DEGGENDORF INSTITUTE OF TECHNOLOGY

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German A1 / 2 + 3 + 4

Course title	German A1 / Parts 2, 3 and 4
Course ID	83141
Person in charge	Dr. Virginia Wallner
Type of course	Lecture with exercises – **compulsory for GE students**
Course of studies	For exchange students (GE)
Level of course	Beginner A1 (in accordance with CEFR)
Prerequisites	• Knowledge of the own native language's basic grammar categories (verbs, nouns, adjectives, subjects, direct objects • German basics (spelling, greeting, introducing, numbers)
SWS	6
ECTS	6
Workload	Total: 180 / In-class: 70 / Self-study: 110
Assessment methods	Written test (90 min.)
Language of Instruction	German
Course Objectives	• Can understand and produce some familiar and daily expressions used in very recurring situations of communication as well as very simple statements aiming at satisfying certain concrete needs of the social life • Can identify himself and answer questions concerning, for example, his nationality, his age, his place of

	residence, his school and possibly, to ask himself questions of this type to somebody • Can participate in an ordinary interaction, at least partially, by means of simple statements (centered on one or two words) also by using his mother tongue or other acquired languages tongues if the interlocutor speaks slowly and clearly and shows himself co-operative and friendly
Course contents	• Grammar o Modal verbs/ sentence brackets o Positions of a verb in a sentence o Prepositions o Separable verbs o The perfect form with 'haben/ sein' o Possessives o Dative verbs o The imperative o Simple Past 'war/ hatte' o The perfect form o Subjunctive II • Topics o Free time activities o Food stuff and meals o Means of transport and vacation o Apartments and houses o Parts of the body o Describing people and their character o Household activities o Weather o Holidays and celebrations
Teaching methods	Introduction and explanation of topics by lecturer, partner and group work, feedback for partner and group work by lecturer, listening comprehension exercises
Recommended literature	Menschen. Deutsch als Fremdsprache. Kursbuch A1.1 mit Lerner DVD-ROM. Hueber. Kapitel 7-12 ISBN 978-3-19-301901-1 Menschen. Deutsch als Fremdsprache. Arbeitsbuch A1.1 mit Audio-CD. Hueber. Kapitel 7-12 ISBN 978-3-19-311901-8

	Menschen. Deutsch als Fremdsprache. Kursbuch A1.2 mit Lerner DVD-ROM. Hueber. Kapitel 13-24 ISBN 978-3-19-501901-9 Menschen. Deutsch als Fremdsprache. Arbeitsbuch A1.2 mit Audio-CD. Hueber. Kapitel 13-24 ISBN 978-3-19-511901-6
Miscellaneous	Students must attend a minimum of 75% of classes and take all final exams in order to obtain the certificate of achievement for the course.

English for GE Students B2

Course title	English for General Engineering Students
Course ID	10491
Level of course	This course is B2, meaning students should already have a basic understanding of the English language. They should be able to write about and discuss various ideas and concepts.
ECTS	2
Course type	Language Training Course
SWS	2
Semester	Winter and summer
Workload in hours	Total: 60 / In-class: 30 / Self-study: 30
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: • Numbers and mathematical operations • Shapes and dimensions

	• 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 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 + listening section) No dictionaries are allowed. Exam structure: - Part 1: Listening comprehension(s) 2-5 minutes - 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 August 2017 Industries. Hampshire: Heinle, Cengage Learning, 2010. Print. Dunn, Marian, David Howey, and Amanda Ilic. English for Mechanical Engineering in Higher Education Studies Course-book. Reading: Garnet Education, 2010. Print. engine: Englisch für Ingenieure. <www.engine-magazin.de> (Darmstadt). Various issues. Print. Foley, Mark, and Diane Hall. MyGrammarLab. Harlow: Pear-son, 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 Engi-neers. Wiesbaden: Vieweg + Teubner Verlag, 2008. Print. Ibbotson, Mark. Cambridge English for Engineering. Cam-bridge: 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-Lehrmittle, 2013. Print. Murphy, Raymond. English Grammar in Use. Cambridge: Cam bridge UP, 2004. Print. Schäfer, Wolfgang. Construction Milestones: Englisch Für Bau-, Holz- Und Anlagenberufe. Stuttgart: Klett, 2013. Print. Wagner, Georg, and Maureen Lloyd. Zörner. Technical Gram-mar and Vocabulary: A Practice Book for Foreign Students. Berlin: Cornelsen, 1998. Print.
Language of instruction	English
Prerequisite	B1 / A-levels / school leaving certificate giving right of en-try to higher education / 7-9 years of English

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

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

Intercultural Training for Germany and Bavaria

Course title	Intercultural Training for Germany and Bavaria
ECTS	1
Course type	Elective but **compulsory** for GE exchange students
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	Participation, Quiz and Presentation
Language of instruction	English/German
Prerequisite	None
Miscellaneous	Requirement for the participation in the elective (AWP) "Bavarian Culture"

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.

Cross-Cultural Team Building

Course title	**Cross-Cultural Team Building Workshop**
Course ID	291
Lecturer	Prof. Dr. Johann Nagengast
Course type	Elective
SWS	2
Semester	Winter and summer
ECTS	2
Assessment method	Seminar paper
Course language	English
Course objectives	Globalisation demands that managers possess the basic skills required to work together in international teams. Many companies actively encourage the development of these skills through teambuilding or team development programs. Especially for change management, team development plays an increasingly important role. Here the critical goal is to optimise how the group members work together as a team. Key factors affecting a team's success include organisation, structures, processes, culture and relationships. International Team Building is conducted at the beginning of the semester as a three day off-campus seminar. The hands-on, outdoor training gives the students intensive exposure to the multifaceted nature of group dynamics. By working together to solve complex problems and through structured feedback sessions, the participants become sensitised to the rolls they assume in group interactions, to the limitations imposed by the German and their own cultures, and to the conditions required for effective team work.

	The course supports the integration of foreign students into campus and social life and helps build lasting working relationships among all participants. The skills of giving and receiving of feedback are learned in the protective atmosphere of small groups through intensive exchanges between instructors and participants. This leads to improved observation and communication skills. Moreover, the group members continually switch roles. This promotes a deeper understanding of social interaction, helps members to reflect on their contribution to the group process, encourages members to experiment with new behavioural concepts, and improves the group's capacity to co-operate and perform. Final feedback rounds offer the possibility to align the members' self-images with the perception others have of them, to reduce "blind spots", to increase self-confidence and their ability to reflect. The capacity to give appropriate feedback in various situations, to monitor one's self image as well as the consequences of one's own behaviour form the basis for a successful career in management.
Course contents	Group dynamics, processes and structures in groups; Roles in groups (roles in tasks and supporting roles); Group leadership; Effect of one's actions in groups; The "give and take" of feedback; Self-image and how others see you; Communication levels (content versus relationship); Conditions for successful co-operation; Cultural influences on teamwork. Note: The main emphasis of this course is not the conveyance of theoretical knowledge, but rather learning directly from experience. The theories on which the intervention and evaluation sessions are based are taught in the course "Human Resources Management".
Teaching methods	This course is organised as an interactive experience and activity based training program. With the help of complex tasks, timed interaction activities combined with elements of surprise, classical outdoor training exercises, moderated feedback and reflection sessions, participants are taught the necessary conditions for effective teamwork. The teaching methods are based on the principles of self-organised learning. The instructors define their roles in terms of Schein's model of process consulting.

	They intervene by questioning the participants in a manner designed not only to examine their perspectives, but to introduce new perspectives and stimulate the group's creative process. The responsibility for these process remains with the participants. In the context of the learning environment, the students enjoy the opportunity to increase their observation, communication, co-operation, self-reflection, teamwork and management skills as well as their self-confidence. In addition, the course offers the students the chance to network and develop sustainable work relationships at the start of their studies.
Suggested Literature	Baron, R. S.: Group Process, Group Decision, Group Action, 2nd. Ed., Buckingham, 2003; Buchanan, D., Huczynski, A.: Organizational Behavior, 5th Ed., Harlow, 2004; Wagner, M., Waldmann, R.: Vom Outdoor-Training zur Teamentwicklung, Welchen Beitrag leisten Hochseilgärten? in: Jagenlauf, M./Michl, W. (Hrsg.) Erleben und Lernen – Internationale Zeitschrift für handlungsorientiertes Lernen, 1/2004
Notes	The weekend seminar is characterised by team teaching in a mountain hostel. The team consists of Prof. Dr. Nagengast and trained tutors selected from participants in the course „Train the Trainer". The tutors make it possible to conduct the training in small „protected" groups (around 8) and to give qualified feedback.

Asian Emerging Economies

Course title	Asian Emerging Economies and Doing Business in the Asian Region
Course ID	299
ECTS	2
Course type	Elective
SWS	2
Semester	Winter and summer
Lecturer	Dr. (rer.pol.) Wei Manske-Wang
Course objectives	• Establishment of global horizons • Learning knowledge holistically about Asia: political, economic and social; Past, current development up to the future prognosis • Awareness of foreign cultures and understanding their causes • Preparing for the challenges of future professional life in a global environment
Course contents	• Institutions and strategic arrangements in Asia: ASEAN, APEC, BRICS, BRI etc. • PEST country analysis: Japan, China, India etc. • Profound background: culture and philosophy etc. • Hot topics in Asia: industrialization, digitization, megacities, mobility, M&A in Europe etc.

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, Group Work, Q&A
Assessment method	Written exam (60 minutes)
Language of instruction	English
Prerequisite	Thinking outside the box and willingness to learn

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	Presentation of project results
Language of instruction	English
Prerequisites	Fundamentals of Informatics, experience with Windows

Introduction to Soil Mechanics

Course title	Introduction to Soil Mechanics
ECTS	2
Course type	Lecture and exercises Presentations Discussion
SWS	2
Semester	Winter and summer
Lecturer	Prof. Dr.-Ing. Parviz Sadegh Azar
Course objectives	The objective of this course is to introduce the subject of soil mechanics and provide the basics of geotechnical engineering. Some of the important topics that students will learn during the course: soil structure and grain size; identification and classification of soils for engineering purposes; physical and engineering properties of soils; fundamental behaviour of soils subjected to various forces; groundwater and seepage through soils; compaction; consolidation; shear strength; and bearing capacity of soils. Students will get acquainted to several geotechnical problems and documentation of geotechnical observations. Upon successful completion of the course, students should be able to apply fundamentals of soil mechanics and principles of geotechnical engineering in the analysis, design, and construction of civil engineering projects.
Course contents	The subject will give an introduction to: • Classification of soil materials • Stresses and strain in soil • Shear strength of soil • Lateral earth pressure • Primary settlement of soil and calculations • Slope stability • Bearing capacity of foundations • Uplift and hydraulic failure

Recommended literature	R.F. Craig. "Soil Mechanics", Van Nostrand Reinhold Company. B. M. Das, "Principles of Geotechnical Engineering", PWS-KENT. 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. T. W. Lambe and R. V. Whitman, "Soil Mechanics", John Wiley & Sons, Inc. C. Liu and J. B. Evett, "Soils and Foundations", Prentice Hall. S. Prakash, "Fundamentals of Soil Mechanics", S.P. Foundation K. Terzaghi and R. B. Peck, "Soil Mechanics in Engineering Practice", John Wiley & Sons, Inc.
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 examination, 90 min.
Language of instruction	English
Prerequisite	Mathematics

International Contracting

Course title	International Contracting
ECTS	5
Course type	Lecture
SWS	4
Semester	Summer
Workload in hours	Total: 150 / In-class: 45 / Self-study: 105
Lecturer	Prof. Dr.-Ing. Gerd Maurer
Course objectives	Basic understanding of procedures in International Contracting of Construction Projects including Tendering & Project Management Methods
Course contents	Tendering & Contracting Construction Management Cost Estimation Scheduling Techniques
Recommended literature	FIDIC
Teaching methods	Lesson
Assessment method	Written examination, 90 min.
Language of instruction	English
Prerequisite	None

Database Engineering

Course title	Database Engineering
ECTS	5
SWS	4
Semester	Winter and summer
Workload in hours	In-class: 60 hrs. / Self-study: 90 hrs / Total: 150 hrs
Lecturer	Prof. Dr. Wolfgang Dorner
Course objectives	After this module students should • be able to describe the database design process, • know the elements of the Entity-Relationship-Model, • can build an Entity Relationship Model for a specific case, • can normalize a database design, • be able to manage a database through a database management system, • be able to query a database using SQL, • know the core components and functionalities of a database management system.
Recommended literature	Conolly, Thomas M.; Begg, Carolyn E.: Database Solutions - A step-by-step guide to building databases. 2nd Edition. Harlow, Essex: Pearson Education Limited, 2004 Conolly, Thomas M.; Begg, Carolyn E.: Database systems - A practical approach to design, implementation, and management. 4th edition. Addison-Wesley, an imprint of Pearson Education, 2005
Teaching methods	Classes with exercises and practical training Course and document management through E-Learning System iLearn
Assessment method	Written examination, 90 min.

Language of instruction	English
Prerequisite	Basics in Computer Science

Project Management

Course title	Project Management
ECTS	5
Course type	Lecture
SWS	4
Semester	Summer
Workload in hours	Lectures: 60 hours / Self-study: 90 hours / Total: 150 hours
Name of instructor	n.a.
Course objectives	Students get acquainted with the core concepts of (IT) project management. After finishing this module, students are able - to define a project order - to derive requirements and structure them in a specification - to design a project plan and estimate project expenses - to use supporting software tools
Course contents	1. What is a project? 2. Phases of projects 2.1 Project order 2.2 Project planning and project manual 2.3 Project controlling 2.4 Project close out and documentation 3. Tendering 3.1 Perspective of purchaser and contractor 3.2 Requirements engineering 3.3 System specifications 3.4 Agilen Methods 4. Tools 4.1 Visio 4.2 MS Project 4.3 MS Team Foundation Server and interfaces 4.4 Excel in Project management 5. Study project

Teaching methods	Lecture and practical training Practical training is up to 25% of the course. Exercises and training material will be provided as voluntary homework.
Assessment method	Written examination, 90 min.
Language of instruction	English
Prerequisite	None

Advanced Modelling and Simulation

Course title	Advanced Modelling and Simulation
ECTS	4
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	Prof. Dr. Werner Bogner
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.) or examination assignment (seminar paper)
Language of instruction	English
Prerequisite	Basic knowledge of solid state devices (bipolar junction transistors, diodes) Basics of electronic networks **Admission test!**

Batteries and Supercaps

Course title	Batteries and Supercapacitors
ECTS	5
Course type	Lecture
SWS	4
Semester	Winter and summer
Workload in hours	Total: 150 / In-class: 60 / Self-study: 90
Lecturer	Prof. Dr.techn. Michael Sternad
Course objectives	Introducing the participant to the chemistry and technology of electrochemical power sources.
Course contents	Understanding the working principles, the function of involved active materials and the application of important present and potential future electrochemical power sources like e.g. alkaline-, lead-acid-, nickel-metal hydride- and lithium-ion batteries as well as electrochemical supercapacitors.
Recommended literature	Reddy, T. B.; Linden, D., Linden's Handbook of Batteries, 4th ed. Reddy, 2011. Hamann, C.; Vielstich, W., Elektrochemie, Wiley, 1997.
Teaching methods	Lesson
Assessment method	Written examination, 90 min.
Language of instruction	English
Prerequisite	None

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
Language of instruction	English
Prerequisite	Statics, Strength of Materials

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: 150 / In-class: 45 / Self-study: 105
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

Design Methodology/CAD

Course Title	Design Methodology/CAD
ECTS	3
Course type	Lecture with the conduction of CAD project
SWS	2
Semester	Winter and summer
Workload in hours	Total: 90 / In-class: 30 / Self-study: 60
Lecturer	Prof. Dr.-Ing. Karl Hain
Course Objectives	Students are able to apply design methods and rules systematically for product development, especially in the earlier design stages, using CAD for the depiction of solutions.

Course Contents	• Introduction to basics
	• Methodology of the design process
	• Conceptual design
	  ○ Analysis and requirements
	  ○ Functional analysis, function structures and logical considerations
	  ○ Aids and methods for finding solutions
	• Evaluation and selection
	• Rules and principles for embodiment design
	• TRIZ techniques
	• Design examples with CAD

Recommended Literature	Pahl, Beitz et. al.: Engineering Design: A Systematic Approach, 3rd Edition, Springer 2007, ISBN: 978-1-84628-318-5
Teaching Methods	Lecture with integrated product development example with CAD
Assessment Methods	Written examination, 90 min.
Prerequisite	Basics of design and CAD

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	Prof. Dr.-Ing. Karl Hain
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
Prerequisite	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	Prof. Dr.-Ing. Karl Hain
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
Prerequisite	Basic knowledge of design and product development

Principles of Controlling

Course title	Principles of Controlling
ECTS	4
Course type	Lecture
SWS	3
Semester	Summer
Workload in hours	Total: 120 / In-class: 40 / Self-study: 80
Lecturer	Senior Lecturer Gerhard Brauch-Widmann
Course objectives	Knowledge and Usage of the tools of Controlling.
Course contents	Cost Accounting Marginal Costing (Direct Costing) Decisions Capital Budgeting Cost Allocation Sheet Job Costing Balance Sheet Ratios
Recommended literature	None
Teaching methods	Lesson
Assessment method	Written examination, 90 min.
Language of instruction	English
Prerequisite	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
Prerequisite	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
Prerequisite	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
Preqrequisite	None
Miscellaneous	Max. 10 participants

3D Displays

Course title	3D Displays
ECTS	2
Course type	Lecture
SWS	2
Semester	Winter and summer
Workload in hours	Total: 60 / In-class: 30 / Self-study: 30
Lecturer	Prof. Dr. Gerald Fütterer
Course objectives	The use of 3D data acquisition and its visualization plays an increasing role e.g. in industrial measurements, medical examinations, engineering and biological science. The lecture explains basic approaches used within the plurality of existing 3D display technologies. Pros and cons are discussed in regards to discrete applications and embodiments.
Course contents	• Physiological aspects of 3D viewing • Stereoscopic displays • Auto-stereoscopic displays • Volumetric displays • Light field displays • Integral imaging • 3D projection displays • HMD, HUD • Classic holographic 3D displays • Holographic 3D with limited space • bandwidth • Data representation • Eye tracking
Recommended literature	Ernst Lueder, ,,3D Displays", ISBN:978-1-119-99151-9, Wiley 2012, UK

Teaching methods	Lecture, script on blackboard, projector
Assessment method	Written examination, 90 min.
Language of instruction	English
Prerequisite	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

Additive Manufacturing – more than 3D Printing

Course title	Additive Manufacturing – more than 3D Printing
ECTS	2
Course type	Lecture
SWS	2
Semester	Summer
Workload in hours	Total: 60 / In-class: 30 / Self-study: 30
Lecturer	Prof. Dr. Christian Wilisch
Course objectives	The students learn about the basic concepts and about the most common methods of additive manufacturing
Course contents	Basic principles of additive manufacturing (AM); AM from the solid, liquid and gaseous phase
Recommended literature	Andreas Gebhardt, A. and Hötter, J.-S.; Additive Manufacturing; Hanser, 2016 (this book is useful, but not required for the class)
Teaching methods	Lectures
Assessment method	Written paper and presentation in class
Language of instruction	English
Prerequisite	None

Introduction to Manufacturing Engineering

Course title	Introduction to Manufacturing Engineering
ECTS	2
Course type	Lecture
SWS	2
Semester	Summer
Workload in hours	Total: 60 / In-class: 30 / Self-study: 30
Lecturer	Prof. Dr. Christian Wilisch
Course objectives	The students learn about the most common methods of manufacturing in use today.
Course contents	Manufacturing methods for metals, ceramics, glass and polymers. Casting, rolling and shaping processes will be covered.
Recommended literature	Kalpakjian, S. and Stephen R. Schmid, S.R.; Manufacturing Engineering and Technology (SI), 7th Ed.; Pearson, 2013
Teaching methods	Lectures
Assessment method	Written paper and presentation in class
Language of instruction	English
Prerequisite	Prior knowledge of material science would be useful, but is not required

Physics for Engineers – an Introduction

Course title	Physics for Engineers – an Introduction
ECTS	3
Course type	Lecture
SWS	3
Semester	Summer
Workload in hours	Total: 90 / In-class: 30 / Self-study: 60
Lecturer	Prof. Dr. Dmitry Rychkov
Course objectives	The course provides in a concise form an Introduction to a General Physics as needed by engineers and students of technical sciences. All fields of Classical Physics will be covered with a short excurse into the Modern Physics, thus providing both theoretical background and technical knowledge for further engineering studies.
Course contents	Mechanics, Electricity and Magnetism, Molecular Physics and Thermodinamics, Optics, Atomic and Quantum Physics
Recommended literature	None
Teaching methods	Lesson
Assessment method	Written examination, 90 min.
Language of instruction	English
Prerequisite	basics of differential and integral calculus

Transducer Properties of Functional Soft Matter

Course title	Transducer Properties of Functional Soft Matter
ECTS	3
Course type	Lecture
SWS	3
Semester	Summer
Workload in hours	Total: 90 / In-class: 30 / Self-study: 60
Lecturer	Prof. Dr. Dmitry Rychkov
Course objectives	This course is an introduction to an exciting world of soft matter sensors and actuators. Based on a multitude of practical examples the students will be able to understand how microscopic-level physical properties of functional materials determine the properties and working behaviour of transducer devices based on them.
Course contents	Dielectric Properties and Maxwell Stress; Charge Storage and Electro-Mechanical Coupling in Dielectrics; Ferro-, Pyro- and Piezoelectricity; Mechanical and Acoustical Properties of Soft Matter; Artificial Muscles for Actuators and Sensors; Sound and Ultra-Sound Sensors with Space-Charge Electrets; Less Can Be More (Ferroelectrets and Piezoelectrets as Sensors and Actuators); Molecular Dipole Electrets with Ferro-, Pyro- and Piezoelectricity; Composite Materials for Multi-Functional Devices; Energy Harvesting with Soft Matter; Soft-Matter Sensors for Electromagnetic and Other Radiation; Space-Charge Electrets for High-Efficiency Air Filtration
Teaching methods	Lesson
Assessment method	Written examination, 90 min.

Language of Instruction	English
Prerequisite	None

Advanced Methods in Procurement

Course title	Advanced Methods in Procurement
ECTS	5
Course type	Lecture
SWS	4
Semester	Summer
Workload in hours	Total: 150 / In-class: 60 / Self-study: 90
Lecturer	Prof. Dr. Diane Ahrens
Course objectives	This course is split into two parts: Part 1: The broad scope of this course starts from principles of sourcing to strategic procurement decisions like low cost country sourcing, procurement concepts like consignment inventory, vendor managed inventory. Prices and Total Cost are analyzed, suppliers evaluated, and development strategies discussed. Part 2: The second part focusses on quantitative methods: Times series are analyzed and different forecasting methods needed for purchasing decisions are trained. Based on this disposition decisions - timing and quantity of orders - are made.
Course contents	Part I: 1. Development of Purchasing Function 2. Leverage Effect of Procurement 3. Best Cost Country Sourcing 4. Sourcing Strategies 5. Price and Total Cost Analysis 6. Supplier Evaluation and Development 7. Replenishment Strategies & Procurement Logistics Part II: 1. Linear and Multiple Regression 2. Time Series and Forecasting Methods 3. Disposition and Ordering 4. Newsvendor and other Models

Recommended literature	Jacobs, F.R.; Chase, R.B.: Operations & Supply Management, 15th Edition, McGraw-Hill Irwin International Edition, 2018 Baily, P.; Farmer, D.; Crocker, B.; et al.: Procurement, Principles & Management, 11th edition, Pearson Education ltd., 2015 Jahns, C.: Cases in Purchasing and Supply Management: Category Sourcing, SMG Publishing, 2005 Van Weele, A.J.: Purchasing and Supply Chain Management, 7th edition, Cengage Learning Emea, 2018
Teaching methods	The course features lectures introducing to strategic sourcing and procurement logistics theory in an international business environment, focused lectures based on selected procurement categories, class discussion, group activities, situational analysis and comparison, and integrative experiential learning. Self-managed student work teams develop procurement strategies based on given case studies, e.g. for steel bulk buying or specific injection molded plastic parts. Students are confronted with procurement decisions from the real world cases and then compare their responses to actual management actions.
Assessment method	Written examination, 90 min.
Language of instruction	English
Prerequisite	None

Public Economics

Course title	Public Economics
ECTS	2,5
Course type	Virtual lecture, exercises
SWS	2
Semester	Winter and summer
Workload in hours	Total: 75 / In-class: 0 / Self-study: 75
Lecturer	Prof. Dr. Hanjo Allinger
Course objectives	The main object of the financial science is the apprentice-ship of the state income and issues, also called „economy of the public sector ". The introductory event deals with the question of the role which the state should take in a social market economy. A main focus lies in the investigation of the typical facts of the matter of market failure which could justify state inter-ventions in the markets – provided that no simultaneous state failure is to be expected. The problems of the most different externalities of private goods and questions of the optimum supply decision and decision of utilisation of public goods are looked thoroughly here. Nevertheless, markets can fail not only in allocative re-gard, but also in distributive regard, possibly if the market supply of goods contradicts central justice images of the society. Hence, the event mediates of distant bases of exogenous and endogenous concepts of justice.
Course contents	Introduction - Introduction to the financial science Externalities - Positive and negative external effects - Graphic and mathematical derivation of the welfare losses

	- Pareto-relevance of externalities - Financial externalities - Internalization by Pigot-taxes - Stamp duties on capital issues - Trade with issue certificates - Infra-marginal externalities - Fixed externalities - Coase theorem Public goods - Criteria more purely of public goods - Impure public goods - Allmende goods (common goods) - Toll goods or collective goods - Supply decision - Crowding costs and decision of utilisation Introduction to the tax effect theory - Tax-induced welfare losses (Excess Burden I) - Tax-induced welfare losses (Excess Burden II) - Introduction to the optimum tax theory Concepts of justice - Exogenous justice - Endogenous justice
Teaching methods	Virtual lecture
Assessment method	Written exam, 90 min.
Language of instruction	English

Market Research incl. SPSS

Course title	Market Research incl. SPSS
ECTS	5
SWS	4
Semester	Summer
Workload in hours	Total: 150 / In-class: 45 / Self-study: 105
Lecturer	Melanie Hazod, Dipl. BA
Course objectives	This lecture should lead you to an understanding of the uses and abuses of market research. After completing the module, you should be able to: • evaluate the usefulness of market research for the problem you are involved with • discuss appropriate types of research with confidence • set yourself realistic expectations regarding the results/ timing • understand the importance of market research • perform a complete market research project • know the statistical software SPSS and can operate basis analysis • analyze questionnaires under quality aspects
Teaching methods	Lesson
Assessment method	Written examination, 90 min.
Language of instruction	English
Prerequisites	None

Introduction to Air Transport Management

Course title	Introduction to Air Transport Management
ECTS	5
Course type	Lecture
SWS	4
Semester	Summer
Workload in hours	Total: 150 / In-class: 45 / Self-study: 105
Lecturer	Jack Romero
Course contents	The Introduction to Air Transport Management course is designed to give you a brief insight into the world of airlines, airports and air transport industry in general by covering topics such as, but not limited to: • Airline business • Airline operations • Airline marketing • Aircraft fleet planning • Airport business • Air transport economics • Quality management of airline operations • Statistical Analysis • Research Methods and Forecasting
Assessment method	Paper
Language of instruction	English
Prerequisite	None

Economies of Africa

Course title	Economies of Africa
ECTS	5
Course type	Lecture
SWS	4
Semester	Winter and summer
Workload in hours	Total: 150 / In-class: 90/ Self-study: 60
Lecturer	Dr. Martin Owuso
Course objectives	This course is meant for the 6th/7th semester, home, RIBA and Erasmus students. In the course, these students would learn about current economic policies of African countries.
Course contents	The course is divided into two parts. The first part will focus on thematic perspectives of African economics. The second part deals with the different state perspectives. In these more detailed perspectives students will be given state-specific topics that include research of the latest economic policies that are persued by individual African states. Each text-based project on economic policies will be presented and discussed in class. Before this project-based part of the lecture starts, students will be given an overview of themes to be presented. Overview: 1. Short Introduction 2. Key dimensions of economic diversity and commonality across the continent 3. Detailed analysis of economic policies in a global context / opportunities and challenges that the global economy presents to Africa 4. Macro-economic perspective including monetary and fiscal policies 5. Micro- and sectorial issues of poverty and human development 6. Diversity of performance - the effectiveness of the state in pursuing development agendas

	7. Failed state interferences - internal and cross-border conflicts 8. Specifics of the current policy making in a long-term perspective and the context of broad environmental and demographic trends 9. Conclusion
Teaching methods	In-class lectures and project work
Assessment method	Written examination, 90 min.
Language of instruction	English
Prerequisite	None