# Handbook

“Courses at Offenburg University taught in English” suitable for bachelor’s level students

**Summer Semester 2020 (March to July)**

*SUBJECT TO CHANGE*

Last update: 18 August 2019

**Editor:** Prof. Torsten Schneider, Ph.D., Vice Director of the International Center, Offenburg University, Germany

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### Providers of courses

<table>
<thead>
<tr>
<th>Provider</th>
<th>Department Name and Location</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>B+W</td>
<td>Department of Business and Industrial Engineering (Campus Gengenbach)</td>
<td><a href="https://bw.hs-offenburg.de/en/international/study-in-offenburg/exchange-students">https://bw.hs-offenburg.de/en/international/study-in-offenburg/exchange-students</a></td>
</tr>
<tr>
<td>EMI</td>
<td>Department of Electrical Engineering, Medical Engineering and Computer Science (Campus Offenburg)</td>
<td><a href="https://ei.hs-offenburg.de/en/international">https://ei.hs-offenburg.de/en/international</a></td>
</tr>
<tr>
<td>M+I</td>
<td>Department of Media and Information (Campus Offenburg)</td>
<td><a href="https://mi.hs-offenburg.de/en/nc/international/study-in-offenburg">https://mi.hs-offenburg.de/en/nc/international/study-in-offenburg</a></td>
</tr>
<tr>
<td>M+V</td>
<td>Department of Mechanical and Process Engineering (Campus Offenburg)</td>
<td><a href="https://mv.hs-offenburg.de/en/international">https://mv.hs-offenburg.de/en/international</a></td>
</tr>
<tr>
<td>SZ</td>
<td>Language Center</td>
<td><a href="https://sprachenzentrum.hs-offenburg.de/kursbeschreibungen">https://sprachenzentrum.hs-offenburg.de/kursbeschreibungen</a></td>
</tr>
</tbody>
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### List of courses

*Level:* A all, B bachelor’s, M master’s, B+M master’s (for bachelor’s students only with sufficient previous knowledge).

*Workload:* SWS hours (45 minutes each) of presence per week, C number of credit points according to ECTS

(1 C equivalent to approx. 25 to 30 working hours for average student, 1 semester comprises 30 C as a rule)

*Location:* Campus Offenburg unless stated otherwise

*Elective courses:* Subject to minimum attendance

*For summary “30 Credit Points (ECTS) in Mechanical and in Process Engineering” see last page.*

**Courses in alphabetical order**

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Type</th>
<th>Level</th>
<th>Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Channel Coding</td>
<td>lecture</td>
<td>B+M</td>
<td>EMI</td>
</tr>
<tr>
<td>Animation</td>
<td>seminar + lab</td>
<td>B</td>
<td>M+I</td>
</tr>
<tr>
<td>Basic Computer Aided Design (CAD)</td>
<td>lab</td>
<td>B</td>
<td>M+V</td>
</tr>
<tr>
<td>Basic Data Processing and Computer-Aided Mathematics Lab</td>
<td>lecture + lab</td>
<td>B</td>
<td>M+V</td>
</tr>
<tr>
<td>Battery and Fuel Cell Technology</td>
<td>lecture</td>
<td>B</td>
<td>M+V</td>
</tr>
<tr>
<td>Business English</td>
<td>seminar</td>
<td>A</td>
<td>SZ</td>
</tr>
<tr>
<td>Business English, Advanced</td>
<td>seminar</td>
<td>A</td>
<td>SZ</td>
</tr>
<tr>
<td>E-Commerce-Workshop</td>
<td>seminar</td>
<td>B</td>
<td>B+W</td>
</tr>
<tr>
<td>Economics</td>
<td>seminar</td>
<td>B</td>
<td>B+W</td>
</tr>
<tr>
<td>Economics English</td>
<td>lecture</td>
<td>A</td>
<td>SZ</td>
</tr>
<tr>
<td>Embedded and Industrial Networks</td>
<td>lecture</td>
<td>A</td>
<td>EMI</td>
</tr>
<tr>
<td>English for Engineers</td>
<td>seminar</td>
<td>A</td>
<td>SZ</td>
</tr>
<tr>
<td>English for Media Engineering</td>
<td>seminar</td>
<td>A</td>
<td>SZ</td>
</tr>
<tr>
<td>Film</td>
<td>seminar + lab</td>
<td>B</td>
<td>M+I</td>
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<tr>
<td>Course</td>
<td>Type</td>
<td>Semester</td>
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<tr>
<td>Fluid Mechanics</td>
<td>lecture</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>German Culture and Society</td>
<td>seminar</td>
<td>A</td>
<td></td>
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<tr>
<td>General Business Administration</td>
<td>lecture</td>
<td>B</td>
<td></td>
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<tr>
<td>Heat and Mass Transfer / Heat Transfer</td>
<td>lecture</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Heat Transfer Lab</td>
<td>lab</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Intercultural Leadership</td>
<td>seminar</td>
<td>B</td>
<td></td>
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<tr>
<td>Logistics Basics</td>
<td>seminar</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Machine Elements / Mechanical Design</td>
<td>lecture + project</td>
<td>B</td>
<td></td>
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<tr>
<td>Marketing</td>
<td>lecture</td>
<td>B</td>
<td></td>
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<tr>
<td>Materials Joining Technology Laboratory</td>
<td>lab</td>
<td>B</td>
<td></td>
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<tr>
<td>Measurement and Control Engineering with Lab</td>
<td>lecture + lab</td>
<td>B</td>
<td></td>
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<tr>
<td>Mechanical Process Engineering Laboratory</td>
<td>lab</td>
<td>B</td>
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<tr>
<td>Media Integration and Lab</td>
<td>seminar + lab</td>
<td>B</td>
<td></td>
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<tr>
<td>Operating Systems</td>
<td>lecture (+ lab)</td>
<td>B</td>
<td></td>
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<tr>
<td>Qualitative Methods</td>
<td>seminar</td>
<td>B</td>
<td></td>
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<tr>
<td>Quick Response Management</td>
<td>lecture</td>
<td>B</td>
<td></td>
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<tr>
<td>Security of Web Applications</td>
<td>lecture + lab</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Software Implementation Project</td>
<td>project</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Technical English</td>
<td>seminar</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Telecommunication Networks</td>
<td>lecture</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Thermodynamics I - Technical Thermodynamics</td>
<td>lecture</td>
<td>B</td>
<td></td>
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<tr>
<td>Thermodynamics II - Engines and Machines with Lab</td>
<td>lecture + lab</td>
<td>B</td>
<td></td>
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<tr>
<td>Transport and Forwarding</td>
<td>lecture + seminar</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>VLSI (Very-Large-Scale Integration) Circuit Design with Lab</td>
<td>lecture + lab</td>
<td>A</td>
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For further courses taught in English, suitable only for master's level students, see the websites of the following master's degree programmes:

- Biotechnology (MBT, winter semester only)
- Communication and Media Engineering (CME)
- Enterprise and IT Security (ENITS)
- Power Data Engineering (PDE, winter semester only)
- Process Engineering (MPE, winter semester only)
course: E-Commerce-Workshop

course ID: B+W0009W
level: B
seminar | 2 SWS, 3 C (ECTS)
host semester: BW 7 / LH 7 / WI 7
assessment: LA (lab work) and RE (oral presentation)

Lecturer(s):
Prof. Dr. Andrea Müller

Module:
BW-31 / LH-28 / WI-26: Wahlpflichtfächer (Electives)

Teaching and learning language:
English

Requirements:
Principles of IT, marketing and management

Objectives and competences:
- Knowledge of how to analyze e-commerce applications
- Ability to develop and realize concepts of e-commerce applications

Contents:
The course covers an introduction in e-commerce principals and is based upon a firm marketing- and IT-background. It is designed to provide an understanding of doing web-based business, which technical and conceptual challenges are to resolve for companies addressing the B2B and B2C markets. In a first part the course provides the students with a basic understanding of e-commerce, the main definitions and recent trends of technical and conceptual developments. In a second part the course focuses on practical developing and realizing business models of e-commerce.

The central focus is set upon:
- How does e-commerce work?
- What are success criteria for e-commerce applications?
- What other channels can be combined for sales-management?
- Why is user experience a central aspect of e-commerce applications?
- What business models could become successful in the future?

Students develop in teamwork (3-4 persons) an e-commerce application and test it in the CXT-Lab.

Literature and Downloads:
Provided in class
course: Economics

course ID: B+W0159
level: B
seminar | 2 SWS, 3 C (ECTS)
host semester: BW 6
assessment: seminar paper = HA (paper) + RE (oral presentation)

Lecturer(s):
Prof. Dr. Philipp Eudelle

Module:
BW-21: Wirtschaftspolitik (Economic Policies)

Teaching and learning language:
English

Requirements:
-

Objectives and competences:
- The students will gain a knowledge about analyzing current economic policy issues
- The students will gain a knowledge about various economic recommendations for action

Contents:
- Analytical basics for individual decision - making problems exemplified by market situations and current economic topics
- Analytical solutions for individual decision - making problems simplified by market situations and current economic topics

Literature and Downloads:
Provided in class
course: General Business Administration (Allgemeine Betriebswirtschaftslehre)

course ID: B+W0101
level: B
seminar | 4 SWS, 5 C (ECTS)
host semester: BW 1 / LH 1 / WI 1
assessment: K90 (written test 90 minutes)

Lecturer(s):
Prof. Dr. Andreas Klasen

Module:
BW-01 / LH-01 / WI-01: Allgemeine Betriebswirtschaftslehre (General Business Administration)

Teaching and learning language:
English (parallel to German-taught course “Allgemeine Betriebswirtschaftslehre”)

Requirements:
-

Objectives and competences:
The purpose of this course is to provide a comprehensive overview of key elements of the business organisation, and to competing theories and models of the firm. It will provide a critical perspective on the main functional areas of business and management including strategy and decision making, logistics and production, marketing and sales, as well as accounting and finance. The course aims to build a foundation of knowledge on the different theoretical approaches to management. On completion of the course, the student will be able to understand the evolution of the business organisation and management thought, identifying the interconnections between developments in these areas, discuss and compare different models and approaches, and evaluate the significance of contemporary issues in business.

Contents:
- Understanding the business organisation
- Strategy and decision making
- Supply chain, logistics and production
- Marketing and sales
- Accounting
- Finance and investment

Literature and Downloads:
course: Intercultural Leadership

course ID: B+W0043W
level: B
seminar | 2 SWS, 3 C (ECTS)
host semester: BW 7 / LH 7 / WI 7
assessment: RE (oral presentation)

Lecturer(s):
Mr. Siefert (external)

Module:
BW-31 / LH-28 / WI-26: Wahlpflichtfächer (Electives)

Teaching and learning language:
English

Requirements:
Basic understanding of corporate structures and communication

Objectives and competences:
- Having knowledge and a keen sense of leadership situations
- Finding appropriate ways of leadership
- Exercising a successful performance management system

Contents:
This course provides knowledge about the influence of leadership behavior on different corporate situations. The course establishes an understanding of how leadership behavior exerts influence on performance in regards to an international company’s cultural diversity and communication.

- First part:
  - Definition and objectives of leadership management
  - Different leading concepts and leading styles
  - Changes in leadership management models
  - Influence of different cultural backgrounds on companies and corporate culture
  - Influence of a leader’s personality and communication skills on performance in different situations
  - Communication dynamics between manager and staff
- Second part:
  - Different approaches of leadership management in different situations
  - Modeling a performance management system
- Workshop:
  - Analyzing leadership management in different corporate situations
  - Designing performance measures in leadership management
  - Developing a performance management system

Literature and Downloads:
Provided in class
course: Logistic Basics

course ID: n/k
level: B
seminar | 4 SWS, 6 C (ECTS)
host semester: BW 7 / LH 7 / WI 7
assessment: RE (oral presentation)

Lecturer(s):
Prof. Dr. Ingo Dittrich

Module:
BW-31 / LH-28 / WI-26: Wahlpflichtfächer (Electives)

Teaching and learning language:
English

Requirements:
Principles of IT, Marketing and Management

Objectives and competences:
By the end of the course the students should
- know the principles and applications relevant to the planning, design, and operations of distribution logistics
- understand classical and upcoming technical solutions of distribution logistics
- be able to solve small case studies in the area of distribution logistics

Contents:
The course covers an introduction in logistics with focus on distribution logistics.
- Definition and basics of distribution logistics; network design
- Order fulfilment
- Receiving
- Put-away
- Storage
- Order Picking
- Shipping Preparation
- Shipping

Strategies, operations execution, challenges, best practices.
The course is designed as a mixture of lecture sessions, self-study, group work and case studies.

Literature and Downloads:
Provided in class
course: Qualitative Methods

course ID: B+W0022W
level: B

seminar | 2 SWS, 3 C (ECTS)

host semester: BW 7 / LH 7 / WI 7

assessment: PA (project work) with RE (oral presentation)

Lecturer(s):
Prof. Dr. Andreas Klasen

Module:
BW-31 / LH-28 / WI-26: Wahlpflichtfächer (Electives)

Teaching and learning language:
English

Requirements:
Maximum 20 participants

Objectives and competences:
The purpose of this course is to equip students to sensitively and critically design, carry out, report, read, and evaluate qualitative research. The module will provide an overview of the principles and practice of qualitative research. Participants will learn to collect data using observation, interview and focus groups, and become familiar with methodologies and methods such as grounded theory. The course has the dual aims of equipping students with both conceptual understandings of current academic debates regarding different methods, and the practical skills to put those methods into practice. It will provide students with a solid understanding of the core methods of qualitative data collection and analysis, as well as critical skills in interpreting and evaluating reports of qualitative studies.

Contents:
- Foundations
- Qualitative and quantitative methods
- Methodology and methods
- Data collection and analysis
- Qualitative methods in a business administration, management and marketing environment

Literature and Downloads:
course: Quick Response Manufacturing

course ID: B+W0038W
level: B
lecture | 2 SWS, 3 C (ECTS)
host semester: BW 7 / LH 7 / WI 7
assessment: M (oral exam)

Lecturer(s):
Mr. Florian Schneider (external)

Module:
BW-31 / LH-28 / WI-26: Wahlpflichtfächer (Electives)

Teaching and learning language:
English

Requirements:
-

Objectives and competences:
Students learn about the special requirements for companies producing „high-mix / low-volume“ products and customer-specific solutions. The key is to understand why those companies use different methods and tools to organize compared to traditional „mass-production“ companies. Learn practical methods & tools to achieve competitive advantage with short lead-times and high flexibility.

Contents:
Learn about the management-strategy of Harley-Davidson and John Deere and why this strategy is not only suitable for global players but also for thousands of SMEs worldwide producing highly customized products.

- QRM as an alternative to traditional methods of corporate management for manufacturing companies operating in „high-mix / low-volume“ environments
- The switch from “mass-production” to “mass-customization”
- “It’s about Time” - Why time is a critical success factor
- Introduction of the Manufacturing Critical-path Time (MCT)
- MCT mapping vs. Value Stream Mapping
- Department vs. QRM-cell: What’s the difference?
- POLCA: The alternative to KANBAN for MTO manufacturers
- System Dynamics: Why spare capacity is important
- QRM, LEAN SIX SIGMA: How do these strategies fit together?

Literature and Downloads:
- http://qrm.engr.wisc.edu
course: Software Implementation Project

course ID: B+W0617
level: B
lecture | 4 SWS, 6 C (ECTS)
host semester: WIN 6
assessment: HA (project work) and M (oral exam)

Lecturer(s):
Prof. Dr. Tobias Hagen

Module:
WIN-26: Software Implementierungsprojekt (Software Implementation Project)

Teaching and learning language:
English

Requirements:
Knowledge in Programming

Objectives and competences:
The students will apply various competencies in a „real“ IT project:
• Specific competencies
• Development competencies
• Methodological competencies
• Social competencies

Contents:
• Project kick-off meeting
• Problem analysis
• Designing the application
• Programming the application
• Testing and implementation
• Final presentation

Literature and Downloads:
Provided in class
course: Transport and Forwarding

course ID: B+W0047W
level: B
lecture | 2 SWS, 3 C (ECTS)
host semester: BW 7 / LH 7 / WI 7
assessment: K (written exam)

Lecturer(s):
Prof. Dr. Ingo Dittrich

Module:
BW-31 / LH-28 / WI-26: Wahlpflichtfächer (Electives)

Teaching and learning language:
English

Requirements:
Principles of Logistics

Objectives and competences:
- Have knowledge of the basic technical issues of the different transport modes which are relevant for economic decisions, forms and relevant players in the different transport modes, laws and principles of European transport
- Be able to understand the interdependences in a transport network, analyze the economic and ecological impacts of decisions concerning the transport modes, analyze how value is created within the transport sector, analyze the choice of strategic decisions in transport services companies

Contents:
Transport and forwarding companies are an important backbone of the European economy. Moreover a well-planned distribution network can save costs and secure an added value to the customer.

At the same time the value of transport is not recognized by most of the customers. The margin of transport companies of all transport modes is low and the circumstances for the staff are often weak. This course is about the functionality of different transport modes and how forwarder and transport companies manage to keep business running. The predominant points of view during the course are those of the loading industry and of a forwarder who organizes transport solutions for companies.

- What are relevant details of all transport modes (technology, law, forms and relevant players)
- What is needed to perform an economic and ecological transport?
- What are relevant future developments?

Literature and Downloads:
Provided in class
course: Advanced Channel Coding

course ID: E+I406
level: B+M

lecture | 2 SWS, 3 C (ECTS)

host semester: CME2

assessment: K60 (written test 60 minutes)

Lecturer(s):
Prof. Dr. Tobias Felhauer

Module:
CME-04: Digital Communications

Teaching and learning language:
English

Requirements:
Basic knowledge about digital communications and information theory

Objectives and competences:
- Achieving the competence to design and analyse error-protection coding schemes being used in modern digital communication systems under different constrains
- Being capable to evaluate the performance of digital communication systems using channel coding for error protection

Contents:
- Coding:
  types of coding; modelling of noisy digital communication channels; coding gain
- Information Theoretical Analysis of a Communication Link:
  Digital communication system model; information measures; entropy and redundancy, equivocation, irrelevance and transinformation of a communication link; channel capacity
- Error Protection Coding (FEC):
  general error protection strategies, types and capabilities of linear codes; boundaries of linear codes
  mechanism of coding and decoding of linear block codes
  special linear block codes: Hamming codes, Simplex codes, Reed-Muller codes, cyclic block codes, Reed-Solomon codes, Bose-Chaudhuri-Hocquenghem (BCH) codes
  error protection coding for burst error channels: CRC-Codes, Fire-Codes, Interleaving
  convolutional coding: description of convolutional codes (Tree-, State- and Trellis-Diagram), characteristics of convolutional codes (minimum free distance, catastrophic error propagation etc.), ML-decoding principle (hard/soft decision Viterbi decoding); puncturing
- Advanced Error Protection Coding:
  concatenated coding: serial concatenated coding (product codes), parallel concatenated coding (turbo codes)
  low-density parity-check codes (LDPC codes)

Literature and Downloads:
Department of Electrical Engineering, Medical Engineering and Computer Science (Campus Offenburg)

course: Embedded and Industrial Networks  
course ID: E+I2205+2206
level: B+M
lecture and laboratory | 2+2 SWS, 2+3 C (ECTS)
host semester: CME2 / EIM2
assessment: K60 + LA (written test 60 minutes + lab report)

Lecturer(s):
Prof. Dr. Axel Sikora

Module:
CME-12: Embedded & Industrial Networks

Teaching and learning language:
English

Requirements:
Basics in embedded and industrial networks

Objectives and competences:
- The students gain a deeper insight into the internal structure of Communication protocols.
- In this way, they also learn about the most important design paradigms and are thus able to select and implement not only the communication protocol that is optimal for the application, but also to design appropriate adaptations and extensions themselves.

Contents:
- Introduction:
  Overview, requirements
  Architectures & Structures
- Algorithms:
  Transmission mechanisms
  Channel access protocols
  Routing algorithms
  Application protocols
  Network synchronization (time synchronization, power saving algorithms)
  Network management (planning, simulation, monitoring)
- Protocol examples:
  CAN & LIN
  Ethernet & Industrial Ethernet
  Profibus & Profinet
  HART & Wireless HART
  Embedded TCP/IP
  Embedded web applications

Lab: Embedded Networks:
- Serial Peripheral Interface (SPI), Local Interconnect Network (LIN), Controller Area Network (CAN), Embedded socket communication with TCP/IP, Embedded web server programming for using HTTP over TCP/IP
- Industrial Networks: PROFINET, Real Time Ethernet

Literature and Downloads:
- Bender, K., Profibus - Der Feldbus für die Automation, Carl Hanser Verlag, 1992
- Pfeiffer, O., Ayre, A., Keydel, C., Embedded Networking with Can and Canopen, Copperhill Media Corporation, 2008
- Shelby, Z., Bormann, C., 6LoWPAN: The Wireless Embedded Internet, John Wiley & Sons, 2009
- Sikora, A., Technische Grundlagen der Rechnerkommunikation: Internet-Protokolle und Anwendungen, Carl Hanser Verlag, 2003
- Lawrenz, W., Controller area network: CAN; Grundlagen, Design, Anwendungen, Testtechnik, VDE-Verlag, 2011
course: Operating Systems

course ID: E+I110
level: B
lecture (+laboratory optional) | 2 (+2) SWS, 3 (+3) C (ECTS)
host semester: AI2
assessment: K60 (written test 60 minutes) + LA (lab report)

Lecturer(s):
Prof. Dr. Tobias Lauer

Module:
AI-07: Betriebssysteme (Operating Systems)

Teaching and learning language:
English (parallel to German-taught course "Betriebssysteme")

Requirements:
Procedural Programming

Objectives and competences:
- Students learn to understand the role of the operating system as part of a system architecture. You know the basic terms, components and functions of an operating system
- Students become familiar with operating system problems and learn how to use solutions
- Through practical exercises the students are able to develop an application using operating system interfaces
- Students can use tools and utilities at the operating system level in a practical way

Contents:
- Architecture of computers and operating systems
- Principles and operating modes of operating systems forming the interfaces between hardware and software
- Synchronisation of processes and threads
- Memory, E/A, and file management
- Selected operating systems: Windows and Linux
- Optional lab: Windows und Linux

Literature and Downloads:
course: Telecommunication Networks

course ID: E-I408
level: B+M

lecture | 2 SWS, 3 C (ECTS)

host semester: CME2

assessment: K60 (written test 60 minutes)

Lecturer(s):
Prof. Dr. Stephan Pfletschinger

Module:
CME-03: Communication Networks

Teaching and learning language:
English

Requirements:
Background knowledge in communication and networks general background in computer science

Objectives and competences:

- Understanding general communication concepts and their practical application
- Understanding role and implications of a layered communication architecture
- Learning the terminology and methodology to be able to analyze and tune communication systems
- Understanding the general architecture and basic mechanisms in modern telecommunication networks
- Understanding advanced modulation and coding schemes in modern telecommunication networks
- Achieving the competence to understand, design, implement and analyze medium access control (MAC) mechanisms being used in modern telecommunication networks
- Achieving the competence to understand the basics of traffic engineering for the use in modern telecommunication networks

Contents:

- Introduction to Cellular Networks:
  Historical overview from 1G to 4G
  The cellular concept: frequency reuse, sectoring
  The mobile channel: link budget, path loss models, fading
  Capacity of fading channels
- Transmission Technologies: Link:
  Modulation and Coding
  Rate Adaptation
  Multi-carrier modulation: OFDM
- Multiple-Access Technologies:
  Scheduled multiple access: TDMA, FDMA, CDMA, SDMA
  Random access: ALOHA and its modern variations
- Further Development: 5G

Literature and Downloads:

courses: VLSI (Very-Large-Scale Integration) Circuit Design with Lab

course IDs: E+I409 +410
level: B+M
lecture and laboratory | 4+1 SWS, 4+2 C (ECTS)
host semester: CME2
assessment: M (oral exam) + LA (lab report)

Lecturer(s):
Prof. Dr. Jasmin Aghassi-Hagmann

Module:
CME-05: VLSI Circuit Design

Teaching and learning language:
English

Requirements:
Basic knowledge of semiconductor physics, basic circuits, integrated analog / digital systems, design automation

Objectives and competences:
• Fully automated Design and Verification of an IC
• Layout of digital and analog building blocks
• Understand Semiconductor Technology and the corresponding CAD tools for Design

Contents:
• Modern semiconductor technology
• Process, design and device functioning of semiconductor integrated circuits
• Layout of transistors and digital logic building blocks
• Fully automated design of an analog and digital design block in the lab
• Place and rout of ICs
• Design rule checks and electrical characterization/simulation

Literature and Downloads:
• Fundamentals of Modern VLSI Devices; Authors: Yuan Taur, University of California, San Diego, Tak H. Ning, IBM T. J. Watson Research Center, New York, 2009
• Electronic design automation (EDA) Manual; authors: Dirk Jansen, Deng Zhu et al., 1991
course: Animation

course ID: m.gp-17
level: B
hands-on seminar with team work in studios and labs | - SWS, 10 C (ECTS)
host semester: -
assessment: practical work

Lecturer(s):
Prof. Götz Gruner

Module:

Teaching and learning language:
English or mixed German-English

Requirements:
Basic design-oriented courses

Objectives and competences:
Ability to develop and produce a media production, in this case animation, VFX and media art

Contents:
• Screenplay, storyboard, conception of installations and performances
• Production of an animated film or a media art project

Literature and Downloads:
course: Film

course ID: m gp16
level: B+M
hands-on seminar with team work in studios and labs | - SWS, 10 C (ECTS)
host semester: -
assessment: practical work

Lecturer(s):

Prof. Dr. Heiner Behring

Module:

Teaching and learning language:

English or mixed German-English

Requirements:

Basic design - oriented courses

Objectives and competences:

Ability to develop and produce a media production, in this case a short movie

Contents:

- Production of a short movie (in team of max 4 students)
- Development and writing of a screenplay
- Arranging and preparation of a media production
- Shooting and post production

Literature and Downloads:
course: Marketing

course ID: VK402
level: B
lecture | SWS, 3 C (ECTS)
host semester: x
assessment: RE (oral presentation)

Lecturer(s):
Prof. Dr. Christopher Zerres

Module:

Teaching and learning language:
English

Requirements:
None

Objectives and competences:

- Awareness of the (marketing) challenges for companies operating internationally
- Understanding of major concepts, methods and instruments used in marketing

Contents:

- Introduction to marketing (definition, tendencies and developments in marketing, theories in marketing, reasons for international company activities)
- International marketing environment (analysis methods like SWOT and PESTLE, consumer behaviour, Introduction to international market research, culture)
- International marketing strategies (market entry strategies, market behaviour strategies, market segmentation strategies)
- International marketing instruments (product, price, promotion and distribution)

Literature and Downloads:
course: Media Integration and Lab

course ID: M+I409 and M+I410
level: B

seminar and laboratory | - SWS, 4 C (ECTS)
host semester: -

assessment: RE (oral presentation) and HA (paper)

Lecturer(s):
Prof. Dr. Roland Riempp

Module:

Teaching and learning language:
English

Requirements:
Basic knowledge of planning and implementing multimedia projects

Objectives and competences:
- Developing own ideas regarding useful multimedia applications
- Research about multimedia applications in the field and create reports based on individual research
- Ability to compare and judge existing multimedia applications
- Developing own competence regarding multimedia conception, content creation and implementation

Contents:
- Introduction, Assignment of topics and dates for individual seminar presentations
- Different categories of interactive multimedia applications
- Screen design for interactive multimedia applications
- Several topics in the context of interactive media. Individual presentations of the participants
- Creating and editing multimedia assets
- Introduction to HTML5 and CSS 3
- Creating an interactive multimedia-applications based on HTML5 and CSS 3

Literature and Downloads:
course: Security of Web Applications  
course ID: UNITS-64  
level: B  
lecture+lab | - SWS, 5 C (ECTS)  
host semester: n/k  
assessment: K (written test)  

Lecturer(s):  
Prof. Dr. Dirk Westhoff  

Module:  

Teaching and learning language:  
English  

Requirements:  
Familiarity with a procedural programming language and to understand Internet and World Wide Web technologies  

Objectives and competences:  
- To understand fundamental web-application attacks and to apply recommended countermeasures against such web-application attacks  
- To be familiar with generic configuration means to harden a Web-Server  

Contents:  
- Client-Server architectures e.g. three tier architecture  
- Fundamental attacks on Web-applications and Defacements  
- Mobile code and security concepts of ActiveX, Java and PHP  
- DoS resp. DDoS-attacks, Websecurity-Scanner  
- Countermeasures against Webapplication attacks  
- Basic security requirements for cloud security  

Literature and Downloads:
course: Basic Computer Aided Design (CAD)

course ID: M+V823 (mandatory)
level: B
laboratory | 2 SWS, 3 C (ECTS)
host semester: MA2
assessment: LA (lab report)

Lecturer(s):
Prof. Dr. Christian Wetzel

Module:
MA-06: Dokumentation (Technical Documentation)

Teaching and learning language:
Normally German (“Grundlagen CAD”); English or mixed English-German groups will be organized on demand.

Requirements:
- Interest in interdisciplinary work
- Basic knowledge in designing and dimensioning simple machine elements in accordance with stress, production and material requirements

Objectives and competences:
- Ability to use a common CAD program, have an overview of the areas of use of CAD systems, and to understand the importance of CAD systems for product design and the flow of business information
- Acquisition of basic knowledge of general methods and working techniques for 3D modelling and design of components, assemblies, definition of standard parts and the derivation of production drawings with 3D CAD systems
- Capability to independently model and visualize simple components and assemblies with a CAD system and to generate technical drawings from them

Contents:
- Introduction to working with 3D-CAD systems and system basics: function structure and structure of CAD systems, user interface, view manager, model information
- Basic construction elements and model references: coordinate systems, reference planes and axes
- Sketching and sketching methodology: creation, dimensioning and conditions of sketches
- Modelling and machining of components: profile and rotating bodies, drawn parts, composite bodies, rounding and chamfers, bores and threads, ribs, pattern creation, copying, mirroring and moving of construction elements, surface modelling, model adjustments, use of standard part libraries
- Assembly modelling: installation, replacement and adaptation of components, design of assembly structure, skeleton models, assembly information
- Drawing derivation from the 3D model: drawing settings, derivation of assembly drawings and individual part drawings in accordance with standards, generation of model views, dimensioning, deviations in shape and position, surface details, fits, creation of parts lists

Literature and Downloads:
- Sham Tickoo: PTC Creo Parametric 4.0 for Designers, CADCIM Technologies; e-book, 4th ed. 2017
- Wyndorps P.: 3D-Konstruktion mit Pro/ENGINEER Wildfire 5.0. 5. Auflage, Europa-Lehrmittel Verlag, 2010
course: Basic Data Processing and Computer-Aided Mathematics

course ID: M+V802 (mandatory)
level: B
lecture and laboratory | 4 SWS, 5 C (ECTS)
host semester: MA3
assessment: K60 (written test 60 minutes) + LA (lab report)

Lecturer(s):
Prof. Dr. Harald Wiedemann

Module:
MA-11: Mathematische Anwendungen (Mathematical Applications)

Teaching and learning language:
Normally German (“Grundlagen Datenverarbeitung / Computergestützte Mathematik Labor”); in case of sufficient demand English instead

Requirements:
Basics of CAD, mathematics I and II, data processing, windows

Objectives and competences:
- Understanding the basic functions of computer systems
- Understanding and interpretation of the representation of data in the computer
- Dealing with objects in simple ways
- Making mathematical problems accessible for algorithmic processing
- Structured programming of simple processes
- Using a common programming system (LabVIEW)

Contents:
- Application examples of mechanical engineering program systems and basic characteristics of a computer system and numerical calculation with programs
- Programming of computer systems, general concepts of the graphical programming language LabVIEW, usual basic data types and their properties
- Control structures for program flow control, case-differentiation, loops and recursion
- Fields, vectors, matrices, etc. as data container, linear equation systems
- Selected topics for the numerical treatment of zeros, extremes, differentiation, integration or interpolation for functions of a variable
- Probability, distribution functions and applied statistics
- Data storage, files (text and binary), XML description
- Fourier arrays and transformation
- Common differential equations, Runge-Kutta procedure

Literature and Downloads:
course: Battery and Fuel Cell Technology

course ID: M+V686 (elective)
level: B
lecture | 2 SWS, 2 C (ECTS)
host semester: ES4+6
assessment: K60 (written test 60 minutes)

Lecturer(s):
Prof. Dr. habil. Wolfgang Bessler

Module:
ES-19+23: Vertiefung I and II (Specialisation I and II)

Teaching and learning language:
Normally German (“Batterie- und Brennstoffzellentechnik”); in case of sufficient demand English instead.

Requirements:
Basic engineering courses: thermodynamics; physics or chemistry

Objectives and competences:
The participants have knowledge of the basics and applications of battery and fuel cell technology. They understand the principle of electrochemical energy conversion and are familiar with typical key figures and characteristic curves. They know the structure and function of typical batteries (alkali-manganese cells), accumulators (lead-acid batteries, lithium-ion batteries) and fuel cells (polymer membrane fuel cells). They understand the system technology (charging methods, safety) and requirements of typical applications (portable devices, electro-mobility, storage of renewable energies).

Contents:
- Fundamentals: History, principle of electrochemical energy conversion, structure of electrochemical cells
- Batteries: Key figures, Alkali-Manganese, Lead-acid, Lithium-ion
- Fuel cells: Efficiencies, polymer membrane fuel cell
- Applications: System technology, portable devices, electro-mobility, renewable energies

Literature and Downloads:
- W. Bessler, lecture notes of this course
course: Fluid Mechanics

course ID: M+V819 (mandatory)

level: B

lecture and exercises | 4 SWS, 5 C (ECTS)

host semester: MA4 / UV4 / BT 4

assessment: K90 (written test 90 minutes)

Lecturer(s):

Prof. Dr.-Ing. Andreas Schneider

Module:

MA-19: Strömungslehre (Fluid Mechanics),
UV-19 / BT-15: Technische Strömungslehre (Technical Fluid Mechanics)

Teaching and learning language:

English (parallel to German taught course “Technische Strömungslehre”)

Requirements:

Physics, technical mechanics I (statics)

Objectives and competences:

Flowing gases and liquids constitute the basis of countless processes in energy technology, chemical and biotechnological processes, in the raw material, food, pharmaceutical and many other industries. Fluid mechanics deals with the states and motion of fluids, i.e. compressible gases and (almost) incompressible liquids, due to the forces acting on them, e.g. weight, centrifugal, pressure and frictional forces.

Understanding the principles of fluid mechanics is therefore essential for many engineers. The students are enabled to use this knowledge in the design of apparatuses and the planning of processes. In addition, there are general approaches in the engineering sciences, illustrated by special fluid mechanics tasks, such as the importance of and working with dimensionless key figures, and responsible working in groups.

Contents:

- Basics: Density and viscosity of fluids, definition of fluids vs solids, fluid statics, capillary effects
- Fluid kinematics: streamlines, continuity equation, flow potential
- Flow of ideal liquids: Navier-Stokes-, Euler-, and Bernoulli equations, vortices, momentum balance
- Fluid kinetics: Similarity laws, Reynolds number, laminar and turbulent flow, boundary layer theory
- Real liquid flow, hydraulic losses
- Introduction to gas dynamics: conservation of mass, Euler equation, Laval nozzle, sonic speed

Literature and Downloads:

- course handout and exercises, downloads from university “moodle” course
course: German Culture and Society

course ID: M+V910 (elective)
level: A
seminar | 2 SWS, 2 C (ECTS)
host semester: MPE1
assessment: RE (oral presentation)

Lecturer(s):
Ms. Zumholz (external)

Module:
MPE-16: Non-Technical Competences

Teaching and learning language:
English

Requirements:
- Only for non-Germans
- Interest and basic knowledge in history, politics, society, in particular with respect to Germany and the Germans

Objectives and competences:
Improving knowledge about and understanding of Germany and the Upper Rhine region and its inhabitants

Contents:
Possible topics:
- Germany: East and West, federal structure, political parties, “social market economy”, free democratic basic law, national anthem (“über Alles”?), public and private media (papers, radio, TV, films), education system, present challenges (EU, regional effects of climate change, terrorism, integration of refugees)
- The image of Germany and “the” Germans in the students’ countries of origin
- The tri-national Upper Rhine region: Baden, Alsace, northwestern Switzerland
- Industrialization in Germany, medium-sized enterprises (“mittelständische Unternehmen”), region-based industries and global players (“Herrenknecht”, “Tesa”, “Daimler”, “BASF”), mining in the Black Forest, tourism, wine growing and beer brewing, media enterprises (“Burdas”)
- The revolution in Baden and the Offenburg freedom movement, German emigration to the second and third world, the synod of Konstanz, religion now and then, hierarchical structures

Literature and Downloads:
- Watson, P.: The German Genius; Simon & Schuster UK, London 2010
- The Federal President - representing and integrating; www.bundespraesident.de/EN/Role-and-Functions/WorkInGermany/RepresentingAndIntegrating/representing-and-integrating.html
- The German revolution 1848 - Frankfurt Vorparlament - German National Assembly: www.age-of-the-sage.org/history/1848/german_revolution.html
- The Hecker uprising (Baden including Offenburg in 1848/49): https://en.wikipedia.org/wiki/Hecker_uprising
- Guide to German culture, customs and etiquette: http://www.uni-frankfurt.de/46329991/Guide-to-German-culture_and-etiquette.pdf
course: Heat and Mass Transfer / Heat Transfer

course ID: M+V528 (mandatory)
level: B

lecture | 4 SWS / 4 C (ECTS) complete course, 3 SWS / 3 C (ECTS) heat transfer only
host semester: BT4+UV4

assessment: K90 (written test 90 minutes) / K60 (heat transfer only)

Lecturer(s):
Prof. Dr. Susanne Mall-Gleißle

Module:
BT-19 / UV-20: Wärme- und Stofftransport (Heat and Mass Transfer)

Teaching and learning language:
English only, or in parallel to German-taught course "Wärme- und Stofftransport" (Heat and Mass Transfer)

Requirements:
Basics of fluid mechanics and thermodynamics.

Objectives and competences:
Heat and mass transfer are important unit operations to describe and to dimension technical processes. The students will be able to deal with similarity relationships and non-dimensional properties. They will be acquainted with the basics of heat conduction and will be capable of describing the temperature distribution in and to dimension a simple heat exchanger. They can deal with the basics of radiation and convection. They command the basics of mass transfer, phase changes and phase equilibrium. They can deal with drying processes and adsorption, and are able to discuss energetic optimization of these processes.

Contents:
- Heat and mass transport in energy technology, parallel, counter and cross flow, conservation equations, dimensionless numbers in thermal processes, principle of similarity (Nusselt), non-dimensional properties, steady-state and unsteady processes (Fourier law), mathematical tools
- Heat transfer: conservation equations for energy and temperature, heat conduction, free and forced convective convection, radiation, heat sources
- Mass transfer: diffusion, Fick's law, convection
- Combined Heat and mass transfer: heat transport and transition, heat exchanger analysis, condensation, binary mixtures, phase equilibria
- Examples, exercises

Note: Students not interested in mass transfer may attend only the heat transfer part of the course, and they will have a shorter exam. If 4 instead of 3 C (ECTS) are still required, the extra credit point can be earned by means of an additional homework (HA) on a selected topic.

Literature and Downloads:
course: Heat Transfer Lab

course ID: M+V502 (mandatory)
level: B
laboratory | 2 SWS, 2 C (ECTS)
host semester: UV4
assessment: LA+RE (lab reports and oral presentation)

Lecturer(s):
Prof. Dr. Susanne Mall-Gleiße

Module:
UV-20: Wärme- und Stofftransport (Heat and Mass Transfer)

Teaching and learning language:
Normally German, on demand English language or bilingual groups in “Technikum Wärmeübertragung” (Heat Transfer Lab)

Requirements:
Good theoretical knowledge in fluid mechanics and thermodynamics.
The laboratory can only be attended independently of the lecture in case of sufficient theoretical knowledge, for example proven by a successful exam in heat transfer or in heat and mass transfer.

Objectives and competences:
Experimental work supplementing and deepening theoretical knowledge in thermal process engineering

Contents:
- Heat transfer in twin-tube heat exchangers, parallel and counter-flow
- Heat transfer in fixed and fluidized particle beds
- Drying process in climatic chamber
- Flash evaporation
- Pervaporation
- Continuous distillation

Literature and Downloads:
Lab test instructions, downloads from university “moodle” course
course: Machine Elements / Mechanical Design

course ID: M+V817 (mandatory)
level: B
lecture and project orientated homework | 6 SWS, 8 C (ECTS)
host semester: MA4
assessment: K120 (written test 120 minutes) and HA (written homework)

Lecturer(s):
Prof. Dr. Christian Wetzel (in charge of module), et al

Module:
MA-18: Maschinenelemente III (Machine Design)

Teaching and learning language:
English (parallel to German-taught course)

Requirements:
Knowledge in technical mechanics (statics, stress and strain), material sciences and CAD

Objectives and competences:
The students acquire in-depth knowledge about the functions, dimensioning and design of a variety of machine elements. They learn to select suitable machine elements according to current standards and technical guidelines. They can deal with standardized methods of dimensioning. They recognize the various interrelations of machine elements in a complex system. They deepen their knowledge in a project-orientated housework.

Contents:
- Review: mechanics and materials, stress and strain, bending, torsion, Mohr’s circle, complex loading, failure theories
- Fatigue
- Screws and fasteners
- Compression springs
- Rolling element bearings, slide bearings, lubrication
- Gearing technology and spur gears
- DIN 3990: Calculation of load capacity of cylindrical gears; introduction and general influence factors
- Clutches and brakes
- Shaft design (time allowing)
- Rivets, welding, bonding (time allowing)

Literature and Downloads:
course: Materials Joining Technology Laboratory

course ID: M+V968 (mandatory)
level: B
laboratory | 4 SWS, 5 C (ECTS)
host semester: ME4
assessment: LA (lab report)

Lecturer(s):
Prof. Dipl.-Ing. Dietmar Kohler (in charge of module), Prof. Dr. rer. nat. Johannes Vinke

Module:
ME-20: Fügetechnik (Materials Joining Technology)

Teaching and learning language:
Normally German (“Labor Fügetechniken”); English or mixed German-English groups on demand

Requirements:
Good theoretical knowledge in materials sciences

Objectives and competences:
Practical experience supplementing theoretical knowledge in the joining technologies of materials sciences

Contents:
- Joining Technologies Metals:
  Manual arc welding, Metal - active / inert gas welding, tungsten - inert gas welding, gas welding, soldering, robot welding, resistance spot welding, flash butt welding
- Joining Technologies Plastics:
  welding technologies, adhesive techniques (physical, chemical)
- Separation Technologies:
  Autogenous cutting, plasma cutting, water jet cutting, laser cutting

Literature and Downloads:
lab instructions
course: Measurement and Control Engineering with Lab

course ID: M+V828 (mandatory)
level: B
lecture and laboratory | 5 SWS, 7 C (ECTS)
host semester: MA6
assessment: K90 (written test 90 minutes)

Lecturer(s):
Prof. Dr.-Ing. Rainer Gasper

Module:
MA-24: Mess- und Regelungstechnik (System Dynamics and Control)

Teaching and learning language:
English (parallel to German-taught course "Mess- und Regelungstechnik mit Labor")

Requirements:
Mathematics, electrical engineering, physics, mechanics, fluid dynamics, thermodynamics, machine elements & design

Objectives and competences:
The students are able to analyse complex systems in mechanical engineering and split them into subsystems exchanging signals. They understand the signal as a physical quantity e.g. displacement, force or temperature. They are able to describe simple linear systems mathematically and analyse simple systems. The students have the abstraction capability to estimate the behaviour of non-linear systems and to simulate and analyse them numerically. They know simple controls and are able to adjust the parameters of those. They recognize critical systems regarding stability and can apply measures to improve stability. The students can familiarise with common measurement methods and can determine their usability.

Contents:
- System / signal / transfer function
- Complex numbers, Bode plot, root locus
- Laplace transformation
- Frequency response / illustration of combined systems
- Principal transfer functions
- Symbols in EMSR technology
- Synthesis of control circles
- Analytic and empirical design rules
- Stability of systems

Literature and Downloads:
  free downloads: www.cds.caltech.edu/~murray/books/AM05/pdf/am08-complete_22Feb09.pdf,
  www.cds.caltech.edu/~murray/books/AM08/pdf/am08-complete_28Sep12.pdf,
  additional material: www.cds.caltech.edu/~murray/wiki/index.php?title=CDS_101/110,_Fall_2015
course: Mechanical Process Engineering Laboratory

course ID: M+V472 (mandatory)
level: B
laboratory | 2 SWS, 2 C (ECTS)
host semester: VT6 (until 2020) / BT6-UV6 (from 2021)
assessment: LA (lab reports)

Lecturer(s):
Prof. Dr. Susanne Mall-Gleißle et al

Module:
VT-24 (until 2020): Mechanische Verfahrenstechnik (Mechanical Process Engineering)
BT-24 / UV-26 (from 2021): Mechanische Verfahrenstechnik (Mechanical Process Engineering)

Teaching and learning language:
Normally German (“Technikum Mechanische Verfahren”), on demand English language or bilingual groups

Requirements:
Good theoretical knowledge in mechanical process engineering, documented for example by a successful exam

Objectives and competences:
Experimental work supplementing and deepening theoretical knowledge in mechanical process engineering

Contents:
Choice of experiments:
- Viscosity measurement
- Particle size reduction and particle size distribution measurement
- Piping technology
- Free fall velocities and settling velocities of particles
- Mixing time measurement in stirred tanks
- Mass transfer rate measurement in stirred tanks
- Scale-up in liquid mixing
- Cake-forming filtration
- Fluidized bed technology

Literature and Downloads:
- Lab test instructions, downloads from university “moodle” course
- EKATO Rühr- und Mischtechnik GmbH; Handbook of Mixing Technology; Schopfheim, 1991
- Mota, M. et al; Effect of real particles packing with large size ratio on porosity and tortuosity of filter bed; Proceedings of 9th World Filtration Congress, New Orleans, USA, 2004
- DIN 53 018, parts 1 and 2; Measurement of the dynamic viscosity of Newtonian Liquids with Rotational Viscometers; Beuth-Verlag, Berlin, 1976 (in German)
- DIN 53 019, part 1; Measurement of Viscosity and Flow Curves with Rotational Viscometers with Standardized Geometry; Beuth-Verlag, Berlin, 1980 (in German)
- DIN ISO 9276-1:2004-09: Representation of results of particle size analysis - Part 1: Graphical representation, Beuth-Verlag (until 2002: DIN 66141) (available in German and English)
- DIN 66145 Graphical representation of particle size distributions; Beuth 2004 (available in German and English)
course: Thermodynamics I - Technical Thermodynamics

course ID: M+V710 (mandatory)
level: B
lecture | 6 SWS, 7 C (ECTS)
host semester: MA3
assessment: K90 (written test 120 minutes)

Lecturer(s):
Prof. Dr. Jörg Ettrich (in charge of module) et al

Module:
MA-14: Technische Thermodynamik (Technical Thermodynamics)

Teaching and learning language:
On demand in English, in parallel to German-taught course “Technische Thermodynamik”

Requirements:
Higher mathematics and physics

Objectives and competences:
The students understand the basic concepts of thermodynamics. They are able to define suitable models and the according conservation laws. The students know model fluids like ideal gas, real gas and gas-vapor-mix, are able to apply thermal and caloric state equations to them and can work with state diagrams.
The students know the meaning of the second law of thermodynamics and can deal with entropy.
The students are able to analyse thermodynamic power cycles (gas and vapour) and to calculate the energy flows. They also know an approach to describe mixtures of substances, multi-phase-thermodynamics and chemical thermodynamics.

Contents:
- Introduction: Phenomenological Thermodynamics
- Basic Concepts:
  Thermodynamic systems, intensive and extensive state variables, thermodynamic equilibrium
- Conservation Laws of Mass and Energy:
  Mass conservation, types of energy, thermal and mechanical energy (work), energy conservation in a closed system - inner energy, energy conservation in an open system - enthalpy
- Thermal and Caloric State Equations:
  Ideal gas, incompressible liquid, vapour-liquid-equilibrium, real gas
- Second Law:
  Reversible and irreversible changes of state, example of second law applications, definition of entropy, mathematical formulation of second law, exergy
- Power Cycles:
  Introduction, Carnot power circle, gas power cycles, vapour power cycles, refrigeration cycles
- Introductions to: Mixtures of substances, psychrometrics, heat transfer

Literature and Downloads:
course: Thermodynamics II - Engines and Machines with Lab

course ID: ex M+V826 (mandatory)
level: B
lecture and laboratory | 4 SWS, 5 C (ECTS)
host semester: MA6
assessment: K90+LA (written test 90 minutes and lab report)

Lecturer(s):
Prof. Dr. Peter Treffinger

Module:
MA-23: Kraft- und Arbeitsmaschinen mit Labor (Engines and Machines with Lab)

Teaching and learning language:
On demand in English, in parallel to German-taught course “Kraft- und Arbeitsmaschinen mit Labor”

Requirements:
Higher mathematics and physics.
It is recommended to also attend the associated course “Thermodynamics I - Technical Thermodynamics”.

Objectives and competences:
The students know the classification of engines and machines and are able to choose a machine suitable for a specific task with emphasis on energy efficiency.

Contents:
- Classification of Engines and Machines
- Energy Balances
- Basics of Fluid Machines:
  Classification and structure, Euler hydrostatical law, scaling of fluid machines
- Hydraulic Fluid Machines:
  System / plant integration, types of impellers of e.g. a water turbine, design and control of Kaplan, Francis, and Pelton turbine, dimensionless identifiers and Cordier diagram, centrifugal pumps
- Thermal Turbomachinery:
  Classification, steam turbine as an example for a multistage turbine, gas turbine
- Displacement Machinery:
  Basics, example of a reciprocating piston compressor
- Combustion Engines:
  Thermodynamics of combustion engines, selected aspects

Literature and Downloads:
course: Business English (campus Gengenbach)

course ID: n/k
level: A
seminar | 2 SWS, 2 C (ECTS)
host semester: BW
assessment: K60 (written test 60 minutes)

Lecturer(s):
various (external)

Module:
-

Teaching and learning language:
English

Requirements:
- Entry level: B 1
- Primarily for students of BW at the Department of Business and Industrial Engineering, Campus Gengenbach

Objectives and competences:
- Enriching business vocabulary; phoning, emailing, socializing, negotiations, meetings, presentations
- Increasing ease in communicating in a business environment
- Improving formal writing
- Target level: B 2

Contents:
- Advanced business vocab on business organization, marketing, HR etc.
- Task-based grammar exercises, if needed

Literature and Downloads:
course: Advanced Business English (campus Gengenbach)

course ID: n/k
level: A
seminar | 2 SWS, 2 C (ECTS)
host semester: DEC / BWM / WIM
assessment: K60 (written test 60 minutes)

Lecturer(s):
various (external)

Module:
-

Teaching and learning language:
English

Requirements:
- Entry level: B 1
- Primarily for students of DEC, BWM and WIM at the Department of Business and Industrial Engineering, Campus Gengenbach

Objectives and competences:
- Understand cultural differences and respect rules of diplomacy
- Express an opinion in a distinguished diplomatic way, being able to contradict another opinion professionally
- Negotiate a deal
- Give presentations
- Apply for a position (resume writing and job interview practice)
- Select information from texts and films in an efficient and comprehensive way
- Write short reports and meeting minutes
- Target level: B 2

Contents:
This course covers a range of themes that students of business and technology related work fields will find useful (see content). The focus will be on the training of spoken production and interaction on the basis of listening and reading comprehension examples from current news and economic developments. Grammar and vocabulary skills will be consolidated.

- International Communication
- Intercultural Differences
- Company Structures
- Entrepreneurship
- Job Interviews

Literature and Downloads:
- www.economist.com
- www.bbc.co.uk
Language Center

course: Economics English (campus Gengenbach)

course ID: n/k
level: A
lecture | 4 SWS, 4 C (ECTS)
host semester: BW1 / BW3 / LH1
assessment: K60 (written test 60 minutes) + RE (oral presentation)

Lecturer(s):
various (external)

Module:
-

Teaching and learning language:
English

Requirements:
- Entry level: B 1
- Primarily for students of BW and LH at the Department of Business and Industrial Engineering, Campus Gengenbach

Objectives and competences:
- Target level: B 2

Contents:
- Enriching business vocabulary: phoning, emailing, socializing, negotiations, meetings, presentations
- Increasing ease in communicating in a business environment
- Improving formal writing

Literature and Downloads:
course: English for Engineers

Lecturer(s):
various (external)

Module:
-

Teaching and learning language:
English

Requirements:
- Entry level: B 1
- Knowing and applying the most important times, as a rule, correctly
- Knowledge of the most common grammatical rules
- Interest in interactive communication and independent presentation of course content

Objectives and competences:
- Capturing and interpreting information from complex texts
- Giving a short lecture on a current occupational topic
- Writing a clearly structured text on a subject-specific topic
- Participating in a technical debate and presenting one’s opinions
- Target level: B 2

Contents:
- Innovations & trends in the future
- Engineering vocabulary needed in working environment
- Intercultural communication for Engineers
- Successful correspondence

Literature and Downloads:
course: English for Media Engineering

course ID: n/k
level: A
seminar | 2 SWS, 2 C (ECTS)
host semester: MI
assessment: RE (oral presentation)

Lecturer(s):
various (external)

Module:
-

Teaching and learning language:
English

Requirements:
- Entry level: B 1
- Primarily for students in the Department of Department of Media and Information
- Knowing and applying the most important times, as a rule, correctly
- Knowledge of the most common grammatical rules
- Interest in interactive communication and independent presentation of course content

Objectives and competences:
- Ability to design presentations in English language
- Commanding vocabulary in media terminology
- Understanding and application of frequently used expressions of the media world
- Participating in a technical debate and presenting one’s opinions
- Target level: B 2

Contents:
Media-related extracts from the website www.ted.com, such as:
- Innovation and future issues
- Intercultural communication
- Global trends in the media scene

Literature and Downloads:
- www.ted.com
course: Technical English (also block courses, also at campus Gengenbach)

course ID: n/k
level: A
seminar | 4 SWS, 4 C (ECTS)
host semester: -
assessment: K90 (written test 90 minutes)

Lecturer(s):
various (external)

Module:
-

Teaching and learning language:
English

Requirements:
- Entry level: B 1
- Courses in Gengenbach (weekly and blocks) primarily for students of WI at the Department of Business and Industrial Engineering, Campus Gengenbach
- Courses in Offenburg (weekly and blocks) for all

Objectives and competences:
- Communicating appropriately in typical situations at work
- Building up relevant vocabulary of diverse technical topics
- Understanding the main ideas of complex technical texts
- Describing technical objects, processes and issues
- Target level: B 2

Contents:
In pairs and groups workshops, roleplays, and presentations on topics such as technical functions and applications, materials technology, components and assemblies, technical problems, technical development, renewable energies, etc. as well as functional language that is useful in any branch of engineering (mechanical, electrical, etc.).
Especially in course for WI students: Automotive, mechanical engineering, electrical engineering, renewable energies.
Pharmaceutical English, Project Management

Literature and Downloads:
Summary:
“30 Credit Points (ECTS) in Mechanical and in Process Engineering”

course (* elective, only if sufficient demand) | type | SWS | C
--- | --- | --- | ---
Basic Computer Aided Design (CAD) | lab | 2 | 3
Basic Data Processing and Computer-Aided Mathematics | lecture + lab | 4 | 5
Battery and Fuel Cell Technology | lecture (*) | 2 | 2
Fluid Mechanics | lecture + exercises | 4 | 5
Heat and Mass Transfer (Heat Transfer only) | lecture | 4 (3) | 4 (3)
Heat Transfer Lab | lab | 2 | 2
Machine Elements / Mechanical Design | lecture + homework | 6 | 8
Materials Joining Technology Laboratory | lab | 4 | 5
Measurement and Control Engineering with Lab | lecture + lab | 5 | 7
Mechanical Process Engineering Laboratory | lab | 2 | 2
Thermodynamics I - Technical Thermodynamics | lecture | 6 | 7
Thermodynamics II - Engines and Machines with Lab | lecture + lab | 4 | 5