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German A1 / part II + III + IV

Course title	German A1 / Parts 2, 3 and 4
Person in charge	Dr. Virginia Wallner, M.A.
Type of course	Practical lectures
Course of studies	Available for all degree courses in the context of AWP or obligatory language courses
Level of course	Beginner
Prerequisites	Students should know - simple grammar terms and concepts in their own mother tongue and - very simple basics of German (spelling, greeting, introducing yourself, numbers)
SWS	6
ECTS	6
Assessment methods	Written exam (90 min.)
Language of Instruction	German
Course Objectives	The students are able to talk about their family, their daily routine and their profession. They know to say the time, the measures and to conduct a simple conversation for purchasing goods. They can ask the way and describe an apartment. Moreover, they can tell about simple issues in the past.
Course contents	The content of the lecture includes the following issues:

	Grammar: - separable verbs - plural of the nouns - accusative forms, verbs with accusative - possessive articles - simple past of "sein" and "haben" - dative forms, prepositions with dative - imperative - modal verbs - present perfect - ordinal numbers Topics: - the clock, daily routine - measurement - eating - family life - asking the way - accommodation - talking about simple issues in the past - asking for personal information - talking about work - at the doctor's - talking on a journey (travel agency, hotel, ticket office) - talking about the weather
Teaching methods	Introductions to topics by lecturer, partner and group work, feedback for partner and group work from lecturer, listening exercises
Suggested Reading	Lehrbuch: „Berliner Platz 1 Neu", Langenscheidt. Lektion 4-12 / Unit 4-12.
Miscellaneous	compulsory for GE exchange students 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.

We offer German courses for beginners as well as higher level courses for more advanced speakers. For more information please have a look at: https://www.th-deg.de/en/study/electives-languages-centre/languages#nav

English for General Engineering Students

Course title	English for General Engineering Students
Course ID	
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	Lecture
SWS	2
Semester	Winter and summer semester
Workload in hours	Total: 60 / In-class: 30 / Self-study: 30
Lecturer	Neal O'Donoghue, M.A.
Course objectives	This course aims to give an insight into English vocabulary, grammar and various areas of language construction. The course is designed to be relevant and interesting for the students and will be adapted to the various needs and interests of the students who participate. By the end of the course, students should have an improved understanding of the English language.
Course contents	During the course, a range of areas will be looked at. Class discussions will be used to explore variety of topics covering business, engineering, travel and study. Topics include but are not limited to the following: • The various cultures of the English-speaking world • Language related to travel, tourism, studies, engineering, normal daily life • Globalisation

	• The role of corporations • Styles of management • Ways of properly communicating, e.g. small-talk, emails, telephoning. • Areas of grammar and technical English Current world events including news events and popular culture will be used as a basis for discussions.
Teaching methods	Listening, reading, writing and speaking will all be part of the course and students are expected to par-ticipate. Students will sometimes work in groups, be given time to formulate arguments or opinions and present them to the other students.
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: Grammar and Vocabulary questions - Parts 1-3 are made up of multiple choice, fill in the gap and short answer questions. - Part 4: Writing composition (150 words) Content for the exam will be taken from materials covered during the semester.
Language of instruction	English
Prerequisite	A-levels (Abitur) / 7-9 years of English

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 semester
Workload in hours	30 hours
Name of Instructor	Ms. 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
SWS	2
ECTS	2
Course type	compulsory for GE exchange students
Language of instruction	English
Name of lecturer	Prof. Dr. Johann Nagengast
Objectives of the course	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 Reading	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. It is compulsory for GE exchange students.

Business Storytelling

Course title	Business Storytelling
Course ID	AWP 296
ECTS	2
Course type	Elective
SWS	2
Semester	Winter Semester
Workload in hours	Total: 60 / In-class: 30 / Self-study: 30
Lecturer	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
Language of instruction	English
Prerequisite	

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 semester
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

Cross-Cultural Team Building

Course Title	**Cross-Cultural Team Building Workshop**
Course ID	291
Point person	Prof. Dr. Nagengast
Course Type	Elective interactive lecture
SWS	2
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.

Ethics in Engineering

Course title	Ethics in Engineering
Course ID	**new**
ECTS	2
Course type	Lectures and in-class discussions Team presentation Individual paper
SWS	2
Semester	Winter and summer semester
Workload in hours	Total: 60 / In-class: 30 / Self-study: 30
Lecturer	Ms Marina Beraz
Course objectives	The course objective is to raise awareness and critical reflection of our individual actions and the importance of applied Ethics across different areas and industries, including contemporary issues ranging from Bioengineering to Space Exploration and the rise of the Ethical AI.
Course contents	Leading by example is not an easy task and responsibility. As future leaders in an ever changing world economy, led by technological revolution, either joining companies or building your own ventures, your belief and value systems will be challenged. Whether engineers will be joining existing companies or building their own (engineers and technical founders make up the best entrepreneurs), Ethics is fundamental to building good products that serve society and driving the technological revolution, re-defining the next frontier for innovation. Engineering students will be constantly challenged to make "good" decisions, independent of the product or company, geography, culture, and context they are embedded in. After a short introduction of Engineering & Business Ethics 101, we will dive into contemporary issues facing philoso-

	phers and scientists with engineers today. As Yuval Harari summarizes the advancements of AI and Biotech: B * C * D = HH Biological knowledge * Computing Power * Data = Ability to Hack Humans Machine learning and artificial intelligence are enabling us access to better health care, more affordable and improved products and services, improving lives for billions of people, at the convenience of our fingertips. But what about free will, issues of privacy, job displacement, what about outsourcing our decisions to an external agency or an algorithm? What decisions are we accountable for and what is the mere consequence of technological disruption? Where in this production chain are you as an engineer? In our time, cooperation between (practical) engineers and (theoretical) philosophers is needed more than ever.
Recommended literature	
Teaching methods	In-class lectures & discussions Team projects & presentations Individual paper
Assessment method	Team presentation Individual paper
Language of instruction	English
Prerequisite	None

IP Protection for Technological Innovators

Course title	Intellectual Property Protection for Technological Innovators
Course ID	
ECTS	4
Course type	Lecture and case studies, Presentations, and Discussion
SWS	4
Semester	Winter Semester
Lecturer	Attorney Carolyn Gouges d'Agincourt
Course objectives	Intellectual property ("IP") protection and defense plays an ever-increasing role for technology innovators. The question of how companies should best position themselves to develop, protect, and/or leverage their IP assets with respect to offensive and defensive positions is a key component of competitive strategy in today's global marketplace. This course aims to provide students with a basic understanding of the world of IP including patents, trademarks, copyright, and trade secrets based on IP law under U.S. practice. This course may be particularly interesting for those students aiming to support innovation in R&D, engineering and/or technical and business management, and marketing in national or multi-national established companies, start-ups and/or strategic consulting.
Course contents	Fundamentals of IP law under U.S. practice and development of IP strategy in the following subject areas: • Patents • Trademarks • Copyright • Trade-secrets

Recommended literature	
Teaching methods	For each of the patent, trademark, copyright and trade secret subject areas, students will learn the fundamental principles of the related IP law under U.S. practice. The students will then apply these fundamental principles to fact patterns in case studies. In group teams, the students will give oral presentations showing how they might apply the principles of IP law to exemplary fact patterns in order to protect and/or defend the intellectual property of their respective companies. Students will also learn how to best position their companies against allegations of IP infringement. Attorney Gouges d'Agincourt will present 50% of the course during lectures scheduled at the Deggendorf campus followed by the remaining 50% of the lectures in a virtual format from her law practice in Boston, Massachusetts, USA.
Assessment method	Oral presentation(s) and written essay(s)
Language of instruction	English
Prerequisite	None

Simplified Microcontroller programming

Course title	Simplified Microcontroller programming for general engineers
Course ID	100 570
ECTS	2 ECTS
Course type	Lecture with practical exercises
SWS	2
Semester	Winter and summer semester
Workload in hours	Total: 60 / In-class: 30 / Self-study: 30
Lecturer	Mr. 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
Prerequisite	Fundamentals of Informatics, experience with Windows

Statistics for Engineers

Course title	Statistics for Engineers
Course ID	100 580
ECTS	5
Course type	Lecture/ practical exercises
SWS	4
Semester	Winter and summer semester
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
Prerequisite	Elementary calculus

Industrial Wastewater Treatment

Course title	Industrial Wastewater Treatment
Course ID	100 360
ECTS	2 ECTS
Course type	Lecture
SWS	2 SWS
Semester	Winter and Summer Semester
Workload in hours	Total: 60 / In-class: 30 / Self-study: 30
Lecturer	Prof. Dr.-Ing. Andrea Deininger
Course objectives	Methods and concepts of industrial wastewater treatment
Course contents	Legal Requirements Integrated Measures for Pollution Control Design Criteria Mechanical and Physical treatment Chemical Treatment Biological Treatment Examples

Recommended literature	Industrial Wastewater Management, Treatment, and Disposal, 3e MOP FD-3 (WEF Manual of Practice) by Water Environment Federation (Jun 17, 2008) Industrial Wastewater Treatment, Recycling and Reuse by Vivek V. Ranade and Vinay M Bhandari (Sep 26, 2014) Wastewater Engineering: Treatment and Resource Recovery by Inc. Metcalf & Eddy, George Tchobanoglous, H. David Stensel and Ryujiro Tsuchihashi (Sep 3, 2013) Biological Wastewater Treatment, Third Edition by C. P. Leslie Grady Jr., Glen T. Daigger, Nancy G. Love and Carlos D. M. Filipe (May 9, 2011)
Teaching methods	Lecture with integrated project development examples
Assessment method	Seminar and examination paper
Language of instruction	English
Prerequisite	Principles of process engineering

Introduction to Soil Mechanics

Course title	Introduction to Soil Mechanics
Course ID	
ECTS	2
Course type	Lecture and exercises Presentations Discussion
SWS	2
Semester	Winter Semester
Lecturer	Prof. Dr.-Ing. P. 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

Database Engineering

Course title	Database Engineering
Course ID	O4102
ECTS	5
SWS	4
Semester	Winter and summer semester
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

Computer Science II

Course title	Applied Computer Science II
Course ID	F3102 (Informatik 2)
ECTS	5
Course type	Lectures with exercises
SWS	4
Semester	Winter semester
Workload in hours	In-class: 45h / Self study: 105 / Total: 150
Lecturer	Prof. Dr. Faber
Course objectives	The course "computer science 2" is part of the module "applied computer science" which is suitable for media technology students. In this course, the students gain first insights in software development techniques and processes using a high level programming language (HLL, e.g., Java). They will learn the concepts of data retention in volatile and non-volatile memory, of variables, data structures and functions. They will be taught to understand the concepts of object oriented programming (classes, objects) and will be capable of implementing small programs in a high level language according to a given specification. They will also learn to analyze and remove bugs that may appear during the development process.

Recommended literature	*Java ist auch eine Insel;* Christian Ullenboom; Galileo Press; 8. Auflage; 2009 *Thinking in Java*; Bruce Eckel; Prentice Hall; 4th Edition; 2006 • *Informatik – Eine grundlegende Einführung*; Manfred Broy; Springer; Berlin [u.a.]; 2. Auflage; 1998 (Bd. 1 bzw. 2) • Further literature and online resources as supplied during the course.
Teaching methods	Seminar/ lectures with excercises
Assessment method	written examination, 90 min.
Language of instruction	English
Prerequisites	Recommended (not compulsary!): Computer Science I Technically oriented background courses, supplying basic knowledge about programming and system design, would be beneficial.

Automotive Drive Systems S34

Course title	Automotive Drive Systems S34
Course ID	CM-17/ CM 2117 Master Electrical Engineering and Information Technology
ECTS	2
Course type	Lecture
SWS	2
Semester	Winter Semester
Workload in hours	Total: 150 / In-class: 60 / Self-study: 90
Lecturer	Prof. Dr. Müller/ Prof. Firsching
Course objectives	Advanced knowledge in control methods of speed variable drive systems Design of a sensorless field oriented control Characterize features of different accumulator technologies Knowledge about necessary infrastructure steps for electrical power supply of vehicles
Course contents	Power electronics control devices for electric machines Modeling of three phase AC machines Speed control of three phase AC machines (field oriented control) Storage devices for electrical energy Power supply for automotive applications
Recommended literature	Schröder D.: Elektrische Antriebe - Regelung von Antriebssystemen. Springer Verlag, 3. Auflage, 2009 Quang N. P., Dittrich J.-A,: Vector Control of Three-Phase AC Machines: System Development in the Practice. Springer-Verlag, 1. Auflage, 2008. H. Wallentowitz et. al.: Strategien zur Elektrifizierung des Antriebstranges. Vieweg+Teubner, 2009 Th. Becks et al.: Wegweiser Elektromobilität. VDE-Verlag, 2010

Teaching methods	Lecture, forms of media used: blackboard, transparencies
Assessment method	Two written examinations each 45 min.
Language of instruction	English
Prerequisite	Knowledge about basics of electric machines and power electronics
Miscellaneous	Students can choose if they want to take part in both parts offered by Prof. Firsching and Prof. Müller. There is the possibility to write a complete exam (90 min.) or just one part of the exam(45 min.)

Selected Chapters of Control Engineering

Course title	Selected Chapters of Control Engineering
Course ID	CM-15/CM 2115 Master Electrical Engineering and Information Technology
ECTS	5 ECTS
Course type	Lecture/ practical exercises
SWS	4 SWS
Semester	Winter semester
Workload in hours	Contact hours: 60 h Self study: 90 h, including: Preparation and follow-up course work: 30 h exercises and preparation for examination: 60 h
Lecturer	Prof. Dr. Müller
Course objectives	- Formulate dynamic systems in state space - Characterize typical behaviour - Judge what kinds of problems may be solved most suitably with what kinds of methods - Design of appropriate state space controllers and observers - Tuning of a Kalman Filter - Application of the theory to simulations

Course contents	- 1. Dynamic systems in state space - 1.1 Setup of state equations - 1.2 Properties (stability, controllability, observability) - 2. Control design in state space - 2.1 Pole assignment method (Ackermann Formula, modal controller, decoupling) - 2.2 LQR controller - 3. Observers - 4. Time discrete systems in state space - 5. Kalman Filter - 5.1 Repetition of stochastics - 5.2 Linear discrete time filter design
Recommended literature	- P. Albertos, S. Antonio: Multivariable Control Systems. Springer, 2004 - Z. Bubnicki: Modern Control Theory. Springer, 2005 - R.C. Dorf, R.H. Bishop: Modern Control Systems. 10th edition, Pearson Prentice Hall, Upper Saddle River, 2005 - B. Kisacanin, G.C. Agarwal: Linear Control Systems. Springer, 2002 - K. Ogata: Modern Control Engineering. 4th edition, Pearson Prentice Hall, Upper Saddle River, 2002
Teaching methods	Lectures with blackboard and beamer "group puzzle" method for chapters 1 and 2 PC simulations using Matlab/Simulink
Assessment method	Written examination, 90 min.
Language of instruction	English
Prerequisite	knowledge of the contents: - Mathematics: Linear algebra, Laplace transformation, z-Transformation, statistics - Control: Understanding of dynamic systems, description of dynamic systems in state space

Advanced Circuits Lab

Course title	Advanced Circuits Lab
Course ID	100 590
ECTS	5
Course type	Practical Exercises
SWS	4
Semester	Winter and summer semester
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

Introduction to the Finite Element Method

Course title	Introduction to the Finite Element Method with NASTRAN & PATRAN
Course ID	100 150
ECTS	4
Course type	Lectures with workshops
SWS	4
Semester	Winter and Summer Semester
Workload in hours	Total: 60/ in-class: 30/ Self-study: 30
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

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 semester
Workload in hours	Total: 60 / In-class: 30 / Self-study: 30
Name of instructor	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)
Course ID	100 330
ECTS	3
Course type	Lecture with CAD exercises
SWS	2
Semester	Winter and summer semester
Workload in hours	Total: 60 / In-class: 30 / Self-study: 30
Name of instructor	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
Miscellaneous	

Advanced Solidworks (CAD)

Course title	Advanced Solidworks (CAD)
Course ID	**new**
ECTS	3
Course type	Practical exercises with CAD system Solidworks
SWS	2
Semester	Winter and summer semester
Workload in hours	Total: 60 / 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

Projects in Science and Engineering

Course title	Projects in Science and Engineering
Course ID	100 210
ECTS	6
Course type	Project work in groups
SWS	4
Semester	Winter and summer semester
Workload in hours	180
Name of 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
Course ID	100 530
ECTS	6
Course type	Project work in groups
SWS	4
Semester	Winter and summer semester
Workload in hours	180
Name of 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
Course ID	
ECTS	6
Course type	Project
SWS	4
Semester	WS and SS
Workload in hours	180
Name of 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

Production Technology in Optics

Course title	Production technology in optics, smart fabrication
Course ID	
ECTS	4
Course type	Lecture and exercises Presentations Discussion
SWS	4
Semester	Winter semester
Lecturer	Prof. Dr. Ing. Christine Wünsche
Course objectives	Optics are high precision products. On the other hand optical products become part in everyday life. This course aims to provide students with basic knowledge about technologies used in the manufacturing process of optics and optical component as well as aspects of testing and quality assurance. , basic introduction to material oriented production, quality assurance and measurement processes and production related data management.
Course contents	• Introduction to materials used for optics • Material oriented production processes • product oriented production processes • measurements in production for quality assurance • Measurement on the product for quality testing

Recommended literature	Bliedtner, Jens, Günter Gräfe: Optical technology; Hanser Verlag 2008 Karow, H.H.: Fabrication methods for precision Optics; Wiley, 2004. Twyman, F.: Prism and lens making; Taylor and Francis limited, 2. Auflage 2018
Teaching methods	Lecture with discussions and presentations
Assessment method	Written Examination, 90 min.
Language of instruction	English
Prerequisite	If possible: material sciences

3D Displays

Course title	3D Displays
Course ID	100 560
ECTS	2
Course type	Lecture
SWS	2
Semester	Winter and summer semester
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	-

Surface Analytics

Course title	Surface analysis
ECTS	4
Course type	Lecture (mainly)/ practical exercises
SWS	4
Semester	Winter semester
Workload in hours	Total: 60 / In-class: 30 / Self-study: 30
Lecturer	Prof. Dr. Christine Wünsche
Course objectives	The students will achieve an understanding about the surface of materials and their properties concerning their use in everyday life. Surface sensitive methods of analysis will be told
Course contents	Description and basic requirements on (technical) surfaces. Introduction to low tech and high tech methods in surface analysis like Surface tension, roughness, SEM, Auger Electron Spectroscopy,… Understanding basic experimental set ups and how to interpret data acquired.
Recommended literature	Somorjai G.A.: Introduction to surface chemistry and catalysis, Wiley (2010) Vickermann J.C.: Surface Analysis the principal techniques, Wiley 2009
Teaching methods	Lesson / practical work
Assessment method	Written examination, 90 min.
Language of instruction	English
Prerequisite	Material sciences, (Physics, Chemistry)

Conventional Energy Technology

Course title	Conventional Energy Technology
ECTS	2
Course type	Lecture/ practical exercises
SWS	2
Semester	Winter
Workload in hours	Total: 60 / In-class: 30 / Self-study: 30
Lecturer	Prof. Dr. Rui Li
Course objectives	Understand the conventional power plants using fossil fuels (natural gas, coal, etc.)
Course contents	○ Energy conversion and energy transfer ○ Fossil fuel resources ○ Components: boiler, chiller, steam turbine, gas turbine, cooling tower, etc. ○ Power generations: steam turbine power plants, gas turbine power plants, combined cycle plants, cogeneration, etc.
Recommended literature	Y. Demirel, Energy: Production, Conversion, Storage, Conservation, and Coupling Y. A. Çengel, Thermodynamics: An Engineering Approach,
Teaching methods	Lesson / exercises
Assessment method	Written examination, 90 min.
Language of instruction	English
Prerequisite	Physics, thermodynamics

Thermodynamics

Course title	Thermodynamics
ECTS	2
Course type	Lecture/ practical exercises
SWS	2
Semester	Winter
Workload in hours	Total: 60 / In-class: 30 / Self-study: 30
Lecturer	Prof. Dr. Rui Li
Course objectives	Cover the basic principles of thermodynamics and present engineering examples of the energy conversion
Course contents	○ Energy, energy transfer and energy analysis ○ Properties of pure substances ○ Closed systems and control volumes ○ Second law of thermodynamics and Entropy ○ Gas power cycles ○ Vapor and combined power cycles
Recommended literature	Y. A. Çengel, Thermodynamics: An Engineering Approach,
Teaching methods	Lesson / exercises
Assessment method	Written examination, 90 min.
Language of instruction	English
Prerequisite	An adequate background in calculus and physics

International Business Development

Course title	International Business Development
Course ID	A3111
ECTS	5
SWS	4
Semester	Winter semester
Workload in hours	Total: 150 / In-class: 45 hrs / Self-study: 105 hrs
Lecturer	Mr. Jack Romero
Course objectives	The course is for students interested in starting their own businesses or focusing on international business development. The aim is to prepare students with skills involved in launching and leading businesses but also to use those skills to develop and run businesses or business units with a direction toward innovation, international expansion and growth. Students gain theoretical insights with practical applications in a learning environment characterized by active participation, both individually and in groups.
Course contents	Perspectives on Strategy: • Strategic thinking from both an internal and external perspective. • Foundations of strategy and strategic perspectives • Strategies for innovation, product, process, organization, marketing Entrepreneurship and Business Growth • Maintaining entrepreneurial drive • Government partnering • Turnaround strategies Managing Networks and Internationalisation • How to develop business capabilities through internationalization and networking • Building, maintaining and supporting es with various modes of foreign operations • Meeting competition from existing incumbents as well as new entrants • Balancing cooperation and competition

	Strategizing in Business Development • Participation in a real-life strategic process • Acting based on assembled knowledge • Developing a business idea
Recommended literature	Exploring strategy Angwin Duncan, Johnson Gerry, Regner Patrick, Scholes Kevan, Whittington Richard Tenth edition. : Harlow : Pearson :2014 ISBN: 9781292002552 (pbk.) International Business Expansion Anthony Gioli Over And Above Press: 2014 ISBN: 978-0989091749
Assessment method	
Language of instruction	English

IT Skills for Project Managers

Course title	IT Skills for Project Managers
Course ID	G7112
ECTS	5
Course type	Online and Lectures
SWS	4
Semester	Wintern semester
Lecturer	Prof. Koivula
Course objectives	• What is a project • What is PM • Popular methodologies • Project life cycle • Project constraints • Benefits of project management • Project manager • Stakeholders • Project assumptions, constraints, risks, roles & responsibilities • Project plan • Kick-off • Project's change management • Project closure and reflection
Course contents	Besides the theoretical background, the course is about IT Skills, not so much taught but used and done. Among others, Project Management software tools will be used during the course. The content shall be delivered by pre-recorded lectures, online live lectures (whole groups) and online live meetings (small groups). Pre-recorded lectures will be available through vimeo.com or as a link-shared Google video. For online live meetings we will use either Google Hangout, Zoom (zoom.us) or BigBlueButton. They require Adobe Flash and Zoom needs player for joining the meeting.

	Flash is usually pre-installed in computers. Hangout and Zoom can be followed with iOS or Android devices but BigBlueButton requires a computer. Pre-recorded lectures can be listened and watched anytime and anywhere, live online sessions take place in the evenings. Live online sessions schedules will be announced when the participant list is ready. The classroom sessions will take place during one week and will have practical approach to the topics of the course.
Teaching methods	Online and lecture
Assessment method	paper
Language of instruction	English

Economies of Africa

Course title	Economics of Africa
Course ID	G6115
ECTS	5
Course type	Lecture
SWS	4
Semester	Winter semester
Workload in hours	Total: 150 / In-class: 90/ Self-study: 60
Lecturer	Dr. 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 de-

	velopment 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	

Financing and Marketing for New Ventures

Course title	Finance and Marketing New Ventures
ECTS	5
Course type	Lecture/ practical exercises
SWS	4
Semester	Winter semester
Workload in hours	Total: 150 / In-class: 45 / Self-study: 105
Lecturer	Prof. Dr. Jürgen Sikorski, Jason Johnson
Course objectives	Learn how to market an innovation-based new venture to investors and to the users of its products.
Course contents	• Start-up financing theory & practice • What do you need to get started? • Review of the different financing vehicles. • The structure of a business plan and what is relevant for investors. • How to estimate your funding needs. • How to create a budget when the future is unknown • What are the basic financial statements and how do you create them? • How to manage founder dilution of shares. • Group project involving estimating funding needs.
Teaching methods	Lesson/Group Project/Case Studies/Exercises
Assessment method	Written Paper
Language of instruction	English
Prerequisite	Basic knowledge of the subject field

Health and Wellbeing in Organisations

Course title	Health and Wellbeing in Organisations
Course ID	**new**
ECTS	5
Course type	Lecture/ practical exercises
SWS	4
Semester	Winter semester
Workload in hours	Total: 150 / In-class: 60 / Self-study: 90
Lecturer	Prof. Dr. Irmgard Tischner
Course objectives	At the end of the module they will be able to apply, as well as critically evaluate these in social and workplace contexts, with the aim to enhance health and wellbeing in and through working environments and cultures.
Course contents	This module will develop students' awareness and knowledge of the dimensions of health and health psychology, as well as social and economic processes and dynamics that influence mental and physical health, on a micro (individual and interpersonal), meso (group and institutional) and macro (national and global) level.
Recommended literature	/
Teaching methods	Lesson / practical work
Assessment method	Endnotenbildende PStA (written paper)
Language of instruction	English
Prerequisite	None