Course Descriptions General Engineering

Summer Semester 2025

13 February 2025

German (different course levels)

Course title	see schedule Language Centre
ECTS	4
Course type	Seminar
SWS	4
Semester	Winter and summer
Workload in hours	60 hrs
Assessment method	Written examination, 90 min.
Language of instruction	German

Please find here the course descriptions for German language courses at all course levels:
https://th-deg.de/en/students/language-electives#german

English in Technical Contexts B2

Course title	English in Technical Contexts B2
ECTS	2
Course type	Language training course
SWS	2
Semester	Winter and summer
Course level	**B2** • Can understand the main ideas of complex text on both concrete and abstract topics, including technical discussions in his/her field of specialization • Can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible without strain for either party • Can produce clear, detailed text on a wide range of subjects and explain a viewpoint on a topical issue giving the advantages and disadvantages of various options
Lecturer	Neal O'Donoghue, MA
Course objectives	This course aims to deepen students' encounter with the English language in a technical context by giving practical training in specialized vocabulary, grammar and language usage. The four cardinal language skills – listening, speaking, reading, and writing – will play an integral role in this training. The course is designed to be relevant and interesting for engineering students and will be adapted to their learning needs and study areas. By the end of the course, participants should have a more

	comprehensive understanding of, and enhanced fluency in, the English language in an engineering context.
Course contents	*Obligatory topics (60 %):* • Numbers and mathematical operations • Shapes and dimensions • August 2017 • Basic physics and the scientific worldview • Materials and their properties • Case study on an area related to technology • /physics/engineering • Grammar/ communication skills *Variable content (40 %):* Variable content will be determined on the basis of a student survey conducted in the first session. Current world events (including news events and popular culture) and recent technological innovations may be used as a basis for discussions.
Teaching methods	Teaching methods focus on improving the four cardinal language skills and include group discussions and group projects; individual work; mini-presentations; role-plays; close reading and listening activities; dictation; grammar games; and various follow-up viewing and writing activities. Work not completed in class should be done at home. Self-study assignments will be set on a weekly basis.
Assessment method	Written exam (60 min) No dictionaries are allowed. Exam structure: • Part 1: Listening comprehension(s) • Part 2: Reading comprehension(s) • Part 3: Vocabulary and technical content

	• Part 4: Grammar (maximum 10% of total exam points, excluding writing exercise) • Part 5: Writing composition (150-200 words) The exam will be based on topics covered during the semester. The exam will be based on topics covered during the semester.
Recommended Literature	Astley, Peter, and Lewis Lansford. Engineering 1: Student's Book. Oxford: Oxford UP, 2013. Print. Bauer, Hans-Jürgen. English for Technical Purposes. Berlin: Cornelsen, 2000. Print. Bonamy, David. Technical English 4. Harlow, England: Pearson Education, 2011. Print. Bonamy, David, and Christopher Jacques. Technical English 3. Harlow: Pearson Longman, 2011. Print. Brieger, Nick, and Alison Pohl. Technical English: Vocabulary and Grammar. Oxford: Summertown, 2002. Print. Dummett, Paul. Energy English: For the Gas and Electricity Industries. Hampshire: Heinle, Cengage Learning, 2010. Print. Dunn, Marian, David Howey, and Amanda Ilic. English for Mechanical Engineering in Higher Education Studies Coursebook. Reading: Garnet Education, 2010. Print. engine: Englisch für Ingenieure. <www.engine-magazin.de> (Darmstadt). Various issues. Print. Foley, Mark, and Diane Hall. MyGrammarLab. Harlow: Pearson, 2012. Print. Glendinning, Eric H., and Norman Glendinning. Oxford English for Electrical and Mechanical Engineering. Oxford: Oxford UP, 1995. Print.

	Glendinning, Eric H., and Alison Pohl. Technology 2. Oxford: Oxford UP, 2008. Print. Heidenreich, Sharon. English for Architects and Civil Engineers. Wiesbaden: Vieweg + Teubner Verlag, 2008. Print. Ibbotson, Mark. Cambridge English for Engineering. Cambridge: Cambridge UP, 2008. Print. Ibbotson, Mark. Professional English in Use. Engineering: Technical English for Professionals. Cambridge: Cambridge UP, 2009. Print. Markner-Jäger, Brigitte. Technical English: Civil Engineering and Construction. Haan-Gruiten: Verl. Europa-Lehrmittel, 2013. Print. Murphy, Raymond. English Grammar in Use. Cambridge: Cambridge UP, 2004. Print. Schäfer, Wolfgang. Construction Milestones: Englisch Für Bau-, Holz- Und Anlagenberufe. Stuttgart: Klett, 2013. Print. Wagner, Georg, and Maureen Lloyd. Zörner. Technical Grammar and Vocabulary: A Practice Book for Foreign Students. Berlin: Cornelsen, 1998. Print.
Language of instruction	English
Prerequisites	B1 / Abitur (A-levels/ school leaving certificate giving right of entry to higher education) / 7-9 years of English

Intercultural Training for Germany and Bavaria

Course title	Intercultural Training for Germany and Bavaria
ECTS	1
Course type	Elective
SWS	1
Semester	Winter and summer
Workload in hours	30 hours
Name of Instructor	Lisa Werner
Course objectives	Participants get an understanding of the different theories of "culture" and learn about stereotypes and traditions in Bavaria. Furthermore, the participants get information on Germany and Bavaria as well as the Deggendorf Institute of Technology.
Course contents	I. Culture (theroies) II. Customs and Rituals in Germany/Bavaria III. Information on Germany and Bavaria and the DIT IV. Quiz and Presentation V. Culture Shock
Recommended literature	Bolten J. und Ehrhardt C., Interkulturelle Kommunikation, Verlag Wissenschaft & Praxis 2003; Bolten J, Einführung in die interkulturelle Wirtschaftskommunikation, Vandenhoeck & Ruprecht 2007
Teaching methods	The course is organized according to four pillars:

	1. Culture 2. Customs and Rituals 3. Information on Germany/Bavaria 4. Culture Shock Whereas hard facts are taught in a classical lecture style, students will do lots of role-plays, critical incidents, short movies and do a quiz.
Assessment method	Paper
Language of instruction	English/German
Prerequisites	None

Bavarian Culture

Course title	Bavarian Culture
Course ID	229
SWS	2
Semester	Winter and summer
ECTS	2
Course type	Elective
Language of instruction	English
Name of lecturer	Jennifer Hauer
Course objectives	Participants get a deeper understanding of the traditional and contemporary Bavarian culture by integrating knowledge about customs, language, and history with culturally routed events.
Course contents	1. Hard facts 1.1. History 1.2. Demographics 1.3. Geography 2. Customs and rituals 2.1. Traditional 2.2. Contemporary 3. Language 4. Events
Teaching methods	The course is organized according to four pillars: 1. Hard Facts 2. Customs and Rituals 3. Language 4. Events

	Whereas hard facts are taught in a classical lecture style, students should experience aspects of the culture in a lively manner through knowledge dissemination of cultural experts, off-campus seminars at events of traditional cultural origin, as well as learning and engaging in cultural rituals themselves. The aim is to deepen and complement the contents taught in the Orientation Week.
Recommended literature	Jonas, B., Gebrauchsanweisung für Bayern, Piper Verlag, 2007
Assessment methods	Seminar paper
Prerequisites	Participants should have attended the introductory Intercultural Training during the Orientation Week.

Business and Society in China & Emerging Asia

Course title	Business and Society in China & Emerging Asia
ECTS	2
Course type	Elective
SWS	2
Semester	Summer
Workload in hours	Total: 60 / In-class: 30 / Self-study: 30
Lecturer	Prof. Dr. Wei Manske-Wang
Course objectives	• Awareness of foreign cultures and understanding their causes • Think out of the box and establish global horizons • Preparing for the challenges of future professional life in a global environment • Doing business in China/Asia successfully requires a holistic view on China/Asia and a thorough understanding how business is done there! This course aims at providing students with the necessary knowledge about contextual determinants of business practice (culture, politics, economy, society, history) and introduces exemplary reference cases.
Course contents	• The historical roots of China: What are structural legacies of the past? How do Chinese perceptions of history influence the present society? • The institutional setting of the Chinese economy: What are the main actors in the Chinese economy (state-owned enterprises, private-owned businesses)?

- The political system and its ramifications in the domain of economic policy and business: What is the role of the Communist Party? What are the principal decision makers on different levels of government? How does this affect central aspects of business environment such as corporate governance?
- What is behind Chinese long-term strategy “Belt and road initiative”?
- Culture and societal values: China represents an amazing mix of global metropolitan life and a resurgence of tradition, deeply enmeshed in her high-speed urbanization process that continue shaping the country in the last decades.
- What do you know about Chinese philosophies in the past? What do you know about Chinese values today?
- What are implications for business, such as regarding consumer demand of young generation?
- Behavioural aspects of business practice: The Chinese are famous for networking. We look at the ‘Chinese way’ in establishing social relations in the business domain. Further, we explore Chinese organizational behaviour in companies.
- What are ‘mega-trends’ of the future affecting the outlook for Chinese business? We touch on issues such as demographic change, looming environmental crises, digitalization and the question of political stability.
- Institutions and strategic arrangements in Asia: ASEAN, APEC, BRICS, BRI, RCEP etc.
- More countries in Asia: Japan, India, Vietnam, Indonesia etc.
- Is an Asian Century dawning?

Recommended literature	Hofstede, G.; Hofstede G.J. (2009): Lokales Denken, globales Handeln: Interkulturelle Zusammenarbeit und globales Management. 4. Auflage. München: Deutscher Taschenbuch Verlag Thomas, A.; Kammhuber S.; Schroll-Machl, S. (Hg.) (2007): Handbuch Interkulturelle Kommunikation und Kooperation Band 2: Länder, Kulturen und interkulturelle Berufstätigkeit. 2. Auflage. Göttingen: Vandenhoeck & Ruprecht
Teaching methods	Lecture, Press Monitoring, Case Studies, Discussions, Group Work, Q&A
Assessment method	Group works – Written Assignment (50%) & Final Presentation (50%)
Language of instruction	English

Business Storytelling

Course title	Business Storytelling
Course ID	296
ECTS	2
Course type	Elective
SWS	2
Semester	Winter and summer
Workload in hours	Total: 60 / In-class: 30 / Self-study: 30
Lecturers	Diego and Raphael Fiche
Course objectives	At the end of this course, students will be able to: • Recognize key elements that go into persuasive storytelling • Identify types of stories and their purposes • Create compelling stories to achieve business goals • Apply acquired knowledge to develop a compelling story to persuade others to think or act in a different way.
Course contents	• Introduction to Business Storytelling • Power of Business Stories: when and why to tell them • Types of Business Stories and Their Purposes • Structuring Your Story to Engage the Audience • Storytelling techniques • Enhance Your Storytelling Skills

Recommended literature	Janis Forman (2013), Storytelling in Business: The Authentic and Fluent Organization Seth Godin(2005), All Marketers Are Liars
Teaching methods	• Lectures • Group work • Case studies • Presentation • Exercises
Assessment method	Class workshops / presentation / case studies / seminar paper
Language of instruction	English
Prerequisites	None

Simplified Microcontroller Programming

Course title	Simplified Microcontroller Programming
ECTS	2
Course type	Lecture with practical exercises
SWS	2
Semester	Winter and summer
Workload in hours	Total: 60 / In-class: 30 / Self-study: 30
Lecturer	Johann Gerner
Course objectives	In almost all areas of technical installations, microcontrollers constitute the core of control and regulating engineering. By means of various university initiatives, systems have been developed that are both inexpensive and easy to program and therefore they are especially suitable for students who do not have an extensive basic knowledge in the field of electrical engineering. Based on the simple development system “Arduino”, students will learn how can be solved technical problems in the various engineering disciplines with the aid of software and hardware. Here, the handling of hardware-based programming is exercised and solution approaches are developed that are presented in the various sensors and actuators.
Course contents	• Introduction: presentation of the development system Arduino and its sub-systems • Testing and analysis of existing sample programs under consideration of special problem cases

	• Reading and implementing Fritzing diagrams and wiring diagrams • Inclusion and application of external program libraries • Application programming of different sensors and their characteristics • Control of different actuators and introduction to the applied technology • Program development for simple measurement and control applications • Information about current development trends in microcontroller engineering
Recommended literature	Massimo Banzi, Arduino für Einsteiger (2012); O'Reilly Simon Monk, Programming Arduino Next Steps: Going Further with Sketches
Teaching methods	Seminar-like lessons and practical tasks in the laboratory
Assessment method	Paper
Language of instruction	English
Prerequisites	Fundamentals of Informatics, experience with Windows

Industrial Wastewater Treatment

Course title	Industrial Wastewater Treatment
ECTS	2 ECTS
Course type	Lecture
SWS	2 SWS
Semester	Winter and summer
Workload in hours	Total: 60 / In-class: 30 / Self-study: 30
Lecturer	Prof. Dr.-Ing. Andrea Deininger
Course objectives	Methods and concepts of industrial wastewater treatment
Course contents	Legal Requirements Integrated Measures for Pollution Control Design Criteria Mechanical and Physical treatment Chemical Treatment Biological Treatment Examples

	Industrial Wastewater Management, Treatment, and Disposal, 3e MOP FD-3 (WEF Manual of Practice) by Water Environment Federation (Jun 17, 2008)
Recommended literature	Industrial Wastewater Treatment, Recycling and Reuse by Vivek V. Ranade and Vinay M Bhandari (Sep 26, 2014) Wastewater Engineering: Treatment and Resource Recovery by Inc. Metcalf & Eddy, George Tchobanoglous, H. David Stensel and Ryujiro Tsuchihashi (Sep 3, 2013)
Teaching methods	Lecture with integrated project development examples
Assessment method	Seminar and examination paper
Language of instruction	English
Prerequisite	Principles of process engineering

Statistics for Engineers

Course title	Statistics for Engineers
ECTS	5
Course type	Lecture/ practical exercises
SWS	4
Semester	Winter and summer
Workload in hours	Total: 60 / In-class: 30 / Self-study: 30
Lecturer	Prof. Dr. Peter Ullrich
Course objectives	This is an introductory course to statistics with emphasis on applications in engineering. You will learn how to use statistical methods to analyse and visualise experimental data. Furthermore, the statistical programming language R is used for practical exercises.
Course contents	Descriptive Statistics, Probability Theory, Inductive Statistics, Programming with R.
Recommended literature	tba
Teaching methods	Lesson / practical work
Assessment method	Written examination, 90 min.
Language of instruction	English

Prerequisites	Elementary calculus

Advanced Circuits Lab

Course title	Advanced Circuits Lab
ECTS	5
Course type	Practical Exercises
SWS	4
Semester	Winter and summer
Workload in hours	Total: 150 / In-class: 60 / Self-study: 90
Lecturer	Michael Benisch
Course objectives	Ability to analyze and apply analog semiconductor circuits. Ability to design simple analog semiconductor circuits.
Course contents	• Lessons for introduction of specific topics - Applications of analog circuits - Diodes and Transistors - Amplifiers - RF circuits (Oscillators, PLL) • Lab Experiments - Introduction to basic electronics measurement equipment - Diode circuits: voltage doubler (Villard and Greinacher circuit), voltage cascade, diode as switch - Integrated circuits: Timer circuit - Design of AF-amplifier according to specification - Differential amplifier: Characteristics, current source, application

	- Quasi-linear AF-power-amplifier: Class A, B, AB operation, biasing, output power, efficiency - Switch mode AF power amplifier: Class D - Phase locked loop – PLL - RF-Oscillators: Phase-shift oscillator, Wien-bridge oscillator, Colpitts-oscillator, LC-oscillators, Franklin-oscillator - Nonlinear RF-circuit simulation using AWR Microwave office - RF-measurements: S-Parameter and time domain reflectometry
Recommended literature	Tietze, Schenk: Electronic Circuits: Handbook for Design and Application, Springer 2nd ed. 2008
Teaching methods	Practical work and some lessons for introduction of specific topics
Assessment method	Written examination (90 min.) and project
Language of instruction	English
Prerequisites	Basic knowledge of solid-state devices (bipolar junction transistors, diodes) Basics of electronic networks **Admission test!**

Medical Applications of Electromagnetic Waves

Course title	Medical Applications of Electromagnetic Waves
ECTS	5
Course type	Lecture / Lab
SWS	4
Semester	Summer
Workload in hours	Total: 150 / In-class: 60 / Self-study: 90
Lecturer	Prof. Dr. Jens Ebbecke
Course objectives	This course will give the students an overview of medical applications of electromagnetic waves. After completing the subject, the students have achieved the following learning objectives: • They are able to explain the effect of certain electromagnetic wavelengths on the human body and the applications resulting out of these effects. • The students are able to choose a certain wavelength of the electromagnetic spectrum for a specified medical problem. • The students will learn to differentiate between the different categories of the electromagnetic spectrum.
Course contents	• Basic properties of electromagnetic waves • Electric field and electric currents in biological systems • Radiowave applications in medicine • Microwave applications in medicine • Terahertz applications in medicine • Medical applications of IR light • Medical applications of visible light • Medical applications of UV light

	• X-ray applications in medicine • Special applications of electromagnetic waves
Recommended Literature	Zohuri, Bahman;McDaniel, Patrick J.: Transcranial Magnetic and Electrical Brain Stimulation for Neurological Disorders; Elsevier James C. Lin: Electromagnetic fields in biological systems; CRC Press André van der Vorst: RF/Microwave Interaction with Biological Tissues; Wiley C. H. Durney: Basic introduction to bioelectromagnetics; CRC Press
Teaching methods	Lecture, seminar-like instructions, exercises, small lab work
Assessment method	Written examination, 90 min.
Language of instruction	English
Prerequisites	None

Python Programming: Basics and Applications

Course title	Python Programming: Basics and Applications
ECTS	2
Course type	Programming sessions and semester project
SWS	2
Semester	Summer
Workload in hours	Total: 60 / In-class: 30 / Self-study: 30
Lecturer	Prof. Dr.-Ing. Giuseppe Bonfigli
Course objectives	After attending this course, students will be able to implement small Python programs for everyday applications in engineering. They will know the fundamentals of the syntax and of the logical structures of Python, including rudimentary elements of Object-Oriented Programming, and will be able to apply them to solve programming tasks. They will be aware of the flexibility of Python, and of the wide range of capabilities provided by additional libraries (modules). Depending on the requirement of the semester project, they may achieve deeper insight into single modules of choice.
Course contents	• Built in data types: int, float, strings, tuples, lists, dictionaries • Loops and flow control structures • Input/Output statements • Classes and elements of object-oriented programming • Most common modules: numerical (math, numpy, scipy), graphical (matplotlib), system interface (os), gui management (tkinter) • Other modules, depending on the specific requirements of the semester project

Recommended literature	• Schell, Scott: Introduction to Python for scientific computing, https://sites.engineering.ucsb.edu/~shell/che210d/python.pdf • Milliken, Connor: Python projects for beginners, https://link.springer.com/book/10.1007%2F978-1-4842-5355-7 • Romano, Fabrizio: Learn Python Programming, https://ebookcentral.proquest.com/lib/th-deggendorf/detail.action?docID=5446038 • Schell, Scott: Introduction to Numpy and Scipy, https://sites.engineering.ucsb.edu/~shell/che210d/numpy.pd
Teaching methods	This course focuses on the practical side of programming and relies on a hands-on approach. Syntactical basics and logical structures will be introduced according to the reference literature. They will be exemplified during the lecture by solving targeted programming tasks. Programming competence will be further trained within regular exercises and in the scope of the semester project. The latter consists of a programming task of moderate to intermediate complexity on a topic of free choice. It might foresee the usage of additional libraries (modules), if convenient for the specific application.
Assessment method	Semester project and presentation of the results
Language of instruction	English
Prerequisite	None

Advanced Modelling and Simulation

Course title	Advanced Modelling and Simulation
ECTS	5
Course type	Seminar
SWS	4
Semester	Summer
Workload in hours	Attendance: 60 / Self-study: 90 / Total: 150
Lecturer	Prof. Dr. Mathias Hartmann
Course objectives	The content of "Advanced Modelling and Simulation" enables students to select and design models of technical systems and processes for different applications. The technical and methodological skills described below are taught for this purpose. After completing the Advanced Modelling and Simulation module, students will be able to • model technical systems using simple balancing approaches • select the required methods from the methods learned for experimental modelling and incorporate them into a modelling process • apply methods for the experimental generation of models of dynamic systems, state machines and machine learning and analyse the model results in a targeted manner • assign and use the generated models to simulation tools in a suitable manner In the module Advanced Modelling and Simulation, the following competences are to be taught:

	Professional competence: • Understanding and applying methods of experimental modelling of dynamic systems • Consolidation (synthesis) of the model-building methods to complex overall models • Understanding and applying methods of machine learning, especially artificial neural networks in the modelling process • Understanding different approaches to the design of simulation systems **Methodological competence:** • Application of state machines for the modelling of technical systems • Verification (evaluation) of modelling results • Application of generated models in suitable simulation systems • Assessment of the suitability of models for the phases of a product development process. **Personal competence:** • Solution of complex modelling and simulation tasks **Social competence:** • The students are able to look at the problems from different perspectives and to use their competences acquired in the module situation appropriately in individual and group discussions.
Course contents	The digital transformation of industrial processes relies heavily on the availability of suitable models. These models are used in virtual product development, in the digitalisation of plant operation and maintenance, but also in the virtual description of processes, e.g. in control systems or material flows. The focus of this course is therefore on the modelling of technical systems as a basis for system simulation.
Recommended literature	• Wernstedt J.: Experimentelle Prozeßanalyse. Oldenbourg-Verlag, 1989. • Kramer U., Neculau M.: Simulationstechnik. Hanser-Verlag,

	1998 • Litz L.: Grundlagen der Automatisierungstechnik. Oldenbourg-Verlag, 2005. • Robert L. Woods, Kent L. Lawrence: Modeling and Simulation of Dynamic Systems. Prentice Hall, 1997 • Ljung, Lennart. System Identification: Theory for the User, 2/E. Prentice Hall, 1999
Teaching methods	Lecture
Assessment method	Written examination (90 min)
Language of instruction	English
Prerequisite	Formal: None Material: Knowledge of systems theory of linear systems, knowledge of physical principles of electrical and mechanical systems

Engineering Mechanics 3: Dynamics

Course title	Engineering Mechanics 3: Dynamics
ECTS	5
Course type	Lectures with Tutorials
SWS	4
Semester	Summer
Workload in hours	Total: 120 / In-class: 60 / Self-study: 60
Lecturer	Prof. Dr. Christian Bongmba
Course objectives	The main aims of the course are: For the students to understand the effect of forces and moments on the motion of mechanical systems. For them to be able to mathematically describe the motion of a particle and a rigid body in an inertial as well as in a moving frame. For the students to have a good understanding of the laws and principles of dynamics (Newton's second law, Newton-Euler equations, d'Alembert's principle, work-energy theorem) and to be able to formulate these laws mathematically. For them to be able to derive the equations of motion of a particle or a rigid body using the laws and principles of dynamics. For the students to understand how to create mechanical models of technical systems and to use dynamics in solving problems related to these technical systems.

Course contents	Kinematics of a Particle Laws of Dynamics Dynamics of a Particle Relative Motion General Motion of a Rigid Body Rigid Bodies in Plane Motion Elementary Impact Dynamics Mechanical Vibrations
Recommended literature	Dietmar Gross, Werner Hauger, Jörg Schröder, Wolfgang Wall, Sanjay Govindjee: Engineering Mechanics 3, Dynamics. Springer, 2011, ISBN: 9783642140198 Hibbeler, Russell C: Engineering Mechanics: Dynamics. 12th ed. Prentice Hall, 2009. ISBN: 9780136077916.
Teaching methods	Lectures and Tutorials
Assessment method	Written examination, 90 min.
Language of instruction	English
Prerequisite	Calculus Statics Mathematics

Introduction to Quality Management

Course title	Introduction to Quality Management
ECTS	4
Course type	Lecture
SWS	3
Semester	Winter and summer* (*won't be offered in the summer semester 2025)
Workload in hours	Total: 60 / In-class: 30 / Self-study: 30
Lecturer	N.N.
Course objectives	Quality management (QM) is an indispensable tool not only in production environments but in all aspects of commerce. This course aims to provide students with basic knowledge about QM techniques and their applications.
Course contents	• What is 'quality'? • Historical context of quality management • Financial aspects of quality management • Quality techniques and their applications • Process control techniques
Recommended literature	• Imai, Masaaki: Gemba Kaizen, 2nd ed., McGraw-Hill, New York, 2012 • Chalkiadakis, Ioannis: New Product Development with the Use of Quality Function Deployment, Lambert, Mauritius, 2019 • Montgomery, Douglas C.: Introduction to Statistical Quality Control, Wiley, New York, 2019
Teaching methods	Lectures with discussions and presentations

Assessment method	Written paper to be presented in class
Language of instruction	English
Prerequisites	None

Chemistry

Course title	Chemistry
ECTS	4
Course type	Lecture
SWS	4
Semester	Winter
Workload in hours	Total: 150 / In-class: 60 / Self-study: 90
Lecturer	Prof. Dr. Jeff Wilkesmann
Course objectives	On successful completion of this module, students should • know the basic concepts and terms of general chemistry (Knowledge) • understand the language of chemistry (symbols, formula, equations, solution, concentrations). (Knowledge) • be able to sketch basic inorganic reactions (Comprehension) • integrate know-how with importance and application of chemistry for every day's life (skills) • Ability to understand chemical problems and translate them into equations and apply the principles of chemistry to solve the problems (skills) • Understand possible material-dependent challenges that arise in product and process development (competences)

	• develop social skills to communicate with peers about a complex topic and find a common solving-oriented approach (competences)
Course contents	atomic structure: atoms, elements and compounds, atomic models; periodic table of elements.; chemical bond: covalent, ionic, metal; definition of the chemical equilibrium; acid and base chemistry: pH-values, strong and weak acids and bases, neutralization, calculation of buffer solutions; redox reactions: definition of oxidation und reduction, making-up redox reactions, corrosion processes; electrochemistry: standard reduction potentials, electrolysis, electrolytic cells. Chemical reactions, reaction kinetics. Principles of organic chemistry.
Recommended literature	Petrucci's General Chemistry: Principles and Modern Applications; (2023) ISBN: 978-1-292-45786-4 Robert C. Fay, John E. McMurry, Jill Kirsten Robinson Atoms First Chemistry, Global Edition (2020) ISBN: 978-1-292-33626-8 Brown, Chemistry: The Central Science (2017)
Teaching methods	Lectures / Course teaching / exercises /tutorials / experimental demonstrations
Assessment method	Written examination, 90 min.
Language of instruction	English
Prerequisites	None

Computation in C

Course Title	Computation in C
ECTS	5
Course type	Lecture
SWS	4
Semester	Summer
Workload in hours	150
Name of lecturer	Prof. Dr. Thomas Stirner
Course objectives	Knowledge of basic software-engineering methods; ability to use an integrated software development environment; ability to use the programming language C; basic understanding of the precompile; ability to implement algorithms in the programming language C
Course contents	Software-engineering methods; computer architecture; precompile; data types; declarations; arithmetic, relational and logic operators; decisions; loops; functions; pointers; arrays; structures; dynamic memory allocation
Recommended literature	Kernighan and Ritchie, The C programming language, Prentice Hall
Teaching methods	Lectures, exercises
Assessment method	Written examination (60 min)

Language of instruction	English
Preqrequisite	None

Projects in Science and Engineering

Course title	Projects in Science and Engineering
ECTS	6
Course type	Project
SWS	4
Semester	Winter and summer
Workload in hours	180
Lecturer	Prof. Dr. Thomas Stirner
Course objectives	Knowledge of project management; analysis, distribution and solution of the tasks in a small team; obtaining and presenting results; practical application of the theoretical knowledge base; communication and team skills; strategic planning; time-management skills; problem-solving skills
Course contents	Projects or part of a project may be of a theoretical nature (e.g. literature review, software development, data mining, etc.) or of an experimental nature (e.g. design of experiment, measurements, etc); project descriptions will be made available at the beginning of the semester; teams will be built to solve the tasks; each team will work on project results, which will be presented in written form and orally
Recommended literature	Specific to the project

Teaching methods	Supervision
Assessment method	Written report and oral presentation
Language of Instruction	English
Prerequisites	None

Advanced Projects in Science and Engineering

Course title	Advanced Projects in Science and Engineering
ECTS	6
Course type	Project
SWS	4
Semester	Winter and summer
Workload in hours	180
Lecturer	Prof. Dr. Thomas Stirner
Course objectives	Deeper knowledge of project management; further analysis, distribution and solution of advanced tasks in a small team; obtaining and presenting results; extensive practical application of the theoretical knowledge base; enhanced communication and team skills; strategic planning; time-management skills; problem-solving skills
Course contents	Advanced projects or part of an advanced project may be of a theoretical nature (e.g. literature review, software development, data mining, etc.) or of an experimental nature (e.g. design of experiment, measurements, etc.); project descriptions will be made available at the beginning of the semester; teams will be built to solve the advanced tasks; each team will work on project results, which will be presented in written form and orally
Recommended literature	Specific to the project

Teaching methods	Supervision
Assessment method	Written report and oral presentation
Language of Instruction	English
Prerequisites	Projects in Science and Engineering

Projects in Industrial Engineering

Course title	Projects in Industrial Engineering
ECTS	6
Course type	Project
SWS	4
Semester	Winter and summer
Workload in hours	180
Lecturer	Prof. Dr. Jutta Stirner
Course objectives	Knowledge of project management; analysis, distribution and solution of the tasks in a small team; obtaining and presenting results; practical application of the theoretical knowledge base; communication and team skills; strategic planning; time-management skills; problem-solving skills.
Course contents	Projects or part of a project may be of a theoretical nature (e.g. literature review, data mining, etc.) or of analytical nature (e.g. business plan, etc.); project descriptions will be made available at the beginning of the semester; teams will be built to solve the tasks; each team will work on project results, which will be presented in written form.
Recommended literature	Specific to the project

Teaching methods	Supervision
Assessment method	Written report
Language of instruction	English
Prerequisites	None
Miscellaneous	Max. 10 participants

Advanced Projects in Industrial Engineering

Course title	Advanced Projects in Industrial Engineering
ECTS	6
Course type	Project
SWS	4
Semester	Winter and summer
Workload in hours	180
Name of lecturer	Prof. Dr. Jutta Stirner
Course objectives	Deeper knowledge of project management; further analysis, distribution and solution of advanced tasks in a small team; obtaining and presenting results; extensive practical application of the theoretical knowledge base; enhanced communication and team skills; strategic planning; time-management skills; problem-solving skills
Course content	Advanced projects or part of an advanced project may be of a theoretical nature (e.g. literature review, data mining, etc.) or of a statistical nature (e.g. data analysis etc.); project descriptions will be made available at the beginning of the semester; teams will be built to solve the advanced tasks; each team will work on project results, which will be presented in written form.
Recommended literature	Specific to the project: Google Scholar, Science Direct via THD library

Teaching methods	Supervision
Assessment method	Written report
Language of Instruction	English
Prerequisites	Projects in Industrial Engineering

Communication and Presentation Techniques

Course title	Communication and Presentation Techniques
ECTS	2
Course type	Lecture
SWS	2
Semester	Summer
Workload in hours	Time of attendance: 30 hours self-study: 30 hours Total: 60 hours
Lecturer	Prof. Dr. Jack Bauersachs / Carolin Helmreich
Course objectives	The main goal is to improve students listening, speaking and presentation skills through theory, observation, practice and group feedback. They also learn to argue in debating sessions. Besides this they will develop the skills that are necessary to prepare presentations, to speak with confidence and to plan and use visual aids effectively. Students learn what communication is, how culture, language choices and non-verbal clues affect the image presented, how to organize a message, how to make persuasive presentations. Students also learn how to be effective listeners and give qualified feedback.
Course contents	The course covers communication and feedback, body language, organizing thoughts and data, voice, non-verbals and audience interaction and visual aids. Students are expected to incorporate the following themes into their presentations: – Basics of successful presentations – How to use visual aids including PowerPoint

	– How to avoid over-presenting with PowerPoint and other media – The logistics of presenting – What to do when things go wrong Students will develop and improve these skills during debates: – What constitutes effective leadership behavior? – How to give and receive feedback in a debate? – What are some obstacles to effective communication and how these can be overcome? – What does a presenter need to know about nonverbal communication? – When is assertive behavior appropriate in communicating? – What are the elements of persuasive presentations? – What are effective response styles? – How to argue convincingly? – How can a verbal confrontation produce its intended result? – What are effective ways to organize a message?
Recommended literature	The Presenter's Fieldbook: A Practical Guide (Christopher-Gordon New Editions) Third Edition, 2018 by Robert J. Garmston The Exceptional Presenter: A Proven Formula to Open Up and Own the Room by Timothy J. Koegel
Teaching methods	The course is conducted like a professional workshop. Students begin by making short presentations on a variety of theoretical and practical topics related to oral presentations and communication techniques. After individual feedback and coaching and discussion rounds with peers, students then evaluate a professional presentation and develop guidelines for improving their own subsequent presentations. Students also participate in a workshop to learn the principles of debating techniques. Students get the opportunity to practice in a small group forum.
Assessment method	oral examination, oral ex. 15 min.
Language of instruction	English

Prerequisites	None

Global Leadership

Course title	Global Leadership
ECTS	5
Course type	Lecture
SWS	4
Semester	Summer
Workload in hours	Total: 150 / In-class: 60 / Self-study: 90
Lecturer	Matthias Koeppen
Course objectives	tba
Course contents	tba
Recommended literature	tba
Teaching methods	tba

Assessment method	tba
Language of instruction	English
Prerequisites	tba