

Faculty of Technology

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MECHANICAL ENGINEERING (required language level B1) BACHELOR LEVEL	Description	Lecturer	CP / ECTS	Term (Semester)
LECTURE: Project Management	Fundamentals of Project Management, Work Breakdown Structures, Project Scheduling and Budgeting, Earned Value Method, Risk Analysis in Projects, Project Organisations, Project Closure and Audit, PCSimulation	Mr. Passenheim	5	fall
LECTURE: Leadership and Communication	Communicating and presenting, basics of communication psychology, goals, conducting conversations and negotiations, leading teams and work groups (including motivation and tools, meeting management, creativity in teams, conversation situations, employee discussions, managing conflicts), leadership role, tasks and - instruments, learning and implementing conversation and leadership skills.)	Mr. Schmidt	5	fall
TECHNICALL PROJECTS: e.g. Mechatronics and Robotics, Materials Engineering, Laser Technologies, Additive Manufacturing, Sustainability, etc.	Subjects on Request, please choose one: Mechatronics and Robotics, Materials Engineering, Laser Technologies, Additive Manufacturing, Sustainability	Esther Held and others	5	fall and spring
LECTURE: Control of and with Smart Products	Students can choose and program microcontroller boards for products. Students can select and describe microcontroller boards and the necessary sensors and actuators. Students can describe and create programs for microcontroller boards. The module serves as an input for the semester project and provides a foundation for understanding smart products. Content: Assembly of a control system, Data flow in control systems, Hardware for control systems, Microcontroller boards, Sensors, Actuators, Programming of microcontrollers, Documentation of programs and hardware, Case studies.	Mr. Wings	5	spring
LECTURE: Data Analysis and Machine Learning	Data analysis and machine learning is an interdisciplinary field that combines the areas of computer science, mathematics and an application area. After this event, the students are able to set up a process for knowledge acquisition from data. The students understand how all three subfields are considered equally. The students know the essential components of data analysis and their tasks. They are familiar with the basic functions of the components. The students know the general structure of the components and can illustrate and apply the basic algorithms and methods. They know not only libraries, frameworks, modules and toolkits, but can use them specifically. As a result, they develop a deeper understanding of the relationships and learn how essential tools and algorithms of data analysis work in the core. Content: Basics of Linear Algebra; Statistics and Probability Theory; Algorithms from the field of Data Science; Models, e.g. k-Nearest Neighbors, Naive Bayes, Linear and Logistic Regression, Decision Trees, Neural Networks and Clustering. Methods of supervised, unsupervised and reinforced learning. Applications, e.g. from the field of Production Technology.	Mr. Wings	5	spring

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LECTURE: Digital Business Models and After Sales	Qualification objective Within the framework of the module, students are able to develop digital and sustainable business models, by selecting a suitable business model pattern, structuring a business model with the Business Model Canvas framework and identifying the value for the customer with the Value Proposition Canvas framework, in order to align value creation sustainably with a business model. Content: Business models and digital business models: structure, characteristics, goals; Life cycle of business models; The Business Model Canvas and the Value Proposition Canvas; Business model innovations; Application of digital business models in the digital economy: zero-cost society, network effects, two-sidedness, platform economy; Digital transformation of after-sales.	Mrs Blattmeier	5	spring	
LECTURE: Product Management and Marketing	Qualification objective The module accompanies students in developing competences for the organization of product management. With the help of market analysis, students design a product portfolio, build a corresponding marketing concept, with which they integrate the products of the portfolio into the market based on digital technologies as an innovation, in order to meet the requirements of customers and see sustainability as a basic characteristic of a modern business model. The module is also an input for the semester project. Content: Goal setting of product management; Organizational forms for product management; Innovation management within the framework of product management; Brand and brand management, concept development of digital marketing.	Mrs Blattmeier	5	spring	

NEW: MECHANICAL ENGINEERING MASTER LEVEL	Description	Lecturer	CP / ECTS	Term (Semester)
LECTURE: Computational Simulation in Energy Engineering	course description will follow soon	Mr. Böcker	5	spring
LECTURE: Turbomachinery Design	course description will follow soon	Mr. Jakiel	5	spring
LECTURE: Structural Dynamics	course description will follow soon	Mr. Graf	5	spring
LECTURE: Thermodynamics of Real - World Processes	course description will follow soon	Mr. Böcker	5	spring
LECTURE: Laser Material Processing	course description will follow soon	Mr Schüning	5	spring
LECTURE: Scientific Working	course description will follow soon	Mrs Ottink	5	tbd
LECTURE: Power Plant Engineering	course description will follow soon	Mr. Jakiel	5	fall
LECTURE: ERP Systems I: Processes and Sustainability Data	course description will follow soon	Mrs Pechmann	5	fall
LECTURE: ERP Systems II: Integrated Business Processes and Data Analysis	course description will follow soon	Mrs. Pechmann	5	fall
LECTURE: Simulation of Production Systems	course description will follow soon	Mrs Pechmann	5	fall
LECTURE: Software Development	course description will follow soon	Mr. Wings	5	fall
LECTURE: Application of Nonlinear Finite-Element-Analysis	course description will follow soon	Mr. Graf	5	fall
LECTURE: Data Science	course description will follow soon	Mr. Wings	5	fall
TECHNICAL PROJECT: Wind Challenge	course description will follow soon	Mr. Herraез	5	fall and spring
TECHNICAL PROJECT: Hypleroop	course description will follow soon	Mr. Schüning	5	fall and spring

SUSTAINABLE ENERGY SYSTEMS Interdisciplinary programme from departments of MECHANICAL ENGINEERING and NATURAL SCIENCES BACHELOR LEVEL (required language level B2)		Description	Lecturer	CP / ECTS	Term (Semester)
LECTURE: Energy Systems Simulation Prerequisites: basic knowledge of programming. Only open to limited no. of students, students of the Renewable Energy Program will be prioritized		Modelling, simulation and analysis of local energy systems with producers, consumers and prosumers	Ms Pechmann	5	fall
LECTURE: Energy Storage and Fuel Cells, only open to limited no. of students, students of the Renewable Energy Program will be prioritized		Storage of thermal, chemical, electrical and kinetic energy, as well as potential energy. Fuel cell and hydrogen storage.	Mr Illing	5	fall
LECTURE: Wind Energy		Design of wind turbines and wind farms, aerodynamics, structural dynamics, wind resource and site assessment. Including hands-on experiments! Basic knowledge of fluid dynamics needed.	Mr. Herráez	5	fall
PROJECT: Wind challenge		Design and production of a small wind turbine in cooperation with a group of students from different backgrounds for participating in an international wind energy contest.	Mr. Herráez	2	fall and spring
LECTURE: Solar Thermal and Geothermal Energy		Solar resource, design of solar thermal systems, performance analysis. Including hands-on experiments! Basic knowledge of thermodynamics needed.	Mr Herráez	5	fall
LECTURE: Photovoltaics		Physical principles of the use of photovoltaic energy, components of photovoltaic installations, design of photovoltaics systems. Including hands-on experiments. Basic knowledge of electrotechnics needed.	Mr. Herráez	5	fall
LECTURE: Sustainable Production Prerequisites: Basic knowledge of programming. Only open for limited no. of students		Globalization and climate change, production systems and production management systems, requirements for sustainable production	Mrs Pechmann	5	spring
LECTURE: Thermal Power Plants		Types and applications, renewable heat sources, cycle processes, optimization strategies for efficiency and power output, main machinery and apparatuses, new technologies and applications; simulation of power plant processes using commercial software. Prerequisites: Basic knowledge of thermodynamics.	Mr. Jakiel	5	fall
LECTURE: Process Modelling		Students will learn how to set up a process simulator using the Aspen Engineering Suite as an example. They learn to analyze existing technical processes from the perspective of process modeling. Components of a simulation model and functions of a process simulator are discussed. Students will learn how to create a process model and implement it in a simulation software. They apply the created model for process analysis. In the practical part, students will carry out the work independently on an example from industry.	Mr. Steinigeweg	5	fall