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
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 cooperative 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.

Course descriptions for German language courses at higher levels:
https://th-deg.de/en/students/language-electives#german

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 Coursebook. Reading: Garnet Education, 2010. Print. engine: Englisch für Ingenieure. <www.engine-magazin.de> (Darmstadt). Various issues. Print. Foley, Mark, and Diane Hall. MyGrammarLab. Harlow: Pearson, 2012. Print. Glendinning, Eric H., and Norman Glendinning. Oxford English for Electrical and Mechanical Engineering. Oxford: Oxford UP, 1995. Print. Glendinning, Eric H., and Alison Pohl. Technology 2. Oxford: Oxford UP, 2008. Print. Heidenreich, Sharon. English for Architects and Civil Engineers. Wiesbaden: Vieweg + Teubner Verlag, 2008. Print. Ibbotson, Mark. Cambridge English for Engineering. Cambridge: Cambridge UP, 2008. Print. Ibbotson, Mark. Professional English in Use. Engineering: Technical English for Professionals. Cambridge: Cambridge UP, 2009. Print. Markner-Jäger, Brigitte. Technical English: Civil Engineering and Construction. Haan-Gruiten: Verl. Europa-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 Grammar 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 entry 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** 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 (theories) 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 (online: paper)
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.

Intercultural Skills

Course title	Intercultural Skills
Course ID	288
ECTS	2
Course type	Elective
SWS	2
Semester	Winter semester
Lecturer	Ariadna Fürstenau
Course objectives	During this course, students shall get a deeper insight in theoretical as well as practical concepts behind cultural differences and their relevance. Based on those theories students will work on case studies which help them expanding their inter- and cross-cultural skills on a personal as well as professional level. Overall target is to combine the findings of intercultural research with practical applications and interpretations of the same. This shall enable the students to gain the ability to move and act securely and confident in a globalized world. A further target of the course is to enable students to acquire the ability to reflect on their own culture and culture related behavior and concepts.
Course contents	• Definition of Culture • Cultural Self-Referencing • Cultural Differences • Culture Shock • Cultural Stereotyping • Critical Incidents • Cultural Dimensions (Hofstede, Hall, Trompenaars) • High/Low Contexts • Iceberg Model vs. Dune Model

	• Sender/Receiver Model • Intercultural Communication • Interculturality / Multiculturality / Transculturality
Recommended literature	• Bolten, J.: Einführung in die Interkulturelle Wirtschaftskommunikation, Göttingen, Vandenhoeck & Ruprecht Stuttgart UTB GmbH (2007) • Bolten, J.: Interkulturelle Kompetenz, Erfurt, Landeszentrale f. polit. Bild. Thüringen (2012) • Hall, E. T., Hall, M. R.: Understanding Cultural Differences, reprint, Yarmouth, Intercultural Press (2000) • Hofstede, G.: Cultures and Organizations, 2nd ed., New York et al., Mc Graw-Hill (2005) • Hofstede, G.: Culture's Consequences, 2nd ed., Thousand Oaks, Sage Publications (2003) • Trompenaars, F., Hampden-Turner, C.: Riding the Waves of Culture, London, Brealey Publishing, (1997) • Trompenaars, F., Hampden -Turner, C.: Managing People across Cultures, Chichester, Capstone Publishing (2004)
Teaching methods	Lectures, group work, case studies
Assessment method	Presentation and seminar paper
Language of instruction	English
Prerequisite	None

Industrial Wastewater Treatment

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

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

Statistics for Engineers

Course title	Statistics for Engineers
ECTS	5
Course type	Lecture/ practical exercises
SWS	4
Semester	Winter and summer
Workload in hours	Total: 150 / In-class: 60 / Self-study: 90
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

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

Introduction to Geotechnical Engineering

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

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

Lean Management in Construction

Course title	Lean Management in Construction
ECTS	5
Course type	Lecture
SWS	4
Semester	Winter
Workload in hours	Total: 150 / In-class: 60 / Self-study: 90
Lecturer	Prof. Dr.-Ing. Gerd Maurer
Course objectives	Basic understanding of LEAN MANAGEMENT Application of Last Planner System ® for Construction
Course contents	Lectures on LEAN MANAGEMENT Introduction into the Last Planner System ® Method Workshops for practical usage of LEAN MANAGEMENT methods Lean Project Delivery Practices in Construction
Recommended literature	Ballard, G. (2000). *The last planner system of production control*. Birmingham, UK: University of Birmingham *Lean Project Delivery and Integrated Practices in Modern Construction,* Syed M. Ahmed, Lincoln H. Forbes, EAN: 9780429859342
Teaching methods	Lecture / presentation / practical work in case studies
Assessment method	Assignment - Paper
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

AI Project

Course title	AI Project
ECTS	5
Course type	Project
SWS	2
Semester	Winter
Workload in hours	150 hours
Lecturer	Prof. Dr. Patrick Glauner
Course objectives	The aim of this class is to provide students with hands-on and real-world AI development experience. They will have the opportunity to work on real data sets in order to solve real-world problems. As these projects are completed in groups, students will also have the opportunity to use professional software development tools for collaboration.
Course contents	• Implementing high-tech projects in the fields of artificial intelligence, machine learning, computer vision, natural language processing and others. • Projects can be chosen for example from Kaggle, from other sources or be done in collaboration with an industrial partner. • Using modern high-end hardware, such as GPU clusters and cloud services. • Utilizing an agile process framework such as Scrum. • Understanding and using modern industrial software development tools such as work package trackers, code revision systems, debuggers, profilers and others. • Presenting R&D outcomes to stakeholders at different levels, such as fellow students, faculty members, practitioners and executives.

Recommended literature	1. I. Goodfellow, Y. Bengio and A. Courville, "**Deep Learning**", MIT Press, 2016. 2. C. Larman, "**Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development**", Prentice Hall, third edition, 2004. 3. S. Chacon and B. Straub, "**Pro Git**", Apress, second edition, 2014.
Teaching methods	Project
Assessment method	Project
Language of instruction	English
Prerequisite	

Big Data

Course title	Big Data
ECTS	2.5
Course type	Lecture and seminar
SWS	2
Semester	Winter
Workload in hours	75 hours
Lecturer	Prof. Dr. Patrick Glauner
Course objectives	The aim of this class is to provide students with an introduction to the field of big data. Students will acquire a solid foundation in how to design and implement big data systems. They will also learn hands-on how to use industrial big data tools. Furthermore, they will understand the limitations of big data-driven approaches and how they can recognize and solve typical issues in big data, such as data quality and biases. As an outcome, they will be able to work on real-world problems that not only require knowledge in AI, but also an expertise in how to use big data infrastructures, frameworks, libraries and tools.
Course contents	• Introduction: 3 Vs, history of big data, selected big data use cases • Revision of database fundamentals: ER diagrams, relational databases, database management systems, queries, indexes, normalization, transactions • Big data architectures: distributed systems, MapReduce, CAP theorem, speedup through GPUs and FPGAs • Big data, small data, all data: data quality, biases in data sets, small sample size problems • Selected big data infrastructures, frameworks, libraries and tools

Recommended literature	1. A. Petrov, "**Database Internals: A Deep Dive into How Distributed Data Systems Work**", O'Reilly Media, 2019. 2. S. Sakr and A. Zomaya, "**Encyclopedia of Big Data Technologies**", Springer, 2019. 3. A. Tanenbaum and M. van Steen, "**Distributed Systems: Principles and Paradigms**", Pearson, 2nd edition, 2007.
Teaching methods	Lecture and seminar
Assessment method	Seminar presentation
Language of instruction	English
Prerequisite	

Computer Vision

Course title	Computer Vision
ECTS	5
Course type	Lecture and lab
SWS	4
Semester	Winter
Workload in hours	150 hours
Lecturer	Prof. Dr. Patrick Glauner
Course objectives	The aim of this class is to discuss Computer Vision (CV), which allows computers to process visual inputs. We deal every day dozens of times with CV, such as facial recognition, real-time translating camera input or auto-tagging friends in photos. Modern CV algorithms are strongly based on machine learning methods, in particular deep neural networks. Students will acquire knowledge in CV and be able to elaborate it further in the future, for example in projects or further studies. Overall, CV is a cutting-edge field, with many high-pay opportunities for graduates.
Course contents	• Introduction: applications, computational models for vision, perception and prior knowledge, levels of vision, how humans see • Pixels and filters: digital cameras, image representations, noise, filters, edge detection • Regions of images: segmentation, perceptual grouping, Gestalt theory, segmentation approaches, image compression • Feature detection: RANSAC, Hough transform, Harris corner detector • Object recognition: challenges, template matching, histograms, machine learning • Convolutional neural networks: neural networks, loss functions and optimization, backpropagation, convolutions and pooling, hyperparameters, AutoML, efficient training, selected architectures

	• Image sequence processing: motion, tracking image sequences, Kalman filter, correspondence problem, optical flow • Foundations of mobile robotics: robot motion, sensors, probabilistic robotics, particle filters, SLAM • Outreach: 3D vision, generative adversarial networks, self-supervised learning
Recommended literature	1. R. C. Gonzalez and R. Woods, "**Digital Image Processing**", Pearson, 3rd edition, 2018. 2. I. Goodfellow, Y. Bengio and A. Courville, "**Deep Learning**", MIT Press, 2016.
Teaching methods	Lecture and lab
Assessment method	Project
Language of instruction	English
Prerequisite	None

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

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.

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

Renewable Energy Systems

Course title	Renewable Energy Systems
ECTS	5
Course type	Lecture
SWS	4
Semester	Winter
Workload in hours	Total: 150 / In-class: 60 / Self-study: 90
Lecturer	Prof. Dr.-Ing. Otto Kreutzer
Course objectives	- Forms of renewable energies - Transport and storage of renewable energies - Potential and limits of a 100 % renewable energy supply - Possibilities to actively stop and reverse the effect of global warming
Course contents	The goal of the course is to find ways to supply all worldwide energy demands with renewable energies and realize a carbon-neutral society. To achieve this goal, the different forms of renewable energies are evaluated and necessary technologies to store and transport those renewable energies are explored. After knowing possible forms of energy supply, the energy demand in the different sectors is evaluated and technical solutions to supply industry, transport (cars, aircrafts, planes, ships) and households with 100 % renewable energies are depicted. In addition solutions are revealed to reduce the atmospheric temperature to pre-industrial levels.
Teaching methods	Lecture / presentation
Assessment method	Seminar paper

Language of instruction	English
Prerequisite	Interest in renewable energies, background in electrical engineering

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

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 Quality Management

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

Language of instruction	English
Prerequisite	None

Customer-driven Production Planning

Course title	Customer-driven Production Planning (in the smart factory)
ECTS	2
Course type	Lecture/ practical exercises
SWS	2
Semester	Winter Semester
Workload in hours	Total: 60 hrs / In-class:30 hrs / Self-study: 30 hrs
Lecturers	Prof. Dr. Christine Wünsche
Course objectives	Basic understanding of the interaction between design, material, production technology and quality assurance in the production of a medical product
Course contents	Customer and customer demands What is quality? Materials, design and production technology Quality control: measuring, quality planning, Industry 4.0
Recommended literature	Optical Technology von Jens Bliedtner, Gunter Grafe und Rupert Hector von Mcgraw Hill Book Co
Teaching methods	Lecture, hands-on training
Assessment method	Written examination, 90 min.
Language of instruction	English
Prerequisite	Basic engineering knowlegde, physics

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

International Business Development

Course title	International Business Development
Course ID	A3111
ECTS	5
SWS	4
Semester	Winter
Workload in hours	Total: 150 / In-class: 60 hrs / Self-study: 90 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 businesses 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
Teaching methods	• Lectures • Group work • Case studies • Learning based on experiences • Exercises
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	written paper
Language of instruction	English

Financing and Marketing for New Ventures

Course title	Finance and Marketing New Ventures
ECTS	5
Course type	Lecture/ practical exercises
SWS	4
Semester	Winter
Workload in hours	Total: 150 / In-class: 60 / Self-study: 90
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