Table of Contents

German A1/ Parts 3 and 4

Course title	German A1/ Parts 3 and 4
ECTS	4
Course type	Course with exercises
SWS	4
Semester	Winter and summer
Workload in hours	60 hrs
Lecturer	Dr. Virginia Wallner
Course objectives	• Can understand and use familiar expressions and very basic phrases aimed at meeting concrete everyday needs • Can introduce themselves and others and ask other people questions about their person • Can communicate in a simple way if the other person speaks slowly and clearly and is willing to help http://www.europaeischer-referenzrahmen.de
Course contents	• Grammar – Prepositions – Possessives – Dative verbs – The imperative-Simple past 'war/ hatte' – The perfect form – Word formation – Subjunctive II • Topics – Apartments and houses – Parts of the body – Describing people and their character – Household activities – Weather – Holidays and celebrations

Recommended literature	Menschen. Deutsch als Fremdsprache. Kursbuch A1.2 Hueber. Kapitel 13-24 ISBN 978-3-19-561901-1 Menschen. Deutsch als Fremdsprache. Arbeitsbuch A1.2 mit Audio-CD. Hueber. Kapitel 13-24 ISBN 978-3-19-511901-6
Teaching methods	• Partner and group work • Explanation of topics by the lecturer • Presentations and discussions • Feedback from the lecturer • Listening exercises
Assessment method	Written examination, 90 min.
Language of instruction	German
Prerequisites	Successful completion of Level A1/Parts 1 and 2 (88121)

Course descriptions for German language courses at higher 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 http://www.europaeischer-referenzrahmen.de/
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.
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

Basics of International Sales and Business Development

Course title	Basics of International Sales and Business Development
Course ID	268
ECTS	2
Course type	Lecture with group work and presentations
SWS	2
Semester	Winter and summer
Lecturer	Ibrahim Waked
Course objectives	General knowledge of international sales and strategic business development mechanisms. As well as profound analysis of practical case studies.
Course contents	• Basics of sales and business development • Analysis of market potential including cultural & political aspects, correlation between microeconomic and demographic aspects, (PESTELO analysis) • Relevancy of world bank reports on general economic performance and their implementation in company BD strategy • Market entry and risk management
Recommended literature	**Strategic Management** by Richard Lynch von Pearson Longman **Business Development Management** By Lutz Becker, Walter Gora, Tino Michalski
Teaching methods	Lecture with integrated project development examples
Assessment method	Presentation and seminar paper
Language of instruction	English

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 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

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

Scientific Communication

Course title	Scientific Communication
ECTS	2
Course type	Elective
SWS	2
Semester	Summer
Workload in hours	Total: 60 / In-class: 30 / Self-study: 30
Lecturer	Prof. Dr. Jeff Wilkesmann
Course objectives	Knowledge: • learn to manage a range of resources and skills for effective communication of complex scientific material • learn how to appropriately summarize, paraphrase and reference research content and avoid plagiarism • Scientific communication types and techniques • Presentation Techniques Skills: • learn to cultivate practical communication skills, with particular emphasis on effective writing Competencies: • undertake a substantial practical project in science writing • prepare a poster and perform a scientific pitch
Course contents	• Systematic literature review: Definition of research question/eligibility criteria. Development of search strategy. Title/abstract/full text screening. Data extraction/quality assessment. Synthesis of results/meta-analysis • Scientific Communication: The Different Scientific Communication Ways. Scientific writing. Avoiding plagiarism, fabrication and falsification. The good style of writing. Paraphrasing, Summarizing, Referencing. Good and bad practice examples.

	Scientific Style Conventions. Graphics & Multimedia. Tables. References. Editorial Style Conventions. Effective Writing & Word Usage. Grammar, Punctuation, & Spelling. General Style Conventions. Numbers, Mathematics, & Units of Measure. Inclusivity Style. General Guidelines. Age. Disabilities, Disorders, & Other Health Conditions. Gender & Sexuality. Race, Ethnicity, & Nationality. • Ethics in Scientific Publication. Communicating Safety Information. Intellectual Property: Copyright, Permissions. Scientific misconduct. Forms of scientific misconduct (fabrication, falsification, plagiarism, …). Motivation to commit scientific misconduct. Responsibility (author, institutions, journals) • Science and Engineering publishing. Journal landscape and selection. Publication impact assessment (Impact factors, H-index). Authorship. Submission/review process. Writing about Your Research: Best Practices. Selecting a Scientific Journal. Organization of Your Research Article. Submission Procedures. Peer Review. • Scientific communication pitching. Preparation of an oralvpresentation and pitching session.
Recommended literature	**Textbook:** Introduction - The ACS Guide to Scholarly Communication (ACS Publications) https://pubs.acs.org/page/acsguide eISBN: 978-0-8412-3583-0 DOI: 10.1021/acsguide **Recommended literature:** • annex-9-inclusive-communication-guidelines-of-the-european-parliament.pdf (europa.eu) • Inclusive communication in the GSC - Publications Office of the EU (europa.eu) • Small Bus Econ (2016) 47:53–76 DOI 10.1007/s11187-016-9700-6
Teaching methods	Seminars constructed like workshops in combination with teamwork and team presentation.
Assessment method	Written assignment & presentation incl. Q+A Session
Language of instruction	English

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

Introduction to Geotechnical Engineering

Course title	Introduction to Geotechnical engineering
ECTS	3
Course type	Lecture and exercises Presentations Discussion
SWS	2
Semester	Winter and summer
Lecturer	Prof. Dr.-Ing. P. Sadegh Azar
Course objectives	This unit of study aims to introduce you to the fundamentals and basic techniques used in Foundation Engineering. Specifically, it will provide you with the design and construction principles used in Foundation Engineering type structures such as earth retaining structures, sheet piles and shallow footings according to European standards (EC 7). Some of the important topics that students will learn during the course: 1. Analyse earth retaining structures to determine active, passive and at rest lateral earth pressures (and associated forces). 2. Design the dimensions of retaining gravity and cantilever walls and assess the stability of these designed walls. 3. Determine the appropriate section of sheet piles and the depth of embedment, maximum moment, and the tension in tie rod in case of using anchored sheet piles. 4. Analyse bearing capacity of soils under shallow footings. 5. Design shallow footings based on dimensions, thickness, area and length. 6. The basics for determining the bearing capacities of single piles. Students will get acquainted to several geotechnical problems and documentation of geotechnical problems. Upon successful completion of the course, students should be able to apply fundamentals of foundation engineering

	and principles of geotechnical engineering in the analysis, design, and construction of civil engineering projects.
Course contents	The subject will give an introduction to: • Introduction to design according to EC 7 • Bearing capacity of foundations • Excavation shoring methods • Introduction to pile design • Uplift and hydraulic failure • Slope stability
Recommended literature	B. M. Das, "Principles of Geotechnical Engineering", David F. McCarthy, "Essentials of Soil Mechanics and Foundations" Prentice Hall. R. D. Holtz, W. D. Kovacs, and T. C. Sheahan "An introduction to Geotechnical Engineering", Prentice-Hall. Braja M. Das, Principles of Foundation Engineering, Sixth Edition, 2007. C. Liu and J. B. Evett, "Soils and Foundations", Prentice Hall. Donald, P. Coduto, Foundation Design Principles and Practices, Second Edition. Bowles, Foundation Analysis and Design
Teaching methods	This course is a comprehensive course of integrating theory and practice. For each of the above topics, students will • first understand the theoretical background (lecture), • then the students get to solve a related problem (exercise), • followed by practical application samples and further cases of using the theoretical background in practice
Assessment method	Written exam
Language of instruction	English
Prerequisites	Soil mechanics

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	
Teaching methods	Lesson / practical work
Assessment method	Written examination, 90 min.
Language of instruction	English
Prerequisites	Elementary calculus

Water Management

Course title	Water Management
ECTS	5
Course type	Lecture and exercises, Presentation, Discussion
SWS	4
Semester	Summer semester
Workload in hours	Total: 150 / In-class: 60 / Self-study: 90
Lecturer	Prof. Dr. Wolfgang Rieger
Course objectives	At the end of the module, students will be able - to understand the dominating water related processes in the catchment scale, - to understand the concepts of integrated water resources management and flood risk management, - to understand the effects of climate change and anthropogenic interventions on hydrological processes and river basins, - to apply assessment and calculation approaches for water management in the catchment scale, - to apply a rainfall-runoff model.
Course contents	- Hydrological processes, climate change and anthropogenic effects in the catchment scale - Integrated Water Resources Management (IWRM): o Theory and History o Blue-Green-Water-Concept o Organization, System scales o Implementation, recent and former examples - Flood Risk Management (FRM): o Safety and Risk o Cycle of Risk Management o Content and meaning of EU-FloodRiskManagementDirective (FRMD) o Types of flood protection measures - Calculation approaches (including hydrological modelling): o Runoff generation processes in the catchment scale

	○ Statistical methods to derive discharge parameters ○ Planning and designing flood protection measures
Recommended literature	The following documents / websites give an introduction to several topics of the module: - Water Resources System Planning and Management (Daniel P. Loucks, Eelco van Beek, 2017, ISBN978-3-319-44232-7) - Technical Background Papers on water resources management in various languages, written by the GWP Technical Committee (2000 – 2017, https://www.gwp.org/en/learn/KNOWLEDGE_RESOURCES/Global_Resources/background-papers/) - The EU Floods Directive - https://environment.ec.europa.eu/topics/water/floods_en - International Commission for the Protection of the Danube River (ICPD) - http://www.icpdr.org/main/ - Merz, B., J. Hall, M. Disse, and A. Schumann. "Fluvial Flood Risk Management in a Changing World." Natural Hazards and Earth System Science 10, no. 3 (March 16, 2010): 509–527. doi:10.5194/nhess-10-509-2010. - Bründl, M., Romang, H.E., Bischof, N., Rheinberger, C.M., 2009. The risk concept and its application in natural hazard risk management in Switzerland. Further literature recommendations will be given during the lecture.
Teaching methods	Lecture with presentations and exercises
Assessment method	Written examination, 90 min.
Language of instruction	English
Prerequisites	Mathematics

Advanced Modelling and Simulation

Course title	Advanced Modelling and Simulation
ECTS	5
Course type	Seminar
SWS	4
Semester	Summer
Workload in hours	Attendance: 40 / Self-study: 80 / Total: 120
Name of instructor	Prof. Dr. László Juhász
Course objectives	General Objectives: • Demonstration of methods of parameter identification and parameter estimation of linear time-invariant systems • Explanation and classification of different simulation methods of mechatronic systems Competencies: • Students will be able to choose between identification methods or parameter estimation methods and apply them to the given situation. • Simulation methods are used to verify the identification results. • Identification methods and simulation methods are integrated into a complete system analysis.
Course contents	• System identification through parameter identification • System identification through parameter estimation • Simulation method for dynamic systems • Simulation method for event-driven systems • Coupled simulation method (HIL, interfaces in simulation systems)
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

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.pdf
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

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 the Finite Element Method

Course title	Introduction to the Finite Element Method with NASTRAN & PATRAN
ECTS	4
Course type	Lectures with workshops
SWS	4
Semester	Winter and summer
Workload in hours	Total: 120 / in-class: 40 / Self-study: 80
Lecturer	Prof. Dr. Christian Bongmba
Course objectives	The main aim is to introduce students to the direct stiffness method. They learn how to derive the stiffness matrices for springs, bars, beams, two- and three-dimensional finite elements. The workshops introduce students to MSC NASTRAN and PATRAN. Students learn how to use PATRAN for pre- and post-processing and NASTRAN as a solver. They learn how to import geometry into PATRAN, carry out the discretization, define material and section properties and boundary conditions and set up a finite element analysis.
Course contents	1. Introduction – What is the Finite Element Method? 2. Discretization examples 3. Development of truss element 4. Development of beam element 5. Two-dimensional elements 6. Three-dimensional elements 7. Workshops with MSC NASTRAN und PATRAN linear static, normal modes and buckling
Recommended literature	Logan, Daryl L.: A First Course in the finite Element Method, CENGAGE Learning 2012.
Teaching methods	Lectures, workshops and videos

Assessment method	Written examination, 60 min.
Language of instruction	English
Prerequisites	Statics, Strength of Materials

Introduction to Solidworks (CAD)

Course title	Introduction to Solidworks (CAD)
ECTS	3
Course type	Lecture with CAD exercises
SWS	2
Semester	Winter and summer
Workload in hours	Total: 90 / In-class: 30 / Self-study: 60
Lecturer	n.n.
Course Objectives	Students are able to apply Solidworks CAD system for product development
Course Contents	• Overview and menus • Sketch elements, tolerance, dimensioning • Modeling single parts • Modeling assemblies • Modeling welded parts • Simulations
Teaching Methods	Supervised CAD exercises at PCs
Assessment Method	Written examination, 90 min.
Language of Instruction	English
Prerequisites	Basics of design and product development

Advanced Solidworks (CAD)

Course title	Advanced Solidworks (CAD)
ECTS	3
Course type	Practical exercises with CAD system Solidworks
SWS	2
Semester	Winter and summer
Workload in hours	Total: 90 / In-class: 30 / Self-study: 60
Lecturer	n.n.
Course objectives	Students are able to apply Solidworks CAD system for more complex product development
Course contents	• Loft boss/base techniques • Spline functions • Surface modelling tools and techniques • Sheet metal parts • Advanced mechanical mates for assemblies
Recommended literature	Solidworks online help
Teaching methods	CAD exercises / practical work
Assessment method	Written examination, 90 min.
Language of instruction	English
Prerequisites	Basic knowledge of design and product development

Introduction to Quality Management

Course title	Introduction to Quality Management
ECTS	4
Course type	Lecture
SWS	3
Semester	Winter and summer
Workload in hours	Total: 60 / In-class: 30 / Self-study: 30
Lecturer	Prof. Dr. Christian Wilisch
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

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 content	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 content	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 content	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

Online Sales

Course title	Online Sales
ECTS	5
Course type	Lecture
SWS	4
Semester	Summer
Workload in hours	Total: 150 / In-class: 60 / Self-study: 90
Lecturer	Donya Byrtus
Course objectives	The main objective of the course is to give the students a general understanding how digital sales and marketing works. The course will combine classical marketing principles and combine that knowledge with the new developments such as social media and new ways of digital marketing such as performance marketing to equip the students with an understanding of new ways to market and sell online and how to develop a digital sales strategy.
Course contents	Among other topics in the course we will look into the following subjects: - Understanding basic principles of SEO - How to successfully create online offerings - How to create a sales funnel - How to promote and sell products online via omni-channel marketing - How to use performance Marketing Recommended Literature

Recommended literature	Digital Marketing Strategy: An Integrated Approach to Online Marketing by Simon Kingsnorth Digital Marketing by Dave Chaffey & Fiona Ellis-Chadwick Brand Storytelling: Put Customers at the Heart of Your Brand Story by Miri Rodriguez Digital Branding by Daniel Rowles
Teaching methods	The teaching method consists of theoretical input in form of lectures and there will be group work as well as presentations.
Assessment method	Written paper
Language of instruction	English
Prerequisites	None