Engineering - Safety Engineering (FPO 2023)	☒ CEM	
	Bachelor Engineering - Automotive Engineering (FPO 2023)	☒ CEM	
	Bridging modules Master II - (PO 2021)	☒ CEM	
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - General Mechanical Engineering (FPO 2023)	☒ RM	
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - Computational Engineering (FPO 2023)	☒ RM	
	Bachelor Engineering - General Mechanical Engineering (FPO 2023)	☒ RM	
	Bachelor Engineering - Computational Engineering (FPO 2023)	☒ RM	
Offer	☒ Winter semester ☐ Summer semester ☐ Irregular		
Workload	Credit points	Contact time	Self-study
	5	60 hours [4 hours per week]	90 hours
Language	German		
Duration of the module	1 Semester		

Approved aids for the exam performance	None
Lecturer(s)	Mr. Prof. Dr. Christian Kontermann
Responsible(s)	Mr. Prof. Dr. Christian Kontermann
Comment	The coursework for dual students in this module differs from the coursework for undergraduate students in that the topic of the coursework has a special reference to the field of activity in the cooperating company. This means that, in addition to the above-mentioned qualification objectives, dual study students have acquired the ability to classify their practice-related activities against the background of the knowledge acquired at the university after successfully completing the module.
Change date	11.03.2025

Fluid Mechanics (B)			
Content	Properties of liquids and gases (aggregate states, fluid concept, continuum hypothesis, pressure in a fluid at rest, thermal equation of state, viscosity, interfacial tension, speed of sound), hydrostatics (Euler's fundamental law of hydrostatics, Pascal's paradox, pressure distribution in the atmosphere, communicating vessels, fluid forces on walls, hydrostatic buoyancy, pressure distribution in rigid body motion), Kinematics (Lagrange's and Euler's representation, velocity, material time derivative and acceleration, streamlines, strike lines, path lines, current tube and current thread, formulation of balance equations, continuity equation), Euler's and Bernoulli's equation, pipe hydraulics (laminar and turbulent flow, pressure losses, pipe calculation), momentum theorem and angular momentum theorem for stationary incompressible flows Translated with DeepL.com (free version)		
Competency goals	After successfully completing the module, students will be able to explain fluid mechanics problems, apply the basic equations of fluid mechanics to practical applications and evaluate analytical calculation results with regard to the underlying simplifications.		
Teaching form	☒ Lecture		
	☒ Exercise		
	☐ Seminar/seminar exercise		
	☐ Laboratory		
	☐ Project		
Recommended Prequesites			
Literature	• Vorlesungsunterlagen • Technische Strömungslehre (Becker, Verlag: Teubner) • Fluid Mechanics (White, Verlag: McGraw-Hill) • Technische Fluidmechanik (Sigloch, Verlag: Springer)		
Study performance	☐ Exercise performance		
	☐ Laboratory performance		
	☐ Term paper		
	☐ Presentation		
	☐ Certificate		
Exam performance	☒ Written exam		
	☐ Oral exam		
	☐ Term paper		
	☐ Project paper		
	☐ Laboratory performance		
	☐ Final thesis and oral exam		
	☐ presentation		
Usability	Bachelor Engineering - (FPO 2023)	☒ RM	
	Bachelor Automotive Engineering - (FPO 2023)	☒ RM	
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - (FPO 2023)	☒ RM	
	Bachelor Engineering - (PO 2015)	☒ RM	
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - (PO 2015)	☒ RM	
	Bachelor Electromobility - (PO 2017)	☒ CEM	
	Bachelor Electromobility - (FPO 2024)	☒ CEM	
	Bridging modules Master II - (PO 2021)	☒ CEM	
	Bachelor Sports and Rehabilitation Technologies - (FPO 2023)	☒ RM	
	Bachelor Sports and Rehabilitation Technologies - (PO 2017)	☒ RM	
	Bachelor Safety Engineering - (PO 2015)	☒ RM	
Offer	☒ Winter semester ☐ Summer semester ☐ Irregular		
Workload	Credit points: 5	Contact time: 90 hours [6 hours per week]	Self-study: 60 hours
Language	German		
Duration of the module	1 Semester		

Approved aids for the exam performance	Will be announced in the lecture
Lecturer(s)	Mr. Prof. Dr. Sven König
Responsible(s)	Mr. Prof. Dr. Sven König
Comment	
Change date	07.03.2025

Grid Infrastructure			
Content			
Competency goals			
Teaching form	☒ Lecture		
	☒ Exercise		
	☐ Seminar/seminar exercise		
	☐ Laboratory		
	☐ Project		
Recommended Prequesites			
Literature	• Schutz und Selektivität in Niederspannungsanlagen, VDE-Verlag, 2. Auflage, 2022. CAE in der Energieverteilung, 3. Auflage voraussichtlich in 2023.		
Study performance	☐ Exercise performance		
	☐ Laboratory performance		
	☐ Term paper		
	☐ Presentation		
	☐ Certificate		
Exam performance	☒ Written exam		
	☐ Oral exam		
	☐ Term paper		
	☐ Project paper		
	☐ Laboratory performance		
	☐ Final thesis and oral exam		
	☐ presentation		
Usability	Electrical Engineering (-Cooperative Study Programme) - (PO 2017)	☒ CEM	
	Bridging modules Master II - (PO 2021)	☒ CEM	
	Bachelor Electromobility - (PO 2017)	☒ RM	
	Bachelor Industrial Electrical Engineering and Management - (FPO 2024)	☒ RM	
	Electrical Engineering (-Cooperative Study Programme) - (FPO 2024)	☒ RM	
Offer	☒ Winter semester ☐ Summer semester ☐ Irregular		
Workload	Credit points	Contact time	Self-study
	5	60 hours [4 hours per week]	90 hours
Language	German		
Duration of the module	1 Semester		
Approved aids for the exam performance	None		
Lecturer(s)	Mr. Prof. Dr. Dirk Brechtken		
Responsible(s)	Mr. Prof. Dr. Dirk Brechtken		
Comment			
Change date	21.11.2024		

Hydraulic System (B)			
Content			
Competency goals			
Teaching form	☒ Lecture		
	☐ Exercise		
	☐ Seminar/seminar exercise		
	☐ Laboratory		
	☐ Project		
Recommended Prequesites			
Literature	• Murrenhoff, H.: Grundlagen der Fluidtechnik, Teil 1, Shaker Verlag • Ortwig, H.; Übungen zur Hydraulik		
Study performance	☐ Exercise performance		
	☐ Laboratory performance		
	☐ Term paper		
	☐ Presentation		
	☐ Certificate		
Exam performance	☒ Written exam		
	☐ Oral exam		
	☐ Term paper		
	☐ Project paper		
	☐ Laboratory performance		
	☐ Final thesis and oral exam		
	☐ presentation		
Usability	Bachelor Safety Engineering - (PO 2015)	☒ CEM	
	Bachelor Engineering - (PO 2015)	☒ CEM	
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - (PO 2015)	☒ CEM	
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - (FPO 2023)	☒ CEM	
	Bachelor Automotive Engineering - (FPO 2023)	☒ CEM	
	Bachelor Sports and Rehabilitation Technologies - (FPO 2023)	☒ CEM	
	Bachelor Engineering - (FPO 2023)	☒ CEM	
	Bridging modules Master II - (PO 2021)	☒ CEM	
Offer	☒ Winter semester ☐ Summer semester ☐ Irregular		
Workload	Credit points: 5	Contact time: 60 hours [4 hours per week]	Self-study: 90 hours
Language	German		
Duration of the module	1 Semester		
Approved aids for the exam performance	None		
Lecturer(s)	Mr. Prof. Dr.-Ing. Harald Ortwig		
Responsible(s)	Mr. Prof. Dr.-Ing. Harald Ortwig		
Comment			
Change date	21.11.2024		

Investment,Financing, Competition				
Content				
Competency goals				
Teaching form	☒ Lecture			
	☐ Exercise			
	☐ Seminar/seminar exercise			
	☐ Laboratory			
	☐ Project			
Recommended Prequesites				
Literature	• Bonart/Bär, Quantitative BWL Bd. II • Schmidt, Reinhard/ Terberger, Eva: Grundzüge der Investitions- und Finanzierungstheorie, 4. Aufl. 1997			
Study performance	☐ Exercise performance			
	☐ Laboratory performance			
	☐ Term paper			
	☐ Presentation			
	☐ Certificate			
Exam performance	☒ Written exam			
	☐ Oral exam			
	☐ Term paper			
	☐ Project paper			
	☐ Laboratory performance			
	☐ Final thesis and oral exam			
	☐ presentation			
Usability	Bachelor Engineering - (FPO 2023)	☒ RM		
	Bachelor Automotive Engineering - (FPO 2023)	☒ CEM		
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - (FPO 2023)	☒ CEM		
	Bachelor Sports and Rehabilitation Technologies - (FPO 2023)	☒ CEM		
	Bridging modules Master II - (PO 2021)	☒ CEM		
	Bachelor Industrial Electrical Engineering and Management - (FPO 2024)	☒ RM		
Offer	☒ Winter semester ☐ Summer semester ☐ Irregular			
Workload	Credit points	Contact time	Self-study	
	5	60 hours [4 hours per week]	90 hours	
Language	German			
Duration of the module	1 Semester			
Approved aids for the exam performance	None			
Lecturer(s)	Mr. Prof. Dr. Juergen Bär			
Responsible(s)	Mr. Prof. Dr. Juergen Bär			
Comment				
Change date	21.11.2024			

Lean- & Project Management, Ideation and Decision Making Methods	
Content	Principles of Lean Management, Rules and Roles of Project Management, Utility analysis, FMEA, ABC, XYZ Analysis, Value Stream Analysis, Target Costing, Overall Equipment Effciency Analysis...
Competency goals	Students understand and learn the principles of lean management and the roles and rules as well as the critical success factors in project management. They learn methods that can be applied in everyday business life for the problems of exploration/innovation, information, decision-making, quality and costs. After successfully completing the module, they will therefore be able to make different decisions on the above-mentioned problems objectively with the help of decision support and idea generation methods, despite different experiences, “ad hoc” knowledge and errors in thinking. People, employees and managers constantly have to make decisions and solve problems in everyday life, which is why the application of these methods increases students’ problem-solving skills.
Teaching form	☒ Lecture
	☐ Exercise
	☐ Seminar/seminar exercise
	☐ Laboratory
	☐ Project
Recommended Prequesites	
Literature	• Wittmann, Skript, Qualitätsmanagementmethoden, 2020 • Rolf Dobelli, Die Kunst des klaren Denkens, 2011
Study performance	☐ Exercise performance
	☐ Laboratory performance
	☐ Term paper
	☐ Presentation
	☐ Certificate
Exam performance	☐ Written exam
	☒ Oral exam (in case of high number of participants)
	☒ Term paper (in case of low number of participants)
	☐ Project paper
	☐ Laboratory performance
	☐ Final thesis and oral exam
	☐ presentation
Usability	Bachelor Automotive Engineering - (FPO 2023) ☒ CEM Bachelor Safety Engineering - (PO 2015) ☒ CEM Bachelor Sports and Rehabilitation Technologies - (PO 2017) ☒ CEM Bachelor Mechanical Engineering (also Cooperative Study Programme) - (PO 2015) ☒ CEM Bachelor Engineering - (PO 2015) ☒ CEM Bridging modules Master II - (PO 2021) ☒ CEM Bachelor Sports and Rehabilitation Technologies - (FPO 2023) ☒ CEM Bachelor Engineering - (FPO 2023) ☒ CEM Bachelor Mechanical Engineering (also Cooperative Study Programme) - (FPO 2023) ☒ CEM
Offer	☐ Winter semester ☒ Summer semester ☐ Irregular
Workload	Credit points: 5 / Contact time: 60 hours [4 hours per week] / Self-study: 90 hours
Language	English
Duration of the module	1 Semester
Approved aids for the exam performance	None
Lecturer(s)	Mr. Prof. Dr. Armin Wittmann
Responsible(s)	Mr. Prof. Dr. Armin Wittmann
Comment	

Change date	21.11.2024

Machine Elements for Electrical Engineers		
Content	Fundamentals of statics and strength theory; axles, shafts, operational strength; springs and other elastic component deformations; connecting elements and connecting techniques; bolts and screws; bearings;	
Competency goals	Students understand the interplay between the correct strength design and construction of simple mechanical components as part of a complex machine in order to be able to use this for their own planning and evaluation.	
Teaching form	☒ Lecture	
	☒ Exercise	
	☐ Seminar/seminar exercise	
	☐ Laboratory	
	☐ Project	
Recommended Prequesites		
Literature	• Hinzen, H.: Basiswissen Maschinenelemente (3. Auflage); De Gruyter Oldenbourg, Berlin/Boston, 2020	
Study performance	☐ Exercise performance	
	☐ Laboratory performance	
	☐ Term paper	
	☐ Presentation	
	☐ Certificate	
Exam performance	☒ Written exam	
	☐ Oral exam	
	☐ Term paper	
	☐ Project paper	
	☐ Laboratory performance	
	☐ Final thesis and oral exam	
	☐ presentation	
Usability	Bachelor Medical Engineering - (PO 2017)	☒ CEM
	Electrical Engineering (-Cooperative Study Programme) - (PO 2017)	☒ CEM
	Bachelor Electromobility - (PO 2017)	☒ CEM
	Bachelor Industrial Electrical Engineering and Management - (PO 2017)	☒ CEM
	Bridging modules Master II - (PO 2021)	☒ EM
	Electrical Engineering (-Cooperative Study Programme) - (FPO 2024)	☒ CEM
	Bachelor Electromobility - (FPO 2024)	☒ CEM
	Bachelor Industrial Electrical Engineering and Management - (FPO 2024)	☒ CEM
Offer	☒ Winter semester ☐ Summer semester ☐ Irregular	

Workload	Credit points	Contact time	Self-study
	5	60 hours [4 hours per week]	90 hours

Language	German and English
Duration of the module	1 Semester
Approved aids for the exam performance	Will be announced in the lecture
Lecturer(s)	Mr. Prof. Dr.-Ing. Heiko Bossong
Responsible(s)	Mr. Prof. Dr.-Ing. Heiko Bossong
Comment	
Change date	07.03.2025

Medical Instrumentation		
Content	1. measurement on the living organism (requirements for medical measurement technology, medical measurement chains) 2. bioelectromagnetism (neurophysiology, basic ideas of volume conductor theory) 3. bioelectric and biomagnetic signals (recording techniques, sources of interference, in detail: ECG and EEG, as an overview: EMG, ERG, EGG, EOG, MEG) 4. measurement technology in audiology (basic middle and inner ear diagnostics) 5. measurement of blood pressure (pressure sensors, palpatory, auscultatory and oscillatory measurement, extra- and intracorporeal measurement)	
Competency goals	Upon successful completion of the module, the student will be able to: -describe the basic knowledge of medical metrology. -be familiar with the special problems of data acquisition in the biomedical field -apply the previously acquired basic knowledge to solve specific problems in medical metrology. apply procedures for invasive and non-invasive diagnostics and patient monitoring In the area of key qualifications, self-organization is particularly promoted in the lecture follow-up and in the laboratories.	
Teaching form	☒ Lecture	
	☒ Exercise	
	☐ Seminar/seminar exercise	
	☒ Laboratory	
	☐ Project	
Recommended Prequesites	• Fundamentals of Electrical Engineering - AC	
Literature	• K. Meyer-Waarden Einführung in die biologische und medizinische Messtechnik , Schattauer Verlag, 1975 • Kramme Medizintechnik Springer Verlag, 2010 • J. Bronzino (Editor) The Biomedical Engineering Handbook, Third Edition - 3 Volume Set , Springer Verlag, 2000	
Study performance	☒ Exercise performance	
	☐ Laboratory performance	
	☐ Term paper	
	☐ Presentation	
	☐ Certificate	
Exam performance	☒ Written exam	
	☐ Oral exam	
	☐ Term paper	
	☐ Project paper	
	☐ Laboratory performance	
	☐ Final thesis and oral exam	
	☐ presentation	
Usability	Bridging modules Master II - (PO 2021)	☒ CEM
	Bachelor Medical Engineering - (PO 2017)	☒ RM
	Bachelor Sports and Rehabilitation Technologies - (FPO 2023)	☒ RM
	Bachelor Sports and Rehabilitation Technologies - (PO 2017)	☒ RM
Offer	☐ Winter semester ☒ Summer semester ☐ Irregular	
Workload	Credit points: 5 / Contact time: 60 hours [4 hours per week] / Self-study: 90 hours	
Language	German and English	
Duration of the module	1 Semester	
Approved aids for the exam performance	None	
Lecturer(s)	Mr. Prof. Dr.-Ing. Klaus Peter Koch	
Responsible(s)	Mr. Prof. Dr.-Ing. Klaus Peter Koch	
Comment		

Change date	06.03.2025

Methods in Micro-Nanotechnology			
Content	- Introduction to bio-nano systems, clean room technology - BioMEMS materials, crystallography - Production of crystalline silicon (Czochralski, float zone) - Thermal oxidation and epitaxy - Layer deposition: CVD (Chemical Vapor Deposition) - Physical layer deposition: PVD (Physical Vapor Deposition) - Doping techniques: Diffusion, ion implantation, annealing - Lithography: contact and proximity exposure, wafer stepper, resist technology - Wet etching, cleaning (isotropic, anisotropic, electrochemical) - Dry etching: Ion beam etching, reactive ion etching, plasma etching - Bulk/surface micromechanics, - Assembly and connection technology - Biosensors - Lab on chip and in-vitro diagnostics - Microsystems in neural implants		
Competency goals	After successfully completing the module, students will be able to - Understand the fundamentals of manufacturing technology of micro and nano systems and microelectronic circuits with a focus on semiconductor technology. - Select the correct manufacturing processes for micro- and nanosystem-based components. - Calculate analytically the manufacturing parameters of microsystem devices - Design production masks. - Characterize the manufactured structures using suitable measurement systems.		
Teaching form	☒ Lecture		
	☒ Exercise		
	☐ Seminar/seminar exercise		
	☐ Laboratory		
	☐ Project		
Recommended Prequesites			
Literature	• wird in der LV bekannt gegeben		
Study performance	☐ Exercise performance		
	☐ Laboratory performance		
	☐ Term paper		
	☐ Presentation		
	☐ Certificate		
Exam performance	☒ Written exam		
	☐ Oral exam		
	☐ Term paper		
	☐ Project paper		
	☐ Laboratory performance		
	☐ Final thesis and oral exam		
	☐ presentation		
Usability	Bachelor Medical Engineering - (PO 2017)	☒ CEM	
	Electrical Engineering (-Cooperative Study Programme) - (PO 2017)	☒ CEM	
	Bachelor Electromobility - (PO 2017)	☒ CEM	
	Bachelor Industrial Electrical Engineering and Management - (PO 2017)	☒ CEM	
	Bridging modules Master II - (PO 2021)	☒ CEM	
	Bachelor Electromobility - (FPO 2024)	☒ CEM	
	Electrical Engineering (-Cooperative Study Programme) - (FPO 2024)	☒ CEM	
	Information Technology (-Cooperative Study Programme) - (FPO 2024)	☒ CEM	
	Bachelor Medical Engineering (-Cooperative Study Programme) - (FPO 2024)	☒ CEM	
	Bachelor Industrial Electrical Engineering and Management - (FPO 2024)	☒ CEM	
Offer	☐ Winter semester ☒ Summer semester ☐ Irregular		
Workload	Credit points	Contact time	Self-study
	5	60 hours [4 hours per week]	90 hours
Language	German and English		

Duration of the module	1 Semester
Approved aids for the exam performance	None
Lecturer(s)	Mr. Prof. Dr.-Ing. Dara Feili
Responsible(s)	Mr. Prof. Dr.-Ing. Dara Feili
Comment	
Change date	16.01.2025

Microscopy		
Content	Lightmicroscopy Electronmicroscopy Scanning Probe Microscopy Other imaging techniques (MRT and CT) Other imaging techniques (MRT and CT)	
Competency goals	Understanding of the basic principles of microscopy and initial practical experience of its use.	
Teaching form	☒ Lecture	
	☐ Exercise	
	☒ Seminar/seminar exercise	
	☐ Laboratory	
	☐ Project	
Recommended Prequesites	• Special Topics in Physics	
Literature		
Study performance	☐ Exercise performance	
	☐ Laboratory performance	
	☐ Term paper	
	☐ Presentation	
	☐ Certificate	
Exam performance	☒ Written exam	
	☒ Oral exam	
	☐ Term paper	
	☐ Project paper	
	☐ Laboratory performance	
	☐ Final thesis and oral exam	
	☐ presentation	
Usability	Bachelor Electromobility - (PO 2017)	☒ CEM
	Bridging modules Master II - (PO 2021)	☒ CEM
	Electrical Engineering (-Cooperative Study Programme) - (PO 2017)	☒ CEM
	Internet of Things - Digital Automation - (PO 2017)	☒ CEM
	Bachelor Medical Engineering - (PO 2017)	☒ CEM
	Bachelor Industrial Electrical Engineering and Management - (PO 2017)	☒ CEM
	Bachelor Electromobility - (FPO 2024)	☒ CEM
	Information Technology (-Cooperative Study Programme) - (FPO 2024)	☒ CEM
	Bachelor Medical Engineering (-Cooperative Study Programme) - (FPO 2024)	☒ CEM
	Bachelor Industrial Electrical Engineering and Management - (FPO 2024)	☒ CEM
	Electrical Engineering (-Cooperative Study Programme) - (FPO 2024)	☒ CEM
Offer	☒ Winter semester ☐ Summer semester ☐ Irregular	
Workload	Credit points: 5	Contact time: 60 hours [4 hours per week] / Self-study: 90 hours
Language	English	
Duration of the module	1 Semester	
Approved aids for the exam performance	None	
Lecturer(s)	Mrs. Dr. Friederike Nolle	
Responsible(s)	Mrs. Dr. Friederike Nolle	
Comment	1/3 of the final grade will be based on a marked presentation by the student during the lecture. 2/3 of the final grade will be based on a written examination at the end of the lecture.	
Change date	10.03.2025	

Neuroprosthetics	
Content	1. areas of application of neuroprosthetics Bladder pacemakers, limb stimulators, cardiac pacemakers, hearing implants, spinal cord stimulators, visual implants, deep brain stimulation, vagus stimulation, diaphragm stimulation 2. electrodes Designs, manufacturing methods, selectivity, implantation 3. polyimide electrodes Designs, production, contacting, microstructuring 4. characterization of electrodes Electrochemical description, impedance, cyclic voltametry, charge transfer, pulse tests 5. electrode materials Manufacture, types, properties 6. assembly and connection technology Leads, connections, adapters, fixation, sterilization 7. housing and encapsulation Requirements, hermetic - non-hermetic, materials, feedthroughs, manufacture 8. characterization of encapsulations Sources of error, leakage current tests, helium leakage test, accelerated ageing, mechanical tests 9. amplifiers and stimulators Requirements, special concepts for implants
Competency goals	After successfully completing the module, students will be able to - compare different methods for manufacturing active medical implants, - differentiate between special processes for the manufacture of subcomponents, - assign solution approaches to different applications, - evaluate quality assurance procedures for the individual components, - develop their own system designs for active implants. Students are able to apply engineering methods in an interdisciplinary manner (essential key qualification).
Teaching form	☒ Lecture
	☒ Exercise
	☐ Seminar/seminar exercise
	☐ Laboratory
	☐ Project
Recommended Prequesites	• Classical and Modern Physics
Literature	• Kramme, R. (Eds.): Medizintechnik-Verfahren, Systeme, Informationsverarbeitung. Berlin Heidelberg, New York: Springer-Verlag, 3. Auflage, 757-764, ISBN 978-3-540-34102-4 (2007) • Karsten Meyer-Waarden, Bioelektrische Signale und ihre Ableitverfahren , Schattauer • Hoffmann, K.-P., Dehm, J. “VDE-Studie zum Anwendungsfeld Neuroprothetik, Mikrosysteme in der Medizin“, Frankfurt/Main: VDE, ISBN 3-00-017424-9 (2005).
Study performance	☒ Exercise performance
	☐ Laboratory performance
	☐ Term paper
	☐ Presentation
	☐ Certificate
Exam performance	☐ Written exam
	☒ Oral exam
	☐ Term paper
	☐ Project paper
	☐ Laboratory performance
	☐ Final thesis and oral exam
	☐ presentation

<table>
<tr><td rowspan="11">Usability</td><td colspan="2">Electrical Engineering (-Cooperative Study Programme) - (PO 2017)</td><td>☒ CEM</td></tr>
<tr><td colspan="2">Bachelor Medical Engineering - (PO 2017)</td><td>☒ CEM</td></tr>
<tr><td colspan="2">Bachelor Electromobility - (PO 2017)</td><td>☒ CEM</td></tr>
<tr><td colspan="2">Bachelor Industrial Electrical Engineering and Management - (PO 2017)</td><td>☒ CEM</td></tr>
<tr><td colspan="2">Bachelor Medical Engineering (-Cooperative Study Programme) - (FPO 2024)</td><td>☒ CEM</td></tr>
<tr><td colspan="2">Internet of Things - Digital Automation - (PO 2017)</td><td>☒ CEM</td></tr>
<tr><td colspan="2">Bachelor Electromobility - (FPO 2024)</td><td>☒ CEM</td></tr>
<tr><td colspan="2">Bachelor Industrial Electrical Engineering and Management - (FPO 2024)</td><td>☒ CEM</td></tr>
<tr><td colspan="2">Electrical Engineering (-Cooperative Study Programme) - (FPO 2024)</td><td>☒ CEM</td></tr>
<tr><td colspan="2">Bridging modules Master II - (PO 2021)</td><td>☒ CEM</td></tr>
<tr><td>Offer</td><td colspan="3">☒ Winter semester ☐ Summer semester ☐ Irregular</td></tr>
<tr><td rowspan="2">Workload</td><td>Credit points</td><td>Contact time</td><td>Self-study</td></tr>
<tr><td>5</td><td>60 hours [4 hours per week]</td><td>90 hours</td></tr>
<tr><td>Language</td><td colspan="3">German and English</td></tr>
<tr><td>Duration of the module</td><td colspan="3">1 Semester</td></tr>
<tr><td>Approved aids for the exam performance</td><td colspan="3">None</td></tr>
<tr><td>Lecturer(s)</td><td colspan="3">Mr. Prof. Dr.-Ing. Klaus Peter Koch</td></tr>
<tr><td>Responsible(s)</td><td colspan="3">Mr. Prof. Dr.-Ing. Klaus Peter Koch</td></tr>
<tr><td>Comment</td><td colspan="3"></td></tr>
<tr><td>Change date</td><td colspan="3">21.11.2024</td></tr>
</table>

Operation Management (B)	
Content	
Competency goals	
Teaching form	☒ Lecture
	☐ Exercise
	☐ Seminar/seminar exercise
	☐ Laboratory
	☐ Project
Recommended Prequesites	
Literature	• Vorlesungsunterlagen
Study performance	☐ Exercise performance
	☐ Laboratory performance
	☐ Term paper
	☐ Presentation
	☐ Certificate
Exam performance	☒ Written exam
	☐ Oral exam
	☐ Term paper
	☐ Project paper
	☐ Laboratory performance
	☐ Final thesis and oral exam
	☐ presentation
Usability	Bachelor Engineering - (FPO 2023) ☒ RM
	Bachelor Automotive Engineering - (FPO 2023) ☒ CEM
	Bachelor Sports and Rehabilitation Technologies - (FPO 2023) ☒ CEM
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - (FPO 2023) ☒ CEM
	Bridging modules Master II - (PO 2021) ☒ CEM
	Bachelor Industrial Electrical Engineering and Management - (FPO 2024) ☒ RM
Offer	☒ Winter semester ☐ Summer semester ☐ Irregular

Workload	Credit points	Contact time	Self-study
	5	60 hours [4 hours per week]	90 hours

Language	German
Duration of the module	1 Semester
Approved aids for the exam performance	None
Lecturer(s)	Mr. Prof. Dr. Armin Wittmann
Responsible(s)	Mr. Prof. Dr. Armin Wittmann
Comment	
Change date	21.11.2024

Production Management with SAP			
Content			
Competency goals			
Teaching form	☒ Lecture		
	☒ Exercise		
	☐ Seminar/seminar exercise		
	☒ Laboratory		
	☐ Project		
Recommended Prequesites			
Literature			
Study performance	☒ Exercise performance		
	☒ Laboratory performance		
	☐ Term paper		
	☐ Presentation		
	☐ Certificate		
Note on study performance	The study performance is a prerequisite for taking the exam		
Exam performance	☐ Written exam		
	☐ Oral exam		
	☒ Term paper		
	☐ Project paper		
	☐ Laboratory performance		
	☐ Final thesis and oral exam		
	☐ presentation		
Usability	Bachelor Mechanical Engineering (also Cooperative Study Programme) - (PO 2015)	☒ CEM	
	Bachelor Safety Engineering - (PO 2015)	☒ CEM	
	Bachelor Electromobility - (PO 2017)	☒ CEM	
	Bachelor Industrial Electrical Engineering and Management - (PO 2017)	☒ CEM	
	Electrical Engineering (-Cooperative Study Programme) - (PO 2017)	☒ CEM	
	Bachelor Medical Engineering - (PO 2017)	☒ CEM	
	Bachelor Automotive Engineering - (FPO 2023)	☒ CEM	
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - (FPO 2023)	☒ CEM	
	Bachelor Sports and Rehabilitation Technologies - (FPO 2023)	☒ CEM	
	Bachelor Engineering - (FPO 2023)	☒ CEM	
	Bachelor Medical Engineering (-Cooperative Study Programme) - (FPO 2024)	☒ CEM	
	Bachelor Electromobility - (FPO 2024)	☒ CEM	
	Bachelor Industrial Electrical Engineering and Management - (FPO 2024)	☒ CEM	
	Electrical Engineering (-Cooperative Study Programme) - (FPO 2024)	☒ CEM	
	Bridging modules Master II - (PO 2021)	☒ CEM	
Offer	☒ Winter semester ☐ Summer semester ☐ Irregular		
Workload	Credit points	Contact time	Self-study
	5	60 hours [4 hours per week]	90 hours
Language	English		
Duration of the module	1 Semester		
Approved aids for the exam performance	None		
Lecturer(s)	Mr. Prof. Dr. Fritz Nikolai Rudolph		
Responsible(s)	Mr. Prof. Dr. Fritz Nikolai Rudolph		
Comment			
Change date	21.11.2024		

Project Report - Automotive Engineering				
Content	Carrying out a vehicle engineering design work with idea generation process, functional structure, morphological box, list of requirements, concept development, sketches, evaluation, concept selection, elaboration, simulation and design of components, FTA, FMEA, assembly instructions, operating instructions and project conclusion. Development and preparation of technical documentation. CADConstruction and drawing derivations. Use standards			
Competency goals	The students are able to design a vehicle product, develop and construct concepts and create a complete set of drawings and parts lists on their own. Based on the fundamentals of systematic conceptual design and construction and with knowledge of the vehicle-technical boundary conditions, they can thus independently design and construct a vehicle-technical product. Organise and carry out construction work.			
Teaching form	☐ Lecture			
	☐ Exercise			
	☐ Seminar/seminar exercise			
	☐ Laboratory			
	☒ Project			
Recommended Prequesites				
Literature				
Study performance	☐ Exercise performance			
	☐ Laboratory performance			
	☐ Term paper			
	☐ Presentation			
	☐ Certificate			
Exam performance	☐ Written exam			
	☐ Oral exam			
	☐ Term paper			
	☒ Project paper			
	☐ Laboratory performance			
	☐ Final thesis and oral exam			
	☐ presentation			
Usability	Bachelor Mechanical Engineering (also Cooperative Study Programme) - (PO 2015)	☒ RM		
	Bridging modules Master II - (PO 2021)	☒ CEM		
Offer	☒ Winter semester ☐ Summer semester ☐ Irregular			
Workload	Credit points	Contact time	Self-study	
	5	60 hours [4 hours per week]	90 hours	
Language	German and English			
Duration of the module	1 Semester			
Approved aids for the exam performance	None			
Lecturer(s)	Mr. Prof. Dr.-Ing. Christoph Heinrich, Mr. Prof. Dr.-Ing. Peter König			
Responsible(s)	Mr. Prof. Dr.-Ing. Peter König			
Comment				
Change date	21.11.2024			

Projectwork Vehicle Design			
Content			
Competency goals			
Teaching form	☐ Lecture		
	☐ Exercise		
	☐ Seminar/seminar exercise		
	☐ Laboratory		
	☒ Project		
Recommended Prequesites			
Literature			
Study performance	☐ Exercise performance		
	☐ Laboratory performance		
	☐ Term paper		
	☐ Presentation		
	☐ Certificate		
Exam performance	☒ Written exam		
	☐ Oral exam		
	☐ Term paper		
	☐ Project paper		
	☐ Laboratory performance		
	☐ Final thesis and oral exam		
	☐ presentation		
Usability	Bridging modules Master II - (PO 2021)		☒ CEM
Offer	☐ Winter semester ☒ Summer semester ☐ Irregular		
Workload	Credit points	Contact time	Self-study
	5	60 hours [4 hours per week]	90 hours
Language	German (lecture), English (exercise)		
Duration of the module	1 Semester		
Approved aids for the exam performance	None		
Lecturer(s)	Mr. Prof. Dr.-Ing. Peter König, Mr. Prof. Dr. Florian Dräger		
Responsible(s)	Mr. Prof. Dr.-Ing. Peter König, Mr. Prof. Dr. Florian Dräger		
Comment			
Change date	21.11.2024		

Python for Engineers			
Content	- Calculation of dynamic systems with Python - Building databases with Python - Using Python in Blender - Raspberry Pi with Python - ANSYS with Python		
Competency goals	The module ”Python for Engineers” deepens existing programming knowledge acquired in a foundational course and demonstrates to students how Python can be effectively applied in various application-oriented scenarios. It imparts practical skills for the development of Python applications in real projects.		
Teaching form	☒ Lecture		
	☐ Exercise		
	☐ Seminar/seminar exercise		
	☐ Laboratory		
	☐ Project		
Recommended Prequesites			
Literature			
Study performance	☐ Exercise performance		
	☐ Laboratory performance		
	☐ Term paper		
	☐ Presentation		
	☐ Certificate		
Exam performance	☒ Written exam		
	☐ Oral exam		
	☐ Term paper		
	☐ Project paper		
	☐ Laboratory performance		
	☐ Final thesis and oral exam		
	☐ presentation		
Usability	Bridging modules Master II - (PO 2021)	☒ EM	
Offer	☒ Winter semester ☐ Summer semester ☐ Irregular		
Workload	Credit points	Contact time	Self-study
	5	60 hours [4 hours per week]	90 hours
Language	English		
Duration of the module	1 Semester		
Approved aids for the exam performance	None		
Lecturer(s)	Mr. Prof. Dr. Alexander Wohlers		
Responsible(s)	Mr. Prof. Dr. Alexander Wohlers		
Comment			
Change date	21.11.2024		

<table>
<tr><th colspan="4">Signals and Systems</th></tr>
<tr><td>Content</td><td colspan="3"></td></tr>
<tr><td>Competency goals</td><td colspan="3"></td></tr>
<tr><td rowspan="5">Teaching form</td><td colspan="3">☒ Lecture</td></tr>
<tr><td colspan="3">☒ Exercise</td></tr>
<tr><td colspan="3">☐ Seminar/seminar exercise</td></tr>
<tr><td colspan="3">☐ Laboratory</td></tr>
<tr><td colspan="3">☐ Project</td></tr>
<tr><td>Recommended Prequesites</td><td colspan="3"></td></tr>
<tr><td>Literature</td><td colspan="3">• Kammmeyer Kroschel, „Digitale Signalverarbeitung“
• Oppenheim, Schaffer „Zeitdiskrete Signalverarbeitung“</td></tr>
<tr><td rowspan="5">Study performance</td><td colspan="3">☐ Exercise performance</td></tr>
<tr><td colspan="3">☐ Laboratory performance</td></tr>
<tr><td colspan="3">☐ Term paper</td></tr>
<tr><td colspan="3">☐ Presentation</td></tr>
<tr><td colspan="3">☐ Certificate</td></tr>
<tr><td rowspan="7">Exam performance</td><td colspan="3">☒ Written exam</td></tr>
<tr><td colspan="3">☐ Oral exam</td></tr>
<tr><td colspan="3">☐ Term paper</td></tr>
<tr><td colspan="3">☐ Project paper</td></tr>
<tr><td colspan="3">☐ Laboratory performance</td></tr>
<tr><td colspan="3">☐ Final thesis and oral exam</td></tr>
<tr><td colspan="3">☐ presentation</td></tr>
<tr><td rowspan="11">Usability</td><td>Electrical Engineering (-Cooperative Study Programme) - (PO 2017)</td><td>☒ CEM</td></tr>
<tr><td>Bachelor Electromobility - (PO 2017)</td><td>☒ CEM</td></tr>
<tr><td>Internet of Things - Digital Automation - (PO 2017)</td><td>☒ CEM</td></tr>
<tr><td>Bachelor Electromobility - (FPO 2024)</td><td>☒ CEM</td></tr>
<tr><td>Bachelor Industrial Electrical Engineering and Management - (FPO 2024)</td><td>☒ CEM</td></tr>
<tr><td>Electrical Engineering (-Cooperative Study Programme) - (FPO 2024)</td><td>☒ CEM</td></tr>
<tr><td>Bridging modules Master II - (PO 2021)</td><td>☒ CEM</td></tr>
<tr><td>Information Technology (-Cooperative Study Programme) - (FPO 2024)</td><td>☒ RM</td></tr>
<tr><td>Bachelor Medical Engineering (-Cooperative Study Programme) - (FPO 2024)</td><td>☒ RM</td></tr>
<tr><td>Bachelor Medical Engineering - (PO 2017)</td><td>☒ RM</td></tr>
<tr><td>Offer</td><td colspan="3">☒ Winter semester ☐ Summer semester ☐ Irregular</td></tr>
<tr><td>Workload</td><td colspan="3"><table><tr><th>Credit points</th><th>Contact time</th><th>Self-study</th></tr><tr><td>5</td><td>60 hours [4 hours per week]</td><td>90 hours</td></tr></table></td></tr>
<tr><td>Language</td><td colspan="3">German</td></tr>
<tr><td>Duration of the module</td><td colspan="3">1 Semester</td></tr>
<tr><td>Approved aids for the exam performance</td><td colspan="3">None</td></tr>
<tr><td>Lecturer(s)</td><td colspan="3">Mr. Prof. Dr. Elmar Seidenberg</td></tr>
<tr><td>Responsible(s)</td><td colspan="3">Mr. Prof. Dr. Elmar Seidenberg</td></tr>
<tr><td>Comment</td><td colspan="3"></td></tr>
<tr><td>Change date</td><td colspan="3">21.11.2024</td></tr>
</table>

Simulation Methods		
Content	The course uses examples such as inductive interfaces, implanted electrodes and heat propagation in the body to set up the problem-specific differential equations and calculate them analytically and using finite element methods. Simplified models are considered analytically in order to verify the simulation results. More complex models are then examined using simulations. Particular emphasis is placed on problems of numerical simulation and the definition of models.	
Competency goals	After successfully completing the module, students will be able to - set up differential equations suitable for physical problems, - develop models for simulation, - calculate solutions analytically from simple geometry in order to verify simulation results, - use their knowledge of field simulations to select the right simulation tools and boundary conditions. Students are able to subject their own results to critical self-monitoring (essential key qualification).	
Teaching form	☒ Lecture	
	☐ Exercise	
	☐ Seminar/seminar exercise	
	☒ Laboratory	
	☐ Project	
Recommended Prequesites	• Fundamentals of Electrical Engineering - AC • • Classical and Modern Physics • Special Topics in Physics	
Literature	• Lehner, Günther Elektromagnetische Feldtheorie für Ingenieure und Physiker • Finkenzeller, Klaus RFID-Handbuch - Grundlagen und praktische Anwendungen von induktiver Funkanlagen, Transponder und kontaktloser Chipkarten • Grodzinsky, Alan J. Fields, Forces, and Flows in Biological Systems Garland Science	
Study performance	☐ Exercise performance	
	☐ Laboratory performance	
	☐ Term paper	
	☐ Presentation	
	☐ Certificate	
Exam performance	☐ Written exam	
	☐ Oral exam	
	☐ Term paper	
	☒ Project paper	
	☐ Laboratory performance	
	☐ Final thesis and oral exam	
	☐ presentation	
Usability	Electrical Engineering (-Cooperative Study Programme) - (PO 2017)	☒ CEM
	Bachelor Medical Engineering - (PO 2017)	☒ CEM
	Bachelor Electromobility - (PO 2017)	☒ CEM
	Bachelor Industrial Electrical Engineering and Management - (PO 2017)	☒ CEM
	Bridging modules Master II - (PO 2021)	☒ CEM
	Bachelor Medical Engineering (-Cooperative Study Programme) - (FPO 2024)	☒ CEM
	Internet of Things - Digital Automation - (PO 2017)	☒ CEM
	Information Technology (-Cooperative Study Programme) - (FPO 2024)	☒ CEM
	Bachelor Electromobility - (FPO 2024)	☒ CEM
	Bachelor Industrial Electrical Engineering and Management - (FPO 2024)	☒ CEM
	Electrical Engineering (-Cooperative Study Programme) - (FPO 2024)	☒ CEM
Offer	☒ Winter semester ☐ Summer semester ☐ Irregular	

Workload	Credit points	Contact time	Self-study
	5	60 hours [4 hours per week]	90 hours
Language	German and English		
Duration of the module	1 Semester		
Approved aids for the exam performance	Will be announced in the lecture		
Lecturer(s)	Mr. Prof. Dr.-Ing. Klaus Peter Koch		
Responsible(s)	Mr. Prof. Dr.-Ing. Klaus Peter Koch		
Comment			
Change date	21.11.2024		

Statistics		
Content		
Competency goals		
Teaching form	☒ Lecture	
	☐ Exercise	
	☐ Seminar/seminar exercise	
	☐ Laboratory	
	☐ Project	
Recommended Prequesites		
Literature	• Schira, Josef: Statistische Methoden für BWL und VWL; 1. Aufl. 2006 • Bonart, Th./Bär, J. Quantitative Betriebswirtschaftslehre, Band I, 1. Auflage 2018	
Study performance	☐ Exercise performance	
	☐ Laboratory performance	
	☐ Term paper	
	☐ Presentation	
	☐ Certificate	
Exam performance	☒ Written exam	
	☐ Oral exam	
	☐ Term paper	
	☐ Project paper	
	☐ Laboratory performance	
	☐ Final thesis and oral exam	
	☐ presentation	
Usability	Bachelor Sports and Rehabilitation Technologies - (PO 2017)	☒ CEM
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - Computational Engineering (FPO 2023)	☒ CEM
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - General Mechanical Engineering (FPO 2023)	☒ CEM
	Bachelor Sports and Rehabilitation Technologies - (FPO 2023)	☒ CEM
	Bachelor Automotive Engineering - (FPO 2023)	☒ CEM
	Bachelor Engineering - (PO 2015)	☒ RM
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - (PO 2015)	☒ CEM
	Bachelor Engineering - (FPO 2023)	☒ RM
	Bridging modules Master II - (PO 2021)	☒ CEM
	Bachelor Industrial Electrical Engineering and Management - (FPO 2024)	☒ RM
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - Safety Engineering (FPO 2023)	☒ RM
	Bachelor Safety Engineering - (PO 2015)	☒ RM
Offer	☒ Winter semester ☐ Summer semester ☐ Irregular	
Workload	Credit points: 5	Contact time: 60 hours [4 hours per week] / Self-study: 90 hours
Language	German	
Duration of the module	1 Semester	
Approved aids for the exam performance	None	
Lecturer(s)	Mr. Prof. Dr. Juergen Bär	
Responsible(s)	Mr. Prof. Dr. Juergen Bär	
Comment		
Change date	21.11.2024	

System Theory	
Content	Fundamentals of signal and system theory Classification of signals Fundamentals of function theory Discrete and continuous convolution Distributions Linear, time-invariant systems, Impulse response and transfer function Fourier series, Fourier transform Laplacetransformation Sampling theorem Discrete-time signals Z-transform
Competency goals	Students are able to differentiate and analyze different signal types. They are proficient in dealing with the various methods of integral transformation (Fourier, Laplace and z-transformation). They can also differentiate dynamic systems in terms of their properties and apply the transformation methods. Students know the corresponding fields of application from practice. They can model simple mechanical systems and systematically calculate the system responses using the transformation methods. They are proficient in computer-aided design tools for solving corresponding problems.
Teaching form	☒ Lecture
	☒ Exercise
	☐ Seminar/seminar exercise
	☐ Laboratory
	☐ Project
Recommended Prequesites	• Analysis 1 • Analysis 2
Literature	• U.Kiencke, H.Jäkel Signale und Systeme • Weber, Laplacetransformation • Preuß, Funktionaltransformation
Study performance	☐ Exercise performance
	☐ Laboratory performance
	☐ Term paper
	☐ Presentation
	☐ Certificate
Exam performance	☒ Written exam
	☐ Oral exam
	☐ Term paper
	☐ Project paper
	☐ Laboratory performance
	☐ Final thesis and oral exam
	☐ presentation

Usability	Electrical Engineering (-Cooperative Study Programme) - (PO 2017)	☒ RM
	Bachelor Industrial Electrical Engineering and Management - (PO 2017)	☒ CEM
	Internet of Things - Digital Automation - (PO 2017)	☒ CEM
	Bachelor Sports and Rehabilitation Technologies - (FPO 2023)	☒ CEM
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - (PO 2015)	☒ CEM
	Bachelor Safety Engineering - (PO 2015)	☒ CEM
	Bachelor Engineering - (PO 2015)	☒ CEM
	Bridging modules Master II - (PO 2021)	☒ CEM
	Bachelor Electromobility - (FPO 2024)	☒ RM
	Bachelor Electromobility - (PO 2017)	☒ RM
	Information Technology (-Cooperative Study Programme) - (FPO 2024)	☒ RM
	Bachelor Industrial Electrical Engineering and Management - (FPO 2024)	☒ RM
	Electrical Engineering (-Cooperative Study Programme) - (FPO 2024)	☒ RM
	Bachelor Medical Engineering (-Cooperative Study Programme) - (FPO 2024)	☒ RM
	Bachelor Medical Engineering - (PO 2017)	☒ RM
	Bachelor Sports and Rehabilitation Technologies - (FPO 2023)	☒ RM
	Bachelor Sports and Rehabilitation Technologies - (PO 2017)	☒ RM
Offer	☒ Winter semester ☐ Summer semester ☐ Irregular	

Workload	Credit points	Contact time	Self-study
	5	60 hours [4 hours per week]	90 hours

Language	German
Duration of the module	1 Semester
Approved aids for the exam performance	None
Lecturer(s)	Mr. Prof. Dr. Matthias Scherer
Responsible(s)	Mr. Prof. Dr. Matthias Scherer
Comment	
Change date	23.11.2024

Technical Safety II			
Content			
Competency goals			
Teaching form	☒ Lecture		
	☐ Exercise		
	☐ Seminar/seminar exercise		
	☐ Laboratory		
	☐ Project		
Recommended Prequesites			
Literature	• Neudörfer, Konstruieren sicherheitsgerechter Produkte, Springer-Verlag • Skripte der FASI-Ausbildung		
Study performance	☐ Exercise performance		
	☐ Laboratory performance		
	☐ Term paper		
	☐ Presentation		
	☐ Certificate		
Exam performance	☒ Written exam		
	☐ Oral exam		
	☐ Term paper		
	☐ Project paper		
	☐ Laboratory performance		
	☐ Final thesis and oral exam		
	☐ presentation		
Usability	Bachelor Mechanical Engineering (also Cooperative Study Programme) - (PO 2015)	☒ CEM	
	Bachelor Engineering - General Mechanical Engineering (PO 2015)	☒ CEM	
	Bachelor Engineering - Automotive Engineering (PO 2015)	☒ CEM	
	Bachelor Engineering - Safety Engineering (PO 2015)	☒ RM	
	Bachelor Sports and Rehabilitation Technologies - (FPO 2023)	☒ CEM	
	Bachelor Automotive Engineering - (FPO 2023)	☒ CEM	
	Bachelor Engineering - Automotive Engineering (FPO 2023)	☒ CEM	
	Bachelor Engineering - General Mechanical Engineering (FPO 2023)	☒ CEM	
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - General Mechanical Engineering (FPO 2023)	☒ CEM	
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - Computational Engineering (FPO 2023)	☒ CEM	
	Bridging modules Master II - (PO 2021)	☒ CEM	
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - Safety Engineering (FPO 2023)	☒ RM	
	Bachelor Engineering - Computational Engineering (FPO 2023)	☒ CEM	
	Bachelor Engineering - Safety Engineering (FPO 2023)	☒ RM	
	Bachelor Safety Engineering - (PO 2015)	☒ RM	
Offer	☒ Winter semester ☐ Summer semester ☐ Irregular		
Workload	Credit points	Contact time	Self-study
	5	60 hours [4 hours per week]	90 hours
Language	German		
Duration of the module	1 Semester		
Approved aids for the exam performance	None		
Lecturer(s)	Mr. Prof. Dr. rer. nat. Lars Draack		
Responsible(s)	Mr. Prof. Dr. rer. nat. Lars Draack		

Comment	
Change date	21.11.2024

Therapeutic Systems			
Content	Therapeutic devices: - Incubator technology - Ventilation technique - Anasthesia technique - Infusion pumps - Dialysis - Electrosurgery - Laser surgery - Debrillator		
Competency goals	After successful completion of the module, the student will be able to: - denote requirements for therapeutic devices - describe types of therapeutic systems - deal with the specific risks involved in using them on patients to develop - calculate parameters of therapeutic devices - estimate the effects of changes to a device		
Teaching form	☒ Lecture		
	☐ Exercise		
	☐ Seminar/seminar exercise		
	☐ Laboratory		
	☐ Project		
Recommended Prequesites			
Literature	• John G. Webster, Medical Instrumentation: Application and Design • Rüdiger Kramme, Medizintechnik, Verfahren - Systeme - Informationsverarbeitung • J. Bronzino (Editor) The Biomedical Engineering Handbook, Third Edition - 3 Volume Set , Springer Verlag, 2000		
Study performance	☐ Exercise performance		
	☐ Laboratory performance		
	☐ Term paper		
	☐ Presentation		
	☐ Certificate		
Exam performance	☒ Written exam		
	☐ Oral exam		
	☐ Term paper		
	☐ Project paper		
	☐ Laboratory performance		
	☐ Final thesis and oral exam		
	☒ presentation		
Usability	Electrical Engineering (-Cooperative Study Programme) - (PO 2017)	☒ CEM	
	Bachelor Sports and Rehabilitation Technologies - (FPO 2023)	☒ CEM	
	Bridging modules Master II - (PO 2021)	☒ EM	
	Electrical Engineering (-Cooperative Study Programme) - (FPO 2024)	☒ CEM	
	Bachelor Medical Engineering (-Cooperative Study Programme) - (FPO 2024)	☒ RM	
	Bachelor Medical Engineering - (PO 2017)	☒ RM	
Offer	☒ Winter semester ☐ Summer semester ☐ Irregular		
Workload	Credit points	Contact time	Self-study
	5	60 hours [4 hours per week]	90 hours
Language	German		
Duration of the module	1 Semester		
Approved aids for the exam performance	None		
Lecturer(s)	Mr. Prof. Dr.-Ing. Dara Feili		
Responsible(s)	Mr. Prof. Dr.-Ing. Dara Feili		

Comment	none none
Change date	21.11.2024

Thermodynamics			
Content			
Competency goals			
Teaching form	☒ Lecture		
	☒ Exercise		
	☐ Seminar/seminar exercise		
	☐ Laboratory		
	☐ Project		
Recommended Prequesites			
Literature	• Vorlesungsskript • Technische Thermodynamik (Cerbe/Wilhelms, Hanser-Verlag) • Thermodynamik (Herbert Windisch, Oldenbourg Verlag) • Thermodynamik (Hans Dieter Baehr, Springer Verlag)		
Study performance	☐ Exercise performance		
	☐ Laboratory performance		
	☐ Term paper		
	☐ Presentation		
	☐ Certificate		
Exam performance	☒ Written exam		
	☐ Oral exam		
	☐ Term paper		
	☐ Project paper		
	☐ Laboratory performance		
	☐ Final thesis and oral exam		
	☐ presentation		
Usability	Bachelor Engineering - (PO 2015)	☒ RM	
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - (PO 2015)	☒ RM	
	Bachelor Electromobility - (PO 2017)	☒ CEM	
	Bridging modules Master II - (PO 2021)	☒ CEM	
	Bachelor Safety Engineering - (PO 2015)	☒ RM	
Offer	☐ Winter semester ☒ Summer semester ☐ Irregular		
Workload	Credit points	Contact time	Self-study
	5	90 hours [6 hours per week]	60 hours
Language	German		
Duration of the module	1 Semester		
Approved aids for the exam performance	Formulary		
Lecturer(s)	Mr. Prof. Dr.-Ing. Christoph Heinrich		
Responsible(s)	Mr. Prof. Dr.-Ing. Christoph Heinrich, N. N.		
Comment			
Change date	21.11.2024		

Vehicle Electronics		
Content	Requirements for electronic systems in motor vehicles: - Hardware, software, mechanics - Structure of vehicle control units: computer, memory, communication, signal processing - output stages Networking technologies: - Network topologies, transmission media, protocols Actuators and sensors in vehicle system technology from the areas of: - Drive technology, comfort, safety Introduction to electromobility: - Electric machines in the vehicle - Battery technology Driver assistance systems: - Classification according to SAE - Autonomous driving Operating systems in the vehicle: - Requirements - AUTOSAR	
Competency goals	Students know the special requirements for control units in the automotive environment. They will be able to differentiate between the various requirements placed on automotive electronics by car manufacturers and suppliers. They will be able to describe the vehicle-specific bus systems, computer architectures and operating systems in detail. Students will be able to analyze the interaction of vehicle components and control unit functions. They will be able to describe the different sensor and actuator technologies of modern drive systems. Students know the requirements for battery systems in vehicles. They will be able to describe the main functions of a battery management system.	
Teaching form	☒ Lecture	
	☐ Exercise	
	☐ Seminar/seminar exercise	
	☐ Laboratory	
	☐ Project	
Recommended Prequesites	• Fundamentals of Electrical Engineering - DC • Fundamentals of Electrical Engineering - AC	
Literature	• Manfred Krüger „Kraftfahrzeugelektronik“ • Guzzella ,“Fahrzeugsysteme” • Bosch (Vieweg Verlag), „Ottomotor Management“ • Jung, „Automotive Electronics“ • Kiencke, Nielson, “Automotive Control” • Kiencke, Nielson, “Automotive Control”	
Study performance	☐ Exercise performance	
	☐ Laboratory performance	
	☐ Term paper	
	☐ Presentation	
	☐ Certificate	
Exam performance	☒ Written exam	
	☐ Oral exam	
	☐ Term paper	
	☐ Project paper	
	☐ Laboratory performance	
	☐ Final thesis and oral exam	
	☐ presentation	
Usability	Bachelor Mechanical Engineering (also Cooperative Study Programme) - Automotive Engineering (PO 2015)	☒ RM
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - General Mechanical Engineering (PO 2015)	☒ CEM
	Bachelor Safety Engineering - (PO 2015)	☒ CEM
	Bachelor Sports and Rehabilitation Technologies - (PO 2017)	☒ CEM
	Bachelor Engineering - (PO 2015)	☒ CEM
	Bridging modules Master II - (PO 2021)	☒ CEM

Offer	☒ Winter semester ☐ Summer semester ☐ Irregular		
Workload	Credit points	Contact time	Self-study
	2	60 hours [4 hours per week]	0 hours
Language	German		
Duration of the module	1 Semester		
Approved aids for the exam performance	None		
Lecturer(s)	Mr. Prof. Dr. Matthias Scherer		
Responsible(s)	Mr. Prof. Dr. Matthias Scherer		
Comment			
Change date	23.11.2024		

Vehicle Integration and Safety			
Content	The complete development process of a new vehicle is covered. Essential contents are derivation of requirements from customer profiles, the design process, vehicle concept development and package development, aerodynamics development, structural design, noise and vibration (N&V), human-machine interface and especially the development of vehicle safety. For this purpose, an introduction to a simulation tool is given.		
Competency goals	Students will be able to describe the fundamentals of vehicle design and derive requirements for the vehicle package. They can describe the development methods of the vehicle properties in detail and design measures to improve the N&V, structural and especially vehicle safety properties. Students will be able to derive and compare vehicle properties on a customer-specific basis.		
Teaching form	☒ Lecture		
	☐ Exercise		
	☐ Seminar/seminar exercise		
	☐ Laboratory		
	☐ Project		
Recommended Prequesites			
Literature			
Study performance	☐ Exercise performance		
	☐ Laboratory performance		
	☐ Term paper		
	☐ Presentation		
	☐ Certificate		
Exam performance	☒ Written exam		
	☐ Oral exam		
	☐ Term paper		
	☐ Project paper		
	☐ Laboratory performance		
	☐ Final thesis and oral exam		
	☐ presentation		
Usability	Bachelor Electromobility - (PO 2017)	☒ CEM	
	Bachelor Safety Engineering - (PO 2015)	☒ CEM	
	Bachelor Engineering - General Mechanical Engineering (PO 2015)	☒ CEM	
	Bachelor Engineering - Automotive Engineering (PO 2015)	☒ RM	
	Bachelor Engineering - Safety Engineering (PO 2015)	☒ CEM	
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - General Mechanical Engineering (PO 2015)	☒ CEM	
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - Automotive Engineering (PO 2015)	☒ RM	
	Bachelor Engineering - General Mechanical Engineering (FPO 2023)	☒ CEM	
	Bachelor Engineering - Safety Engineering (FPO 2023)	☒ CEM	
	Bachelor Automotive Engineering - (FPO 2023)	☒ RM	
	Bachelor Mechanical Engineering (also Cooperative Study Programme) - (FPO 2023)	☒ CEM	
	Bachelor Sports and Rehabilitation Technologies - (FPO 2023)	☒ CEM	
	Bridging modules Master II - (PO 2021)	☒ CEM	
	Bachelor Engineering - Automotive Engineering (FPO 2023)	☒ RM	
	Bachelor Engineering - Computational Engineering (FPO 2023)	☒ CEM	
Offer	☐ Winter semester ☒ Summer semester ☐ Irregular		
Workload	Credit points: 5	Contact time: 60 hours [4 hours per week]	Self-study: 90 hours
Language	German and English		
Duration of the module	1 Semester		
Approved aids for the exam performance	None		

Lecturer(s)	Mr. Prof. Dr.-Ing. Peter König
Responsible(s)	Mr. Prof. Dr.-Ing. Peter König
Comment	
Change date	21.11.2024