



# UAS Technikum Wien

## COURSE GUIDE SUMMER TERM 2017

COURSES OFFERED IN ENGLISH

February 1<sup>st</sup>, 2017 – June 30<sup>th</sup>, 2017

**Please note:**

Incoming students have the possibility to combine courses from different study programs. The number of places available for Incoming students in each course may vary or be limited to a certain number.

The module “Cross-Cultural Competences & Language” at the beginning of each semester is held for all Incoming students as well as for all Double Degree students.

**Please take into consideration that this course guide may be subject to change!**

**Last update:** 12.10.16

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# CAMPUS INTERNATIONAL

## Cultural Aspects and Gender in Online Communication

<b>Degree programme</b>	CI Campus International
<b>Semester</b>	2
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	1.00
<b>Incoming Places</b>	20

<b>Course Description</b>	<p>We will discuss different dimensions of online communication eg. Social Media and to that effect chances and challenges regarding cultural aspects and gender. Students will be sensitized on the complexity of cultural aspects and gender in online communication, analyze and compile best practices and will have the ability to convert bad practice into good practice. This integrated course also provides space to improve presentation and feedback techniques.</p> <p>The goal is to increase awareness on the challenges that might occur in online communication because of gender and cultural backgrounds and to elaborate solution strategies and tools for successful and equitable online communication.</p>
<b>Learning outcome</b>	<p>After passing this course successfully, students will:</p> <ul style="list-style-type: none"><li>- know about the current state of research and will be able to reflect the (online) world critically in the matter of cultural, gendered and ethical aspects of (online) communication</li><li>- be sensitized on the complexity of cultural aspects and gender in online communication</li><li>- be able to draw on solution strategies and tools for successful and equitable online communication</li><li>- have improved their presentation and feedback techniques</li></ul>
<b>Course Contents</b>	<ul style="list-style-type: none"><li>- Communication in general</li><li>- What is online communication?</li><li>- Gender and online communication</li></ul>

	<ul style="list-style-type: none"> <li>- Cultural aspects in and of online communication</li> <li>- Ethics of communication and ethical aspects of online communication</li> <li>- Presentation techniques and feedback</li> </ul>
<b>Teaching methods</b>	- Team work, games, case studies, discussions and debates, video clips, market stalls, presentations, statement-maze
<b>Prerequisites</b>	None
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- Participation</li> <li>- Presentation</li> <li>- Homework (one reflection at the end of the semester)</li> </ul>
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Herring, S. (2003): <i>Gender and Power in Online Communication</i>. In: Holmes, J./Meyerhoff, M.: <i>The Handbook of Language and Gender</i>. Backwell Publishers, Malden, Oxford, Melbourne, Berlin.</li> <li>- Danet, B./Herring, S. (2004): <i>Multilingualism on the Internet</i>. In: <i>The Routledge Handbook of Multilingualism</i>, 553-592.</li> <li>- Adam, A. (2001): <i>Computer ethics in a different voice</i>. In: <i>Information and Organization</i>, 11, Information Systems Research Centre, University of Salford, UK, 235-261.</li> </ul>
<b>Attendance</b>	Attendance is compulsory in this course, only 20% of absence is tolerated. In case you miss more than 20% of the class you lose the first attempt in the exam.

## Renewable Energy Laboratory

<b>Degree programme</b>	CI Campus International
<b>Semester</b>	2
<b>Course methods</b>	LAB
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming Places</b>	12

<b>Course Description</b>	Experimental setup of different means of measuring methods to evaluate the performance of renewable energy technologies and systems.
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- measure and analyze the energetic performance of components of energy conversion systems and measure and interpret the power quality of energy networks</li> </ul>



	<ul style="list-style-type: none"> <li>- measure and analyze the energetic performance of heat pumps,</li> <li>- measure and analyze the energetic performance of thermal solar plants and photovoltaic plants,</li> <li>- measure certain parameters of ventilation and hydraulic systems and interpret it</li> </ul>
<b>Course Contents</b>	<ul style="list-style-type: none"> <li>- Measurements and analysis of the energetic performance of energy conversion systems,</li> <li>- analysis of the power quality of electrical networks,</li> <li>- measurement and analysis of the efficiency of heat pump systems,</li> <li>- measurements and performance tests of solar thermal and photovoltaic plants,</li> <li>- performance tests of ventilation and hydraulic systems</li> <li>- Presentation techniques and feedback</li> </ul>
<b>Teaching methods</b>	- Laboratory exercises in small groups of typically 8-12 students
<b>Prerequisites</b>	Basics in: <ul style="list-style-type: none"> <li>- Electrical machines</li> <li>- Mechanical engineering</li> <li>- Thermodynamics</li> <li>- Instrumentation</li> </ul>
<b>Assessment Methods</b>	Course immanent assessment method <ul style="list-style-type: none"> <li>- Laboratory notes</li> <li>- Laboratory reports</li> <li>- Grading of practical session - Laboratory reports</li> </ul>
<b>Recommended Reading and Material</b>	Scripts of the lecturers
<b>Attendance</b>	Attendance is mandatory in this course, only 20% of absence is tolerated. In case you miss more than 20% of the class you lose the first try in the exam.

### Module Cross Cultural Competences and Language:

<b>Degree Program</b>	Campus International
<b>Semester</b>	<b>Note:</b> The module is taking place in the first two weeks of each semester and all the following courses are obligatory for Incoming Students: <ul style="list-style-type: none"> <li>• Austrian Culture &amp; more</li> <li>• Developing Cross Cultural Competences</li> <li>• Scientific writing in different cultural traditions</li> </ul>

	<ul style="list-style-type: none"> <li>German Language A1/, A2/B1 or B2 <ul style="list-style-type: none"> <li>English Language B2 (for German Native Speakers)</li> </ul> </li> </ul>
<b>Course Methods</b>	ILV
<b>ECTS</b>	4.00
<b>Incoming Places</b>	Open
<b>Prerequisites</b>	None
<b>Attendance</b>	Yes
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>Hofstede/Petersen/Hofstede (2002): Exploring Culture. Exercises, Stories und Synthetic cultures. Boston/London: Intercultural Press</li> <li>Schroll/Machl (2008): Doing Business with Germans. Göttingen: Vandenhoeck &amp; Ruprecht</li> <li>Script of the lecturer</li> </ul>

<b>Course Description</b>	<p>For all Incoming-students, the UAS Technikum Wien offers the module „Cross Cultural Competences and Language“ which takes place in the two orientation weeks at the beginning of each semester and is compulsory for all Incoming students.</p> <p>In this module, selected topics related with intercultural aspects such as Austrian cultural standards compared to student's culture of origin, intercultural scientific writing traditions, selected cultural models (Schein, Thomas, Hofstede), facts and figures about Austria and individual cultural imprints will be examined. Key aspects will be formed in terms of languages and of discussions on cultural standards in Austria based on similarities and differences in the student's culture of origin. The content rests upon the intercultural potential of the students.</p> <p>Regarding the language course, the students have to choose between German or – for German speaking students – English Language. An entrance level test in order to identify the appropriate level has to be completed in advance.</p>
<b>Assessment</b>	<ul style="list-style-type: none"> <li>Course immanent assessment method</li> <li>Final exam</li> <li>Written reflection</li> </ul>

## - Austrian Culture & more

<b>Degree programme</b>	Campus International
<b>Course methods</b>	ILV
<b>Language</b>	English

<b>ECTS Credits</b>	1.50
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<b>Course Description</b>	In this course the students gain knowledge about Austria (country, culture, history, geography) and discuss about similarities and differences towards their culture of origin on the base of selected culture models (such as Schein, Hofstede). Finally, similarities and differences regarding high/low context culture, time planning and dealing with conflicts will be elaborated in the course of reflections and presentations.
<b>Learning outcome</b>	After passing this course successfully students are able to: <ul style="list-style-type: none"> <li>- analyze and reflect own cultural imprints and the culture of origin with the use of the culture models of Schein.</li> <li>- describe Austrian cultural standards in terms of geography, history, society and language on the base of selected facts and figures.</li> <li>- explicate the topics high/low context culture, time planning and dealing with conflicts (Schein und Hofstede) and derivate Dos and Don'ts in Austria</li> <li>- compare the topics high/low context culture, time planning and dealing with conflicts as well as Dos and Don'ts in Austria with the culture of students origin</li> <li>- develop similarities and differences regarding the several cultures on the base of case studies.</li> </ul>

### • Developing Cross Cultural Competences

<b>Degree programme</b>	Campus International
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	0.5

<b>Course Description</b>	This module will familiarize the students with inter-cultural culture dimensions (Hofstede) and help them analyze these by presenting case examples, which further helps avoid conflicts in various communication situations. Furthermore, reasons for culture shock, its process and avoidance strategies will be discussed.
<b>Learning outcome</b>	After passing this course successfully students are able to: <ul style="list-style-type: none"> <li>- recognize, analyze and react to the various cultural dimensions and communications styles</li> <li>- define the process of culture shocks and derive proactive strategies and prevent these shocks</li> </ul>

- Scientific writing in different cultural traditions

<b>Degree programme</b>	Campus International
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	0.5

<b>Course Description</b>	The students define the term science and analyze the criteria of scientific work in the German speaking scientific context as well as the structure of a scientific paper at the UAS Technikum Wien and compare similarities and differences with the inter-cultural writing tradition of their cultures of origins.
<b>Learning outcome</b>	After passing this course successfully students are able to: <ul style="list-style-type: none"> <li>- characterize and apply the criteria of a scientific paper in the German speaking scientific context and further to compare these traditions of scientific writing to their own cultures</li> <li>- describe the structure of a scientific paper and its most important criteria (citation rules, plagiarism).</li> </ul>

- English Language B2+ (for German Native Speakers)

<b>Degree programme</b>	Campus International
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	1.50

<b>Course Description</b>	Starting from level B2 of the Common European Framework of Reference for Languages, we aim at developing and strengthening language skills required for personal and professional interaction in a cross-cultural context.
<b>Learning outcome</b>	Upon completion of this course, the students will be able to: <ul style="list-style-type: none"> <li>- provide biographical details about themselves</li> <li>- act spontaneously and competently in informal situations</li> <li>- communicate spontaneously and fluently in various situations in a university context</li> <li>- identify and avoid possible pitfalls of cross-cultural communication</li> <li>- analyze persuasive strategies</li> </ul>

	- plan, deliver and evaluate a persuasive speech studies.
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### • German Language A1

<b>Degree programme</b>	Campus International
<b>Course methods</b>	ILV
<b>Language</b>	German
<b>ECTS Credits</b>	1.50

<b>Course Description</b>	We aim at providing students without any prior knowledge of German with the basic language skills required for personal and social interaction in a cross-cultural context.
<b>Learning Outcomes</b>	<p>After passing this course successfully students are able to:</p> <ul style="list-style-type: none"> <li>- greet others, introduce themselves and ask questions about personal details</li> <li>- talk about themselves and others using basic language structures</li> <li>- understand and write short e-mails, using an appropriate level of formality</li> <li>- read and fill in various types of registration forms</li> <li>- understand and formulate simple questions and orders</li> <li>- understand and use numbers in various contexts</li> <li>- ask for prices</li> <li>- give the time of day</li> <li>- understand and use the phrases required for shopping and eating out</li> </ul>

### • German Language A2/B1

<b>Degree programme</b>	Campus International
<b>Course methods</b>	ILV
<b>Language</b>	German
<b>ECTS Credits</b>	1.50

<b>Course Description</b>	Starting from level A2 of the Common European Framework of Reference for Languages, we aim at developing and strengthening
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	language skills required for personal and social interaction in a cross-cultural context.
<b>Learning outcome</b>	<p>After passing this course successfully students are able to:</p> <ul style="list-style-type: none"> <li>- use simple structures correctly</li> <li>- talk about themselves and others</li> <li>- initiate and participate in short conversations in routine contexts</li> <li>- successfully communicate in most situations encountered while studying in Austria</li> <li>- follow and participate in discussions on topics relating to Austria using simple structures</li> <li>- understand and write e-mails as encountered in a university context</li> </ul>

## • German Language B2

<b>Degree programme</b>	Campus International
<b>Course methods</b>	ILV
<b>Language</b>	German
<b>ECTS Credits</b>	1.50

<b>Course Description</b>	Starting from level B1+ of the Common European Framework of Reference for Languages, we aim at developing and strengthening language skills required for personal and social interaction in a cross-cultural context
<b>Learning outcome</b>	<p>Upon completion of this course, the students will be able to:</p> <ul style="list-style-type: none"> <li>- provide biographical details about themselves in a well-structured way</li> <li>- to act spontaneously and competently in informal situations</li> <li>- communicate spontaneously and fluently in various situations in a university context</li> <li>- identify and avoid possible pitfalls of cross-cultural communication</li> <li>- understand certain characteristics of Austrian life and culture</li> <li>- analyze persuasive strategies</li> <li>- plan, deliver and evaluate a persuasive speech</li> </ul>

# FACULTY OF COMMUNICATION TECHNOLOGIES & ELECTRONIC ENGINEERING

## Bachelor Degree Programs

### Electronic Engineering

Technical and Creative Communication

<b>Degree programme</b>	BEL
<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	2.00
<b>Incoming places</b>	Limited

<b>Course description</b>	This seminar discusses and elaborates technical concepts, procedures and their effects.
<b>Teaching methods</b>	An interactive communicative approach is used where students have the opportunity to improve their speaking and listening skills. Writing skills are taught through activities in class and assignments.
<b>Learning outcome</b>	After passing this course successfully students are able to ... <ul style="list-style-type: none"><li>- structure and describe a technical process in English for a given target group</li><li>- illustrate and explain abstract technical concepts through real-life examples</li><li>- analyze and interpret literary texts in the English language.</li></ul>
<b>Course contents</b>	<ul style="list-style-type: none"><li>- distinguishing the three main types of discourse</li><li>- audience adaptation in terms of language and content</li><li>- impact analysis</li><li>- technical process descriptions</li><li>- use of persuasive language</li><li>- analysis and interpretation of literary texts</li></ul>
<b>Prerequisites</b>	Common European Framework of Reference for Languages Level

	B1+
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- Attendance and participation in class discussions</li> <li>- The quality of your assignments</li> <li>- Personal improvement of your English and communication skills</li> </ul>
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Lernunterlagen / Learning material:</li> <li>- Studienbriefe / Dedicated scripts and lecture notes</li> </ul>
<b>Attendance</b>	Attendance is compulsory

## Scientific Writing

<b>Degree programme</b>	BEL
<b>Semester</b>	4
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	2.00
<b>Incoming places</b>	Limited

<b>Course description</b>	This seminar discusses language-related and formal criteria required for short scientific papers, together with the discussion of ethics concepts in the professional sphere and the analysis of real-life case studies.
<b>Teaching methods</b>	Writing examples and in-class assignments will be used in the classroom. Students will have the opportunity to choose a technical subject and present it to the class as well as research and present case studies concerning engineering ethics (learning by doing). Feedback and opportunities for group evaluation will follow.
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- cite/reference other authors' work in compliance with paper guidelines</li> <li>- structure and write short scientific papers according to the language-related and formal criteria given</li> <li>- formulate and justify a rationally defensible position on basic ethical problems</li> <li>- analyze ethical dilemmas in case studies</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Structuring a scientific paper</li> <li>- Correct citation of other authors' findings</li> <li>- Language-related peculiarities of a scientific paper</li> </ul>



	<ul style="list-style-type: none"> <li>- Principles of ethical judgement</li> <li>- Different approaches to ethics</li> <li>- Case studies</li> </ul>
<b>Prerequisites</b>	Common European Framework of Reference for Languages Level B2 Completion of previous semester course
<b>Assessment Methods</b>	- active participation in class activities and timely completion of assignments
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Learning material:</li> <li>- Lecture notes</li> </ul>
<b>Attendance</b>	Attendance is compulsory

## Electronics and Business (full-time)

### Creative English

<b>Degree programme</b>	BEW
<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Starting from the Common European Framework of Reference for Languages B1+, we aim at developing and strengthening the vocabulary of the students' field of study along with the language skills required for technical and creative communication
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- upon completion of this course, the students will be able to: structure and describe a technical process in English for a given target group; illustrate and explain abstract technical concepts through real-life examples; analyse and interpret literary texts in the English language.</li> <li>- upon completion of this course, the students will be able to:</li> <li>- structure and describe a technical process in English for a given target group;</li> </ul>

	<ul style="list-style-type: none"> <li>- illustrate and explain abstract technical concepts through real-life examples;</li> <li>- analyse and interpret literary texts in the English language.</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Distinguishing the three main types of discourse• audience adaptation in terms of language and content• impact analysis• technical process descriptions• use of persuasive language• analysis and interpretation of literary texts</li> <li>-</li> <li>- Distinguishing the three main types of discourse</li> <li>- Audience adaptation in terms of language and content</li> <li>- Impact analysis</li> <li>- Technical process descriptions</li> <li>- Use of persuasive language</li> <li>- Analysis and interpretation of literary texts</li> </ul>
<b>Prerequisites</b>	Common European Framework of Reference for Languages Level B1+ Completion of previous semester course
<b>Assessment Methods</b>	- Course immanent assessment method, i.e. active participation in class activities and timely completion of assignments
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Maderdonner, O. / et al (2014): Technical and Creative Communication, Script • Connolly, P. / Kingsbury, P. et al. (2014): eSNACK, learning platform• Additional current handouts and audio-visual support</li> <li>-</li> <li>- Maderdonner, O. / et al (2014): Technical and Creative Communication, Script</li> <li>- Connolly, P. / Kingsbury, P. et al. (2014): eSNACK, learning platform;</li> <li>- Additional current handouts and audio-visual support</li> </ul>
<b>Attendance</b>	Compulsory

## Business English 2

<b>Degree programme</b>	BEW
<b>Semester</b>	4
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Starting from the Common European Framework of Reference for Languages B2, students acquire relevant terms, concepts and language skills necessary to be competitive in the job market
<b>Learning outcome</b>	After passing this course successfully students are able to ... - demonstrate their qualifications in the job application process - present and negotiate projects successfully in English - conduct various forms of business communication
<b>Course contents</b>	- CV and covering letter - Job interview - Presenting and negotiating project concepts and business plans - Business communication
<b>Prerequisites</b>	Completion of previous course
<b>Assessment Methods</b>	- Course immanent assessment method, i.e. active participation in class activities and timely completion of assignments
<b>Recommended Reading and Material</b>	- Maderdonner, O. (2014): English for Business, Skriptum - Additional current handouts and audio-visual support
<b>Attendance</b>	Compulsory

## Advanced English 2

<b>Degree programme</b>	BEW
<b>Semester</b>	6
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	The students acquire and practice the writing and speaking skills necessary to complete their bachelor studies, such as writing abstracts, techniques for successful presentations
<b>Learning outcome</b>	After passing this course successfully students are able to ... - write abstracts in compliance with the given formal and language-related Guidelines - present and defend one of their theses in English in front of the exam committee

<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Structure of an abstract vs. German summary</li> <li>- Writing process</li> <li>- Building an English presentation from a German paper</li> <li>- Presentation techniques and relevant language</li> </ul>
<b>Prerequisites</b>	- Common European Framework of Reference for Languages Level B2 - Completion of previous semester course
<b>Assessment Methods</b>	- Course immanent assessment method, i.e. active participation in class activities and timely completion of assignments
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Maderdonner, O. / et al (2014): Abstract Writing, Script</li> <li>- Maderdonner, O. / et al (2014): Presentation Essentials, Script</li> <li>- Additional current handouts and audio-visual support</li> </ul>
<b>Attendance</b>	Compulsory

## Electronics and Business (distance study)

### Electronic Measurement & Control Engineering

<b>Degree programme</b>	BEW
<b>Semester</b>	2
<b>Course methods</b>	FUV
<b>Language</b>	English
<b>ECTS Credits</b>	6.00
<b>Incoming places</b>	Limited

<b>Course description</b>	The course Electronic Measurement and Control Systems presents the fundamentals of Control Theory like Open Loop, Closed Loop model, calculation of step response and transfer function, Analysis of stability under consideration of different controllers like PID. The issue of gain – and phase margin and the digital controller are also the topics auf this course.
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- explain basic terms such as Open Loop, Closed Loop model, Stability, gain-and phase margin, P,I and D Controller.</li> <li>- apply calculation method of step response and transfer function.</li> <li>- calculating gain-and phase margin of Control circuit</li> <li>- design a digital controller</li> </ul>

<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Basic principles of Control Circuits</li> <li>- Laplace Transformation</li> <li>- Plants and Controller (P,I and D Controller)</li> <li>- Step Response</li> <li>- Transfer Function</li> <li>- Stability</li> <li>- Control Deviation</li> <li>- Gain and phase margin</li> <li>- Digitalization of the Control process</li> </ul>
<b>Prerequisites</b>	Successful completion of the courses of the first semester
<b>Assessment Methods</b>	- Assessment in writing, theory and calculations.
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Distance learning materials:</li> <li>- Scripts</li> <li>- Videos</li> <li>- Books:</li> <li>- Electrical Engineering-know it all.</li> <li>- Haager: Regelungstechnik öbv</li> <li>- Matlab</li> </ul>
<b>Attendance</b>	Compulsory attendance during on-campus phases

## Team Work

<b>Degree programme</b>	BEW
<b>Semester</b>	2
<b>Course methods</b>	FUV
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	The course prepares students for team work in their studies and in their professional work.
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- explain models of team development (for example Tuckman ) and to derive interventions for their own practice.</li> <li>- explain team roles (for example Belbin ) and to identify them in simple practical examples.</li> <li>- use constructive feedback in team conflicts.</li> </ul>
<b>Course contents</b>	- Characteristics and criteria of success in Teamwork

	<ul style="list-style-type: none"> <li>- Team development</li> <li>- Team roles</li> <li>- Structure of personalities in team processes</li> <li>- Preferred team roles and personal potential for development</li> <li>- Constructive feedback in conflicts</li> </ul>
<b>Prerequisites</b>	None
<b>Assessment Methods</b>	- Course immanent assessment method
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Belbin, M. R. (1999): Team Roles at Work, Oxford: Butterworth &amp; Heinemann</li> <li>- Harvard Business Essentials (2004): Creating Teams with an Edge. The Complete Skill Set to Build Powerful and Influential Teams, Boston: Harvard Business School Publishing Corporation</li> <li>- Maginn, M. (2004): Making Teams Work: 24 Lessons for Working Together Successfully, Dubuque: McGraw-Hill Professional Education Series</li> </ul>
<b>Attendance</b>	Compulsory attendance during on-campus phases

## Technical and Creative Communication

<b>Degree programme</b>	BEW
<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	Starting from the Common European Framework of Reference for Languages B2, we aim at developing and strengthening the vocabulary of the students' field of study along with the language skills required for technical and creative communication
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- structure and describe a technical process in English for a given target group;</li> <li>- illustrate and explain abstract technical concepts through real-life examples;</li> <li>- distinguish and implement the basic formal and language-related features of technical communication.</li> </ul>

<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Audience adaptation in terms of language and content</li> <li>- Impact analysis</li> <li>- Technical process descriptions</li> <li>- Elements of technical communication</li> <li>- Technology and creativity</li> </ul>
<b>Prerequisites</b>	Common European Framework of Reference for Languages Level B2 Completion of previous semester course
<b>Assessment Methods</b>	- Course immanent assessment method, i.e. active participation in online activities and timely completion of assignments
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Schökler, G. (2015): Einzelskripten, adapted from Maderdonner, O. / et al (2014): Technical and Creative Communication, Skriptum</li> <li>- Connolly, P. / Kingsbury, P. et al. (2014): eSNACK, Lernplattform</li> <li>- Additional current handouts and audio-visual support</li> </ul>
<b>Attendance</b>	Compulsory attendance during on-campus phases

## Mathematics 2

<b>Degree programme</b>	BEW
<b>Semester</b>	2
<b>Course methods</b>	FUV
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Advanced topics in engineering mathematics focussing on signal analysis and differential equations
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- decompose vectors into orthogonal components</li> <li>- expand a given periodic function into its Fourier series (in real and complex form)</li> <li>- determine Fourier and Laplace transforms of functions using tables and transformation rules (shift theorems, scaling properties)</li> <li>- solve simple ordinary differential equations and initial value problems using appropriate methods</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Vectors and vector spaces, bases</li> <li>- Scalar products and orthogonality</li> <li>- Fourier series</li> </ul>

	<ul style="list-style-type: none"> <li>- Fourier transform</li> <li>- Laplace transform</li> <li>- Overview of types of differential equations</li> <li>- Solution methods for simple (in particular linear) ordinary differential equations and corresponding initial value Problems</li> <li>- Solving initial value problems for linear differential equations with constant coefficients using the Laplace transform</li> </ul>
<b>Prerequisites</b>	Mathematics 1
<b>Assessment Methods</b>	- Written tests at midterm and end of semester
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Papula, L. (2015): Mathematik für Ingenieure und Naturwissenschaftler Band 2, Springer Vieweg</li> <li>- Stingl, P. (2009): Mathematik für Fachhochschulen: Technik und Informatik, Hanser</li> <li>- Sturm, Th. F. (2007): Mathematik für Ingenieure 3</li> <li>- Timischl, W. / Kaiser, G.: Ingenieur-Mathematik 4, E. Dorner</li> </ul>
<b>Attendance</b>	compulsory attendance during on-campus phases

## Computer Science 2

<b>Degree programme</b>	BEW
<b>Semester</b>	2
<b>Course methods</b>	FUV
<b>Language</b>	English
<b>ECTS Credits</b>	6.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Computer Science Theory of Computation
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- identify relevant financial and staff expenditures related to IT</li> <li>- explain development, implementation and operation of a database application</li> <li>- explain the fundamentals of technical computer science (internet security, cryptography, theory of computation, foundations of programming, algorithms and data structures)</li> </ul>
<b>Course contents</b>	- Fundamentals of technical computer sciences (internet security, cryptography, theory of computation, foundations of programming, algorithms and data structures)



	<ul style="list-style-type: none"> <li>- Total Cost of Ownership (TCO)</li> <li>- Software Project Management</li> <li>- Database Systems</li> </ul>
<b>Prerequisites</b>	None
<b>Assessment Methods</b>	- Course immanent assessment method
<b>Recommended Reading and Material</b>	- King, K.N. (2008):C Programming, Norton
<b>Attendance</b>	Compulsory attendance during on-campus phases

## Electronic Engineering 2

<b>Degree programme</b>	BEW
<b>Semester</b>	2
<b>Course methods</b>	FUV
<b>Language</b>	English
<b>ECTS Credits</b>	6.00
<b>Incoming places</b>	Limited

<b>Course description</b>	In the Electronic Engineering 2 course students acquire basic knowledge of fundamental rules in Electrical and Electronics Engineering of AC circuits and understand physical laws and abstractions applied to semiconductor devices.
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- apply the methods of complex alternating current technology (e.g. calculation with complex resistors and pointers as well as phasor diagrams) for calculating peaks of voltages and currents as well as phase shifts and to dimension the values of resistors, inductors and capacitors in AC circuits.</li> <li>- analyze and simulate a buck converter circuit.</li> <li>- design transistor circuits (transistor as switch, amplifier)</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Inductor / Capacitor in DC / AC circuits</li> <li>- Complex alternating current calculus</li> <li>- Filter Circuits (low-pass, high-pass, band-pass)</li> <li>- Resonance circuits</li> <li>- Power</li> <li>- Phasor diagram</li> <li>- Diode, rectifier</li> </ul>

	<ul style="list-style-type: none"> <li>- Transistor, Mosfet</li> <li>- DC-DC Converter, transformer</li> </ul>
<b>Prerequisites</b>	Electronic Engineering 1
<b>Assessment Methods</b>	- Course immanent assessment method and end exam
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Maxfield and others (2008): Electrical Engineering – know it all, Newnes Verlag</li> <li>- Seidel, Heinz-Ulrich (2003): Allgemeine Elektrotechnik: Gleichstrom Felder – Wechselstrom, Hanser Verlag</li> <li>- Weißgerber, Wilfried (2013): Gleichstromtechnik und Elektromagnetisches Feld. Ein Lehrund Arbeitsbuch für das Grundstudium, Springer Fachmedien Wiesbaden Verlag</li> <li>- Bieneck, Wolfgang (2014): Grundlagen der Elektrotechnik ; Informationsund Arbeitsbuch für Schüler und Studenten der elektrotechnischen Berufe, Holland und Josenhans Verlag</li> </ul>
<b>Attendance</b>	Compulsory attendance during on-campus phases

## Laboratory 2

<b>Degree programme</b>	BEW
<b>Semester</b>	2
<b>Course methods</b>	LAB
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Design and experimental set-up of electronic circuits and circuits, as well as their validation and characterization with modern measuring instruments.
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- design and experimental set-up basic electronic circuits and validate and characterize them with modern measuring instruments.</li> <li>- measure and interpret voltage and current in circuits with inductor, capacitor, transistor, resistor and diode with an oscilloscope.</li> <li>- simulate and design a buck converter circuit.</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Safety regulations, laboratory rules, technical reports</li> <li>- ADC-DAC Voltage</li> <li>- Bridge circuits</li> </ul>

	<ul style="list-style-type: none"> <li>- Switching of an inductive load</li> <li>- Electronic measurement and control engineering circuits</li> <li>- Buck converter</li> </ul>
<b>Prerequisites</b>	Electronic Engineering 1, Electronic Design 1
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- Course immanent assessment method</li> <li>- Laboratory notes</li> <li>- Laboratory reports</li> <li>- Grading of practical session</li> <li>- Laboratory reports</li> </ul>
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Maxfield and others (2008): Electrical Engineering – know it all, Newnes Verlag</li> <li>- Seidel, Heinz-Ulrich (2003): Allgemeine Elektrotechnik: Gleichstrom Felder – Wechselstrom, Hanser Verlag</li> <li>- Weißgerber, Wilfried (2013): Gleichstromtechnik und Elektromagnetisches Feld. Ein Lehrund Arbeitsbuch für das Grundstudium, Springer Fachmedien Wiesbaden Verlag</li> <li>- Bieneck, Wolfgang (2014): Grundlagen der Elektrotechnik ; Informationsund Arbeitsbuch für Schüler und Studenten der elektrotechnischen Berufe, Holland und Josenhans Verlag</li> </ul>
<b>Attendance</b>	Compulsory attendance during on-campus phases

## Physics 1

<b>Degree programme</b>	BEW
<b>Semester</b>	2
<b>Course methods</b>	FUV
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	The lecture focuses on the transfer of basic knowledge on mechanics and thermodynamics and electrodynamics. It is the goal to enable students to describe technical processes by means of scientific methods. Thereby an understanding of physical and scientific modelling is generated. By applying physical laws to simple technical problems the meaning of physical laws is explained.
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- find out the relevant physical laws for a given technical problem and</li> </ul>

	apply the laws to solve the Problem - give a physical explanation for simple processes and deduce a mathematical formulation - deduce mathematical equations based on technical Problems - transfer technical problems in a mathematical form so that calculations can be done - analyze the results of a calculation with respect to the technical consequences and give clear advice for implementation
<b>Course contents</b>	- Mechanics - Oscillations and waves - Thermodynamics - Electrodynamics
<b>Prerequisites</b>	Basic mathematical knowledge.
<b>Assessment Methods</b>	- Course immanent assessment method and end exam
<b>Recommended Reading and Material</b>	- Horst Kuchling (2004): „Taschenbuch der Physik“, Carl Hanser Verlag - Halliday, Resnick, Walker (2003): „Physik“, Wiley-VCH
<b>Attendance</b>	Compulsory attendance during on-campus phases

## Moderation & Problem Solving Techniques

<b>Degree programme</b>	BEW
<b>Semester</b>	4
<b>Course methods</b>	FUV
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	The course prepares the students for the role of a facilitator using relevant methods of problem solving and supporting creativity.
<b>Learning outcome</b>	After passing this course successfully students are able to ... - plan a moderation cycle adapted to task and the needs of the target group. - allow and to promote different perspectives from a neutral attitude. - moderating a target group related with subsequent clustering and multi-point query is a query cards
<b>Course contents</b>	- Roles: facilitator, recorder, person responsible

	<ul style="list-style-type: none"> <li>- Individual, organisational and methodical preparation</li> <li>- Setting of goals and Tasks</li> <li>- Structure, development and process control of a facilitation</li> <li>- Brainstorming and creativity techniques</li> <li>- Problem-solving techniques</li> </ul>
<b>Prerequisites</b>	None
<b>Assessment Methods</b>	- Course immanent assessment method (participated successfully)
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Dörner, Dietrich (2008): Die Logik des Mißlingens: Strategisches Denken in komplexen Situationen, rororo</li> <li>- Gigerenzer, Gerd (2008): Bauchentscheidungen: Die Intelligenz des Unbewussten und die Macht der Intuition, München Goldmann Verlag</li> <li>- Hartmann, M./Rieger, M. (2007): Zielgerichtet moderieren, Weinheim: Beltz</li> <li>- Klein, Z. M. (2006): Kreative Geister wecken. Kreative Ideenfindung und Problemlösungstechniken, Bonn: Manager Seminare Verlag</li> <li>- Schilling, Gert (2005): Moderation von Gruppen, überarb. Auflage, Schilling Verlag, Berlin</li> <li>- Seifert J. W (2004): Besprechungen erfolgreich moderieren, Offenbach: Gabal Verlag Auflage</li> </ul>
<b>Attendance</b>	Compulsory attendance during on-campus phases

## Communication Technologies

<b>Degree programme</b>	BEW
<b>Semester</b>	4
<b>Course methods</b>	FUV
<b>Language</b>	English
<b>ECTS Credits</b>	6.00
<b>Incoming places</b>	Limited

<b>Course description</b>	<p>This lecture offers an introduction to digital mobile communication. On the one hand, fundamentals and implementation of mobile communication systems, in particular with the focus on:- 2nd Generation of mobile networks (GSM und GPRS)- 3rd Generation of mobile networks (UMTS)- 4th Generation of the mobile networks (LTE)are covered and on the other hand, the course presents fundamental techniques for data compression, channel coding and</p>
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	channel modeling, in particular with the focus on:- entropy coding- linear block codes- discrete channels
<b>Learning outcome</b>	After passing this course successfully students are able to ... <ul style="list-style-type: none"> <li>- outline and compare different mobile network architectures</li> <li>- explain mobile radio interfaces and to list their characteristics</li> <li>- describe different mobile network use cases</li> <li>- calculate characteristics of information sources (e.g. information content, entropy)</li> <li>- design a binary coding with minimum average code word length for information sources</li> <li>- apply linear block codes to detect and correct errors</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Radio interface, network architecture and functionalities in 2nd generation of mobile networks (GSM and GPRS)</li> <li>- Radio interface, network architecture and functionalities in 3rd generation of mobile networks (UMTS)</li> <li>- Radio interface, network architecture and functionalities in 4th generation of the mobile networks (LTE)</li> <li>- Principles of information theory (information content, entropy, Markov sources)</li> <li>- Entropy coding (Huffman and Arithmetic Coding)</li> <li>- Pre-Coding (run length encoding, quadtree coding)</li> <li>- Encoding and decoding with linear block codes (generator matrix, parity check matrix, syndrome)</li> <li>- Receiver strategies and channel capacity</li> </ul>
<b>Prerequisites</b>	To successfully pass the course, students must have basic mathematical knowledge in:- statistics- linear algebra
<b>Assessment Methods</b>	- Course immanent assessment method (regular homeworks) and end exam
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- J. G. Proakis, M. Salehi, Digital Communications, Fifth Edition, McGraw-Hill, New York, 2008</li> <li>- J. Schiller, Mobile Communications, Second Edition, Pearson Education Limited, 2003</li> <li>- B. Walke, Mobilfunknetze und ihre Protokolle, Band 1 und 2, B. G. Teubner, Stuttgart, 1998.</li> <li>- B. Walke, M. P. Althoff, P. Seidenberg, UMTS –Ein Kurs, J.SchlembachFachverlag, 2001</li> </ul>
<b>Attendance</b>	Compulsory attendance during on-campus phases

## Electronic Project 2

<b>Degree programme</b>	BEW
<b>Semester</b>	4
<b>Course methods</b>	FUV
<b>Language</b>	English
<b>ECTS Credits</b>	6.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Application of electronic design to develop an electronic device in a project environment. Theme control systems
<b>Learning outcome</b>	After passing this course successfully students are able to ... <ul style="list-style-type: none"> <li>- design and simulate electronic circuits</li> <li>- assemble prototypes, to operate and measure them</li> <li>- design and simulate analog and digital control Systems</li> <li>- design algorithms for control systems and apply them on a microprocessor</li> <li>- write technical documentations</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Analog and digital control Systems</li> <li>- C-programming</li> <li>- Microcontroller programming</li> <li>- Simulation in MatLab</li> </ul>
<b>Prerequisites</b>	Control systems
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- Course immanent assessment method</li> <li>- Technical documentation</li> <li>- Individual examination of circuit and measurement knowledge</li> <li>- Working prototype</li> </ul>
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Hager, Wilhelm (200): Regelungstechnik, öbv</li> <li>- Schmidt, Günther (1994): Grundlagen der Regelungstechnik, Springer</li> <li>- Tietze, Ulrich / Schenk, Christoph / Gamm, Eberhard (1999): Halbleiter – Schaltungstechnik, Springer</li> <li>- Scripts</li> </ul>
<b>Attendance</b>	compulsory attendance during on-campus phases

## Computer Science 4

<b>Degree programme</b>	BEW
<b>Semester</b>	4
<b>Course methods</b>	FUV
<b>Language</b>	English
<b>ECTS Credits</b>	6.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Computer science
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- describe the software life cycle</li> <li>- define object-oriented terminology and UML artifacts</li> <li>- interpret UML artifacts</li> <li>- develop UML diagrams (use case diagram, class diagram, activity diagram, interaction diagram) using checklists and a UML tool</li> <li>- summarize the diagrams in a complete requirements specification</li> <li>- derive an OOD class diagram from an OOA class diagram</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Object-oriented analysis and design using UML</li> <li>- Visualization using UML</li> <li>- Requirements specification</li> </ul>
<b>Prerequisites</b>	Basic knowledge of a programming language.
<b>Assessment Methods</b>	- Course immanent assessment method and final exam
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Balzert, H. (2004 bzw., 2011, Auflage), Lehrbuch der Objektmodellierung, Analyse und Entwurf mit der UML 2, Spektrum Akademischer Verlag</li> <li>- King, K.N. (2008):C Programming, Norton</li> </ul>
<b>Attendance</b>	Compulsory attendance during on-campus phases
<b>Comments</b>	Tool: Enterprise Architect

## Business Communication for Engineers

<b>Degree programme</b>	BEW
<b>Semester</b>	4
<b>Course methods</b>	FUV
<b>Language</b>	English



<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	Starting from the Common European Framework of Reference for Languages B2, students engage with global economic and technical developments and their impact on society, and thereby acquire relevant terms and concepts together with the appropriate language skills
<b>Learning outcome</b>	After passing this course successfully students are able to ... - recognize connections between economic theories and forms of government - analyze the impact of globalization on society and the Environment - compare and contrast corporate innovation models
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Economic concepts and theories</li> <li>- Winners and losers of globalization</li> <li>- Development of technologies</li> <li>- Innovation</li> </ul>
<b>Prerequisites</b>	Completion of previous course
<b>Assessment Methods</b>	- Course immanent assessment method, i.e. active participation in class activities and timely completion of assignments
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Maderdonner, O. / et al (2014): Economy, Technology and Society, Script</li> <li>- Additional current handouts and audio-visual support</li> </ul>
<b>Attendance</b>	Compulsory attendance during on-campus phases

## Business Administration 2

<b>Degree programme</b>	BEW
<b>Semester</b>	4
<b>Course methods</b>	FUV
<b>Language</b>	English
<b>ECTS Credits</b>	6.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Basics Business Administration
<b>Learning outcome</b>	After passing this course successfully students are able to ...

	<ul style="list-style-type: none"> <li>- explain key terms of accounting</li> <li>- explain the accounting cycle</li> <li>- prepare and interpret balance sheet, income Statement</li> <li>- explain and apply core concepts of Managerial accounting: Full costing, Activity-based costing (ABC), Break Even Point, etc.</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Financial Accounting: Key terms in financial accounting</li> <li>- Double Entry bookkeeping</li> <li>- Balance sheet, Income Statement</li> <li>- Management Accounting</li> <li>- Key terms cost accounting</li> <li>- Classification of cost</li> <li>- Activity-based costing</li> <li>- Break Even Point, Make or buy decisions, pricing decisions, etc.</li> </ul>
<b>Prerequisites</b>	BA 1
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- End exam</li> <li>- Exams</li> <li>- Participation in class</li> </ul>
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Studienbriefe (SB):</li> <li>- SB: Daniel F. Leutgeb: Grundlagen Rechnungswesen_Einführung, Wien, 2007</li> <li>- SB: Daniel F. Leutgeb: Grundlagen Rechnungswesen_ Externes RW, Wien, 2007</li> <li>- SB: Martina Herzog: Folienskriptum Bilanzanalyse</li> <li>- SB: Daniel F. Leutgeb: Grundlagen Rechnungswesen_ Internes RW, Wien, 2007</li> <li>- + Folien</li> </ul>
<b>Attendance</b>	Compulsory attendance during on-campus phases

## Physics 3

<b>Degree programme</b>	BEW
<b>Semester</b>	4
<b>Course methods</b>	FUV
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Course mainly focuses physical problems solveable by ODEs: for
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	example: growth phenomena and oscillations. Prospects to wave phenomena and transport phenomena as thermal conductivity effects.
<b>Teaching methods</b>	Blended learning with MoodlePrivate study of well defined tasksIndividual written elaboration and collegiate review
<b>Learning outcome</b>	After passing this course successfully students are able to ... - description of physical problemsMathematical solution and interpretation of resultsHow to use specific literature
<b>Course contents</b>	- ElectricityMagnetismGrowth EffectsOscillationProspects to wave phenomena and transport phenomena as thermal conductivity effectsUncertainty in Measurement Results
<b>Prerequisites</b>	Elementary physics and mathematics
<b>Assessment Methods</b>	- Individual written elaborationCollegiate reviewExamination
<b>Recommended Reading and Material</b>	- Gerthsen: PhysikTipler: PhysikModul ScriptsWeb
<b>Attendance</b>	Compulsory attendance during on-campus phases

## Specialization Technology Management

<b>Degree programme</b>	BEW
<b>Semester</b>	6
<b>Course methods</b>	FUV
<b>Language</b>	English
<b>ECTS Credits</b>	6.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Introduction to the basics of innovation management by founding a virtual technology oriented company
<b>Learning outcome</b>	After passing this course successfully students are able to ... - develop strategy plans in technology oriented enterprises; - execute market estimations including the analysis of competition; - describe and calculate new technical products; - shape different kinds of organizational structures of enterprises; - calculate business plans for start ups; - interpret selected key figures of balances.
<b>Course contents</b>	- Strategy planning

	<ul style="list-style-type: none"> <li>- Market estimation</li> <li>- Product definition</li> <li>- Organizational structure of enterprises</li> <li>- Business planning</li> </ul>
<b>Prerequisites</b>	Basics of technology management
<b>Assessment Methods</b>	- 51% bachelor paper30% final test10% personal assignments9% presentation of results
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Hülsmann, Michael/ Pfeffermann, Nicole (2011): Strategies and Communications for Innovations, Springer</li> <li>- Sehestad, Claus / Sonnenberg, Henrik (2011): Lean Innovation, Springer</li> </ul>
<b>Attendance</b>	Compulsory attendance during on-campus phases

## Technology Management

<b>Degree programme</b>	BEW
<b>Semester</b>	6
<b>Course methods</b>	FUV
<b>Language</b>	English
<b>ECTS Credits</b>	6.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Technology Management
<b>Teaching methods</b>	LectureSelf StudiesElaborations on set topicsWorking on an individually agreed case study taken from the material accompanying the coursebook
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- basic understanding of Innovation- and Technology Management</li> </ul> <p>Technology Management as a forefront discipline to Innovation ManagementComprehension of respective processes</p>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Differentiation: Technology Management - Innovation Management</li> </ul> <p>Best practices of Technology Management and Innovation Management in enterprises and organizationsSources of Innovation</p>
<b>Prerequisites</b>	According to the position of the course in the Program's Curriculum

<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- Assignments</li> <li>- Presentation</li> <li>- Final written exam</li> </ul>
<b>Recommended Reading and Material</b>	- Managing Innovation by Joe Tidd and John Bessant, 5th edition, 2013, Wiley , ISBN: 978-1-118-36063-7
<b>Attendance</b>	Compulsory attendance during on-campus phases

## Business Law

<b>Degree programme</b>	BEW
<b>Semester</b>	6
<b>Course methods</b>	FUV
<b>Language</b>	English
<b>ECTS Credits</b>	6.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Imparting knowledge of selected legal topics regarding the international economic law
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- specify the legal rules</li> <li>- interpret legal cases</li> <li>- find solutions for legal problems by using these legal rules</li> <li>- utilise selected legal data-banks</li> <li>- evaluate legal decisions concerning defined questions and answer these questions</li> <li>- develop arguments to justify legal decisions</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- International Economic Law, Introduction, Actors and Rules/Principles</li> <li>- World Trade Organization (WTO) and law of the WTO</li> <li>- United Nations Convention on Contracts for the International Sale of Goods</li> <li>- Law of the European Union &amp; Case study</li> <li>- Competition law</li> <li>- International property rights</li> </ul>
<b>Prerequisites</b>	None
<b>Assessment Methods</b>	- Course immanent assessment method and End exam (written exam)

<b>Recommended Reading and Material</b>	- Scripts and materials (audio-visual presentations, etc.) available in the downloadarea of moodle
<b>Attendance</b>	Compulsory attendance during on-campus phases

## Change Management

<b>Degree programme</b>	BEW
<b>Semester</b>	6
<b>Course methods</b>	FUV
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	The course Change Management prepares the students for contact with change processes from a systemic view.
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- identify phases (for example by B. Conner ) and dynamics (symptoms, causes) of resistance using simple examples and explain.</li> <li>- name basic models of change management ( for example 3-phase-model of Lewin, strategy models of Glasl) and to analyze concrete situations by reference to them.</li> <li>- explain methods of integration of employees (for example kick-off workshop , interview ) and to explain consequences of participation / non-participation.</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Guidelines and models for change processes</li> <li>- Context clarification</li> <li>- Handling of resistance</li> <li>- Systemic Thinking</li> <li>- Methods of employee participation</li> </ul>
<b>Prerequisites</b>	None
<b>Assessment Methods</b>	- Course immanent assessment method (participated sucessfully)
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Conner, Daryl R. (2006): Managing at the speed of change, Verlag Randome House, NY</li> <li>- Doppler Klaus/ Lauterburg, Christoph (2005): Change Management Den Unternehmenswandel gestalten, 1Auflage, Frankfurt/Main: Campus Verlag</li> </ul>

	<ul style="list-style-type: none"> <li>- Häfele, Walter (2009): OE-Prozesse initiieren und gestalten: ein Handbuch für Führungskräfte, BeraterInnen und ProjektleiterInnen, Auflage, Verlag Haupt, Bern/Wien</li> <li>- Leao, Anja/Hofmann, Mathias (2009): Fit for Change: 44 praxisbewährte Tools und Methoden im Change für Trainer, Moderatoren, Coaches und Change Manager, Auflage, Verlag managerSeminare, Bonn</li> <li>- Schiersmann, Christiane/Thiel, Heinz-Ulrich (2010): Organisationsentwicklung: Prinzipien und Strategien von Veränderungsprozessen, Auflage, Verlag VS, Wiesbaden</li> </ul>
<b>Attendance</b>	Compulsory attendance during on-campus phases

## Advanced Communication

<b>Degree programme</b>	BEW
<b>Semester</b>	6
<b>Course methods</b>	FUV
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	The students acquire writing and speaking skills necessary to complete their bachelor studies, such as writing abstracts and techniques for successful presentations
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- write abstracts in compliance with given formal and language-related Guidelines</li> <li>- present one of their term papers in english to the exam committee and to defend their paper</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Structure of an abstract vs. German summary</li> <li>- Writing process</li> <li>- Building an English presentation from a German paper</li> <li>- Presentation techniques and relevant language</li> </ul>
<b>Prerequisites</b>	<p>Common European Framework of Reference for Languages Level B2</p> <p>Completion of previous semester course</p>
<b>Assessment Methods</b>	- Course immanent assessment method, i.e. active participation in class activities and timely completion of assignments

<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Maderdonner, O. / et al (2014): Abstract Writing, Skriptum</li> <li>- Maderdonner, O. / et al (2014): Presentation Essentials, Skriptum</li> <li>- Additional current handouts and audio-visual support</li> </ul>
<b>Attendance</b>	Compulsory attendance during on-campus phases

## Specialization Telecommunication

<b>Degree programme</b>	BEW
<b>Semester</b>	6
<b>Course methods</b>	FUV
<b>Language</b>	English
<b>ECTS Credits</b>	6.00
<b>Incoming places</b>	Limited

<b>Course description</b>	<p>After deepening basic knowledge concerning relevant ICT (Information and Communication Technology) as well as methods and procedures of analyzing and reviewing (evaluation) of technical solutions the students will research the application and implementation of telecommunication, mobile communication and Internet technologies as interdisciplinary technologies / enablers in future topics like Smart Cities, Energy, Mobility, E-Health, IIoT (Industrial Internet of Things) preparing their second bachelor thesis.</p>
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- explain relevant telecommunication and Internet technologies (e.g. mobile communication, computer networks, IT-security, audio/video processing, IPv6, Voice over IP)</li> <li>- analyze trends and emerging Information and Communication Technologies (ICT) (e.g. Virtualization, Cloud Computing, Big Data, Semantic Web) and evaluate their impact on telecommunication (e.g. requirements on data/audio/video transmission, security)</li> <li>- based on existing ICT standards and solutions identify, compare and contrast adequate practical scenarios in concrete application areas as well as propose technical Solutions</li> <li>- study and prepare the application and implementation of telecommunication, mobile communication and internet technologies as interdisciplinary technologies / enablers in future topics (like Smart Cities, Energy, Mobility, E-Health, Industrial Internet of Things) and scientifically formulate, argue and demonstrate the results in the second bachelor thesis</li> </ul>



<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Deepening Information and Communication Technology (ICT)</li> <li>- Actual telecommunication and Internet technologies (mobile communication, computer networks, IT-security, audio/video processing, IPv6, Voice over IP), standardization</li> <li>- ICT trends, emerging and future technologies, innovation in telecommunication and Internet (Internet of Things, Internet of Services, Cloud Computing, Semantic Web, Smart Devices, Data Security, Watermarking / Fingerprinting, Computer Vision)</li> <li>- Process models concerning technology and innovation management, system and software engineering (V-model, SCRUM)</li> <li>- Application of ICT (Smart Grids / Energy, Mobility, Industrial Internet of Things (IIoT))</li> </ul>
<b>Prerequisites</b>	Basic knowledge of- Electronics- Computer Science- Communication technologies from previous SemestersBasics from Specialization Telecommunication 1
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- Course immanent assessment method</li> <li>- Elaboration of specific Topics</li> <li>- Ongoing learning control in technical discussions</li> <li>- Bachelor thesis</li> </ul>
<b>Recommended Reading and Material</b>	- Presentations, documentation concerning relevant topics (including further reading and links to open available documents (articles, RFCs)
<b>Attendance</b>	Compulsory attendance during on-campus phases

## Specialization Embedded Systems

<b>Degree programme</b>	BEW
<b>Semester</b>	6
<b>Course methods</b>	FUV
<b>Language</b>	English
<b>ECTS Credits</b>	6.00
<b>Incoming places</b>	Limited

<b>Course description</b>	The course Specialization Embedded Systems describes and applies typical hardware platforms for digital hardware design, design methods and development tools (Altera Quartus II).
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- describe and compare the structure of CPLDs and FPGAs</li> </ul>

	<ul style="list-style-type: none"> <li>- plan and implement a digital design in VHDL according to a specification</li> <li>- verify the function of a more complex design according to a specification</li> <li>- implement and test a digital design on an Altera FPGA platform with Altera Quartus II</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Development steps for digital designs</li> <li>- Synchronous design methods</li> <li>- Verification methods for digital designs</li> <li>- Simulation</li> <li>- Introduction to synthesis and place and route with Altera Quartus II</li> <li>- Implementation of a digital hardware design project from specification to application in the target hardware platform</li> </ul>
<b>Prerequisites</b>	The students must be able to...- describe the basic components of digital logic designs- implement the basic components of digital logic designs via VHDL and interpret VHDL code- design a verification environment in VHDL for a given design specification- verify a VHDL design by simulation in Modelsim
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- Project delivery at the end of the course (25%)</li> <li>- Exam about the theory described by the distance learning letters (25%)</li> <li>- Bachelor thesis (50%)</li> </ul>
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- N. M. Botros, HDL Programming Fundamentals VHDL and Verilog – Hingham, MA, USA. Da Vinci Engineering Press, 200– ISBN 1-58450-855-8.</li> <li>- K. C. Chang, Digital Design and Modeling with VHDL and Synthesis Los Alamitos, Calif. [u.a.] : IEEE Computer Soc. Pr., 199XVI, 345 S.. ISBN 0-8186-7716-3</li> <li>- Sundar Rajan, Essential VHDL: RTL Synthesis Done Right, USA, 199ISBN 0966959-0-0</li> <li>- Lecture slides and scripts provided via the CIS page for the course</li> </ul>
<b>Attendance</b>	Compulsory for the two attendance phases
<b>Comments</b>	The grade of the second bachelor thesis is part of the course grade (50%). This course is a successor of the course from the 5.term (pre-requisites = learning outcomes 5.term)

## Specialization Industrial Electronics

<b>Degree programme</b>	BEW
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<b>Semester</b>	6
<b>Course methods</b>	FUV
<b>Language</b>	English
<b>ECTS Credits</b>	6.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Deeper knowledge of power converters and basics of batteries
<b>Learning outcome</b>	After passing this course successfully students are able to ... - evaluate the different types of batteries, their characteristics, and the conditions of Operation - choose the appropriate charging method - describe the function of a 4th order converter, construct, and calculate the relationships between the voltages and currents in the converter
<b>Course contents</b>	- Batteries, charging methods - Analyzation of DC/DC converters
<b>Prerequisites</b>	- Basics of electronics- Industrial electronics- Mathematics
<b>Assessment Methods</b>	- Course immanent assessment method
<b>Recommended Reading and Material</b>	- N. Mohan, T. Undeland, W. Robbins: Power Electronics, Jon Wiley & Sons, Inc.
<b>Attendance</b>	Compulsory attendance during on-campus phases

## Information and Communication Systems and Services

### Technical and Creative Communication

<b>Degree programme</b>	BIC
<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Starting from the Common European Framework of Reference for Languages B1+, we aim at developing and strengthening the vocabulary of the students' field of study along with the language skills required for technical and creative communication
<b>Learning outcome</b>	After passing this course successfully students are able to ... - structure and describe a technical process in English for a given target group; - illustrate and explain abstract technical concepts through real-life examples; - analyze and interpret literary texts in the English language.
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Distinguishing the three main types (informative, persuasive, and experiential) of discourse</li> <li>- Audience adaptation in terms of language and content</li> <li>- Impact analysis</li> <li>- Technical process descriptions</li> <li>- Use of persuasive language</li> <li>- Analysis and interpretation of literary texts</li> </ul>
<b>Prerequisites</b>	Common European Framework of Reference for Languages Level B1+
<b>Assessment Methods</b>	- Course immanent assessment method
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Recommendations:</li> <li>- R. Johnson-Sheehan (2014): Technical Communication Strategies for Today, Pearson Education Ltd. Learning materials:</li> <li>- Dedicated scripts and lecture notes</li> <li>- O. Maderdonner et al. (2014): Personal and Social Communication, Script</li> <li>- P. Connolly, P. Kingsbury et al. (2014): eSNACK, Lernplattform</li> </ul>
<b>Attendance</b>	Attendance is compulsory

## Business English

<b>Degree programme</b>	BIC
<b>Semester</b>	6
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Students engage with global economic and technical developments and their impact on society, and thereby acquire relevant terms and concepts together with the appropriate language skills.
<b>Learning outcome</b>	After passing this course successfully students are able to ... - recognize connections between economic theories and forms of government; - analyze the impact of globalization on society and the environment; - conduct various forms of business communication.
<b>Course contents</b>	- Economic concepts and theories - Winners and losers of globalization - Development of technologies - Presenting and negotiating project concepts and business plans - Business communication
<b>Prerequisites</b>	- Listening, reading and speaking skills at level C1 of the Common European Framework of Reference for Languages. - Knowledge and skills necessary to write short scientific papers in English.
<b>Assessment Methods</b>	- Course immanent assessment method
<b>Recommended Reading and Material</b>	- Recommendations: - M. Duckworth (2003): Oxford Business English, Oxford University Press, - I. Mackenzie (2010): English for Business Studies, Cambridge University Press Learning materials: - Dedicated scripts and lecture notes - O. Maderdonner, et al. (2014): Economy, Technology and Society, Script - O. Maderdonner (2014): English for Business, Script
<b>Attendance</b>	Attendance is compulsory

## Master Degree Programs

### Industrial Electronics

#### Intercultural Communications

<b>Degree programme</b>	MIE
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<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	We aim at raising intercultural awareness and broadening the students' horizons
<b>Learning outcome</b>	After passing this course successfully students are able to ... - meet the challenges of communicating with members of other cultures - recognize the potential of working in an intercultural team - act flexibly and confidently in an unknown environment
<b>Course contents</b>	- Terms and theories of culture: Johari window, Iceberg theory etc. - Manifestations of culture - Inside and outside perspectives on culture
<b>Prerequisites</b>	Completion of previous semester courses
<b>Assessment Methods</b>	- Grade depends on: - Attendance - Presentation of an intercultural aspect in class - Participation in class discussions
<b>Recommended Reading and Material</b>	- Lewis, R.D. et al (2012) When Cultures Collide 3rd ed., Nicholas Brealey International - Additional current handouts and audio-visual support
<b>Attendance</b>	Attendance is compulsory

## Telecommunications and Internet Technologies

### Credit Course User Experience Design

<b>Degree programme</b>	MTI
<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English

<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	This course is very practically oriented! Basic theoretical knowledge on the most important UX design aspects as well as important psychological basics (see contents) are presented. The emphasis of this course lies in the team design projects and their discussions and iterations in class.
<b>Learning outcome</b>	After passing this course successfully students are able to ... - explain the required steps of a methodological interaction design process and apply them in a concrete project - explain the task- and user oriented perspective in UX Design and to take this perspectives in a concrete project - explain and apply the application of the most common user interface patterns
<b>Course contents</b>	- UX Design methods and processes, (e.g. scrum) wireframes and conceptual design, wording, navigation, information presentation, task flows, international design, Icons, some relevant psychological basics from cognitive and social psychology
<b>Prerequisites</b>	Completion of all previous MTI courses
<b>Assessment Methods</b>	- Course immanent assessment method and continuous home assignments
<b>Recommended Reading and Material</b>	- Neuro Web Design, What makes them click? Weinschenk Susan, 2009, New Riders - About Face - Interface and Interaction Design Cooper Alan, Reimann Robert, Cronin David, 2010, mitp - Universal Principles of Design, Lidwell William, Holden Kritina, Butler Jil, 2010, Rockport Publishers - The powerpoint slides of this course show, what parts of the books are relevant
<b>Attendance</b>	Optional

## Credit Course Austrian culture and doing business in Austria 2

<b>Degree programme</b>	MTI
<b>Semester</b>	2
<b>Course methods</b>	SE, FL
<b>Language</b>	English

<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	In order to be successful in an international business-context, cross-cultural competences and adequate behavior are seen as essential criteria. In this credit course the students gain knowledge about Austria (country, culture, doing business) and discuss about similarities and differences towards their culture of origin on the base of selected culture models (such as Schein, Hofstede, Thomas). Finally, similarities and differences regarding high/low context culture, time planning and dealing with conflicts will be elaborated in the course of reflections and presentations.
<b>Learning outcome</b>	After passing this course successfully students are able to ... - explicate the topics high/low context culture, time planning and dealing with conflicts (Thomas, Hofstede) and derivate Dos and Don't's in doing business in Austria - compare the topics high/low context culture, time planning and dealing with conflicts as well as Dos and Don't's in doing business in Austria with the culture of students origin - develop similarities and differences regarding the several cultures on the base of case studies.
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Business-Kultur in Österreich</li> <li>- Sensibilisierung, Analyse und Reflexion in Bezug auf Kontextorientierung, Zeitorientierung und Umgang mit Konflikten zwischen den Herkunftskulturen und Österreich</li> </ul>
<b>Prerequisites</b>	Completion of all previous MTI courses
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- Course immanent assessment method and end exam</li> <li>- 20%: online – preliminary work</li> <li>- 30%: presentation in the last unit</li> <li>- 50%: written reflection (8.000 to 10.000 characters)</li> </ul>
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Primary literature</li> <li>- Hofstede/Petersen/Hofstede (2002): Exploring Culture. Exercises, Stories und Synthetic cultures. Boston/London: Intercultural Press</li> <li>- Schroll/Machl (2008): Doing Business with Germans. Göttingen: Vandenhoeck &amp; Ruprecht</li> <li>- Skriptum/ Foliensatz Allmayer (2015) Sekundärliteratur</li> <li>- Roraff/Krejci (2011): CultureShock! A Survival Guide to Customs and Etiquette in Austria</li> <li>- Müller/Gelbrich (2004): Interkulturelles Marketing. München: Vahlen</li> </ul>



	- Brück (2002): Interkulturelles Management. Kulturvergleich Österreich, Deutschland, Schweiz. Frankfurt/Main und London: IKO
<b>Attendance</b>	Optional
<b>Comments</b>	This course is designed for international students as well as for students with Austrian origin. In the frame of the course, an expert of an international company will be invited.

## Credit Course Agile Software Development

<b>Degree programme</b>	MTI
<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	In this course you learn about the fundamentals of agile project management based on the SCRUM approach, with additional aspects like effort estimation and the pre project phase. - Develop knowhow on agile project management methods - Discuss further agile topics based on student speeches.
<b>Learning outcome</b>	After passing this course successfully students are able to ... - define agile projects, to initialize projects and to discuss and to analyze the use of agile project management - discuss and to apply agile project management methods based on a project description - attend on effort estimation process
<b>Course contents</b>	- Agile Project management models with focus on software and IT projects: - Pre Project phase - Differences between classical models and agile approaches - SCRUM as process - SCRUM roles - Effort estimation biases and process
<b>Prerequisites</b>	Completion of all previous MTI courses
<b>Assessment Methods</b>	- Immanent assessment character - Written exam

	- students speech
<b>Recommended Reading and Material</b>	- Kenneth S. Rubin: Essential Scrum: A Practical Guide to the Most Popular Agile Process (Addison-Wesley Signature Series (Cohn)) Paperback, August 5, 2012
<b>Attendance</b>	Optional

## Credit Course Smart Homes

<b>Degree programme</b>	MTI
<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	This course gives an introduction to the basics of building automation and smart homes.
<b>Learning outcome</b>	After passing this course successfully students are able to ... - explain the basic characteristics of open building automation (e.g. KNX) networks - define the requirements of wired and wireless automation networks - analyze the application areas of open building automation systems and identify their benefits and disadvantages
<b>Course contents</b>	- Application areas (e.g., ambient assistive technologies) and structure of building automation systems - Requirements and challenges for wired and wireless communication - Trade and system spanned integration - Security and safety aspects - Relevant open standards (e.g., BACnet, EnOcean, KNX, KNX RF, LonWorks, ZigBee)
<b>Prerequisites</b>	Completion of all previous MTI courses
<b>Assessment Methods</b>	- Course immanent assessment method (written exam and exercises)
<b>Recommended Reading and Material</b>	- Merz, H. / Hansemann, T. / Hübner, C. (2009): Gebäudeautomation - Kommunikationssysteme mit EIB/KNX, LON und BACnet, 2., neu bearbeitete Auflage

	- KNX Association (2006): Handbuch Haus- und Gebäudesystemtechnik, ZVEI, ZVEH, 5. überarbeitete Auflage - Kastner, W. / Praus, F. / Neugschwandtner, G. / Granzer, W. (2011): KNX. B.M. Wilamowski and J.D. Irwin, editors, Industrial Electronics Handbook, volume 2: Industrial Communication Systems, chapter 42, pages 42-1 - 42-14. CRC Press, 2nd edition
<b>Attendance</b>	Optional

## Digital Transmission Systems

<b>Degree programme</b>	MTI
<b>Semester</b>	2
<b>Course methods</b>	SE, FL
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	The course covers basic principles of digital transmission systems; in particular it presents source and channel coding algorithms as well as receiver strategies and discusses the term channel capacity.
<b>Learning outcome</b>	After passing this course successfully students are able to ... <ul style="list-style-type: none"> <li>- construct a Huffman coding for the symbols of memoryless information sources and information sources with memory</li> <li>- apply arithmetic encoding and decoding to symbol sequences</li> <li>- analyze the generator matrix of a linear block code in order to calculate parameters for error detection and error correction at the receiver (e.g. syndrome)</li> <li>- name typical decision strategies for the receiver and to calculate the absolute error probability of the receiver</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Huffman coding</li> <li>- Arithmetic encoding and decoding</li> <li>- Channel encoding and channel decoding</li> <li>- Receiver strategies</li> <li>- Channel capacity</li> </ul>
<b>Prerequisites</b>	Completion of all previous MTI courses
<b>Assessment Methods</b>	- Course immanent assessment method (regular homework) and end exam

<b>Recommended Reading and Material</b>	- John G. Proakis / Masoud Salehi: Digital Communications; McGraw-Hill International Edition 2008
<b>Attendance</b>	Optional

## Telecommunication Service Delivery Platforms

<b>Degree programme</b>	MTI
<b>Semester</b>	2
<b>Course methods</b>	SE, FL
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	This course introduces the IP Multimedia Subsystem (IMS). It is a platform of operators to develop end provide telecommunication services and is based on the Session Initiation Protocol (SIP) including specific protocol extensions.
<b>Learning outcome</b>	After passing this course successfully students are able to ... <ul style="list-style-type: none"> <li>- explain the reasoning behind IMS,</li> <li>- describe the architecture of IMS,</li> <li>- expand about the roles of different network elements and</li> <li>- explain the most important procedures (registration session setup/ear down, integration of service platforms)</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- The architecture of IP Multimedia Subsystems (IMS)</li> <li>- The role of the network elements of IMS</li> <li>- The main protocol procedures of IMS (registration, session setup/tear down)</li> <li>- Messages-flows and analysis</li> <li>- Further aspects: Quality of Service, Charging</li> </ul>
<b>Prerequisites</b>	Completion of all previous MTI courses
<b>Assessment Methods</b>	- Written end exam
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- G. Camarillo, M. Garcia-Martin (3rd edition, 2008): The 3G IP Multimedia Subsystem, (IMS), Wiley &amp; Sons</li> <li>- M.Poikselka, G.Mayer, H. Khartabil (3rd edition, 2009): The IMS - IP Multimedia Concepts and Services, Wiley &amp; Sons</li> </ul>
<b>Attendance</b>	Optional

## Mobile and Wireless Systems

<b>Degree programme</b>	MTI
<b>Semester</b>	2
<b>Course methods</b>	SE, FL
<b>Language</b>	English
<b>ECTS Credits</b>	6.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Introduction to mobile radio systems and wireless access networks
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- to explain the network architectures of mobile radio systems currently in use as well as to describe the tasks of the network elements</li> <li>- to explain the technical implementation of the procedures used in mobile radio systems (such as network attach, connection setup, handover, connection release, ... ) and the related signaling between the network elements</li> <li>- to explain the physical layer technologies on the radio interface (e.g. block diagrams, digital modulation schemes, multiplex and multiple access methods, antenna technologies, ... ) and to model them with the use of mathematical methods</li> <li>- explain multiplexing and multiple access methods as well as media access mechanisms (e.g. CSMA/CA, DTS, RTS , ... ) used in wireless LAN</li> <li>- to define the topic for the master's thesis project</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Network architectures, network elements and protocols in mobile communications systems (GSM, GPRS, UMTS, LTE, ...)</li> <li>- Procedures and signaling in mobile systems</li> <li>- Physical layer technologies on the radio interface</li> </ul>
<b>Prerequisites</b>	Completion of all previous MTI courses
<b>Assessment Methods</b>	- Written Exam
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Martin Sauter: From GSM to LTE-Advanced; An Introduction to Mobile Networks and Mobile Broadband; Revised Second Edition, Wiley 2014</li> <li>- IEEE 802.11 Specification</li> </ul>
<b>Attendance</b>	Optional

## Credit Course RFID and NFC 2

<b>Degree programme</b>	MTI
<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	NFC enabled smartphones and devices with NFC air interface became more important regarding industry 4.0. Information about the specified protocols, data rates, and formats are placed in this course.
<b>Learning outcome</b>	After passing this course successfully students are able to ... - design an NFC tag-based application - evaluate different NFC modes regarding their technical parameterization - compare RFID and NFC
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Definition of NFC</li> <li>- Architecture</li> <li>- NFC data exchange format (NDEF)</li> <li>- Compatibility with RFID</li> <li>- Operating modes</li> <li>- Field of applications</li> <li>- Problem areas</li> </ul>
<b>Prerequisites</b>	Completion of all previous MTI courses
<b>Assessment Methods</b>	- Presentation
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Finkenzeller, Klaus.(2012: RFID-Handbuch: Grundlagen und praktische Anwendungen von Transpondern, kontaktlosen Chipkarten und NFC, Carl Hanser Verlag GmbH &amp; Co. KG; Auflage: 6., aktualisierte und erweiterte Auflage</li> <li>- Igoe, Tim/ Coleman, Don/ Jepson, Brian. 2014: NFC mit Android und Arduino; O'Reilly Verlag; Auflage: 1</li> </ul>
<b>Attendance</b>	Optional

## Credit Course Digital Radio and TV Systems 2

<b>Degree programme</b>	MTI
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<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	This course discusses the digital transmission technologies in DVB-S/S2, DVB-C/C2 and DAB/DAB+ systems
<b>Learning outcome</b>	After passing this course successfully students are able to ... - explain the technical differences of the various DVB Systems and show their robustness in comparison to analog systems - explain all necessary quality parameters (e.g. C/N) of a digital transmission chain
<b>Course contents</b>	- Digital signal processing and digital transmission systems - DVB-S/S2, DVB-C/C2, DAB+, DRM, DRM+
<b>Prerequisites</b>	Completion of all previous MTI courses
<b>Assessment Methods</b>	- Written examination
<b>Recommended Reading and Material</b>	- Walter Fischer: Digitale Fernseh-und Hörfunktechnik in Theorie und Praxis (3.Auflage); Springer - Ulrich Reimers: DVB-Digitale Fernsehtechnik (3.Auflage); Springer
<b>Attendance</b>	Optional

## Credit Course Introduction to legal aspects for Internet Service Providers

<b>Degree programme</b>	MTI
<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	This course presents current topic in relation to information systems law
<b>Learning outcome</b>	After passing this course successfully students are able to ... - illustrate and explicate the guiding principles of information systems

	law - discuss challenges in this field and if considered necessary to propose approaches on how to regulate these matters.
<b>Course contents</b>	- Net neutrality, Internet Governance, ISP liability, cybercrime, data retention, current issues of intellectual property rights (trademarks, patents, utility model, design rights)
<b>Prerequisites</b>	Completion of all previous MTI courses
<b>Assessment Methods</b>	- Course immanent assessment method and written assignment (Art 26 Austrian Federal Privacy Act – Request for Information)
<b>Recommended Reading and Material</b>	- Haybäck: Marken- und Immaterialgüterrecht; Lexis Nexis; 2014; <a href="https://shop.lexisnexis.at/marken-und-immaterialgueterrecht-9783700755982.html">https://shop.lexisnexis.at/marken-und-immaterialgueterrecht-9783700755982.html</a>
<b>Attendance</b>	Optional

## Credit Course Internet of Energy 2

<b>Degree programme</b>	MTI
<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	<p>The requirements for the energy supply have changed fundamentally. Global warming is now considered as driver for changes in the energy sector and requires a holistic view of the electricity, gas and heat / cold supply. Our flats are becoming smart homes and our cities will be developed to smart cities. To ensure the potential synergies of different infrastructure technologies, it requires a high information and data exchange. This means that the IT and telecommunication sector get an increasingly important role in context of energy supply. The objective of merging the disciplines of energy, IT and telecommunications is imminent. In addition to considering the requirements for climate change, end users should have additional comfort and should have possibilities to become more efficient in the use of energy. In the lecture "Internet of Energy" the requirements for future energy networks will be shown and a potential migration path starting from today's energy networks via</p>
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	Smart Metering towards Smart Grids is discussed. The corresponding enabling technologies are presented and the main processes and operational management aspects are highlighted.
<b>Learning outcome</b>	After passing this course successfully students are able to ... - identify the essential components of a smart home. - recognize and explain the interactions of energy and communication in urban areas and Smart Cities.
<b>Course contents</b>	- Smart Home - Smart City
<b>Prerequisites</b>	Completion of all previous MTI courses
<b>Assessment Methods</b>	- End exam or students work out selected topics in group work.
<b>Recommended Reading and Material</b>	- Stephen F. Bush: Smart Grid: Communication-Enabled Intelligence for the Electric Power Grid, Wiley – IEEE, Hardcover, March 31, 2014
<b>Attendance</b>	Optional

## Credit Course Mental Power in IT Disciplines

<b>Degree programme</b>	MTI
<b>Semester</b>	2
<b>Course methods</b>	SE, FL
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	In this course you will learn to use the whole capacity of your brain to solve problems and to achieve any goal you wish.
<b>Teaching methods</b>	- Seminar- Distant Learning
<b>Learning outcome</b>	After passing this course successfully students are able to ... - formulate goals they want to achieve - practicing basic elements of attention meditation - focus the consciousness mind on goals to align unconscious processes
<b>Course contents</b>	- Processing of information in the human brain - Consciousness and unconsciousness parts of the brain - Gaining consciousness use of primarily unconsciousness parts of

	the brain - Using skill full meditation techniques to improve business performance
<b>Prerequisites</b>	Completion of all previous MTI courses
<b>Assessment Methods</b>	- Continuous assessment
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- James Borg, "Mind Power", Pearson 2010</li> <li>- Kazuo Inamori, "A Compass to Fulfillment", Mc Graw Hill 2010</li> <li>- Heinz Hilbrecht, "Meditation und Gehirn", Schattauer, 2010</li> <li>- Richard Bandler, "Veränderung des subjektiven Erlebens", Jungfern Verlag 2007, Original: "Using your brain - for a change", Real People Press, U.S. (August 1985)</li> <li>- Henry P. Stapp, "Mindful Universe" 2nd Edt Springer 2011</li> <li>- Chade-Meng Tan "Search Inside Yourself" Optimierte dein Leben durch Achtsamkeit, Goldmann Verlag 2015</li> </ul>
<b>Attendance</b>	Compulsory

## Telecommunications and Internet Markets

<b>Degree programme</b>	MTI
<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	This course deals with business processes in telecommunications and Internet markets including Internet economics, business models and business strategies, customer requirements and technology evaluations for fixed line communications, wireless communications, ISPs, equipment manufacturers, and Internet content providers.
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- evaluate business models in telecommunications and Internet markets</li> <li>- define plans of actions for day-to-day business.</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Analysis of current and future business models and business strategies in the telecommunications and Internet industries.</li> <li>- Evaluation of business opportunities and innovation.</li> </ul>

	<ul style="list-style-type: none"> <li>- Development of marketing and business plans for telecommunications products and services.</li> <li>- Analysis of Requirements of residential and business customers.</li> </ul>
<b>Prerequisites</b>	Completion of all previous MTI courses
<b>Assessment Methods</b>	- Written Assignment
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- OECD, OECD Communications Outlook 2013 (or the most current 90 report), <a href="http://www.oecd.org">http://www.oecd.org</a></li> <li>- RTR, RTR Telekom Monitor 1/2015 (or the most current report), <a href="http://www.rtr.at">http://www.rtr.at</a></li> <li>- RTR, Kommunikationsbericht 2013 (or the most current report), <a href="http://www.rtr.at">http://www.rtr.at</a></li> <li>- Economides Nicholas, Stern School of Business, N.Y.U., <a href="http://www.stern.nyu.edu/networks/papers.html">http://www.stern.nyu.edu/networks/papers.html</a></li> <li>- Fader Peter, Wharton, University of Pennsylvania, <a href="http://knowledge.wharton.upenn.edu">http://knowledge.wharton.upenn.edu</a></li> <li>- InfoDev Telecommunications Regulation Handbook, <a href="http://www.infodev.org/en/Publication.22.html">http://www.infodev.org/en/Publication.22.html</a></li> <li>- Odlyzko Andrew, University of Minnesota, <a href="http://www.dtc.umn.edu/~odlyzko">http://www.dtc.umn.edu/~odlyzko</a></li> </ul>
<b>Attendance</b>	Optional

## IT Project Management

<b>Degree programme</b>	MTI
<b>Semester</b>	2
<b>Course methods</b>	SE, FL
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	<p>In this course you learn about the fundamentals of project management based on the PMA approach, with focus on the project start process.</p> <ul style="list-style-type: none"> <li>- Develop knowhow on project management methods</li> <li>- Discuss the benefits of professional project management</li> <li>- Apply project management methods on a project</li> </ul>
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- define projects, to initialize projects and to discuss and to analyze the use of project management</li> </ul>

	- discuss and to apply project management methods (project objectives plan, objects of consideration plan, work breakdown structure, project environment analysis, ...) based on a project description
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Project management definition</li> <li>Methods of the project start:</li> <li>- Project assignment</li> <li>- Project objectives</li> <li>- Project planning</li> <li>- Project costs</li> <li>- Project organization</li> </ul>
<b>Prerequisites</b>	Completion of all previous MTI courses
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- Course immanent assessment method consisting of</li> <li>- Groupwork</li> <li>- Quizzes</li> <li>- Exam</li> </ul>
<b>Recommended Reading and Material</b>	- Gareis, R. (2006): Happy Projects!; Manz (available at our library in German and English)
<b>Attendance</b>	Optional

## Intercultural Communication

<b>Degree programme</b>	MTI
<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	We aim at raising intercultural awareness and broadening the students' horizons
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- meet the challenges of communicating with members of other cultures</li> <li>- recognize the potential of working in an intercultural team</li> <li>- act flexibly and confidently in an unknown environment</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Terms and theories of culture: Johari window, Iceberg theory etc.</li> <li>- Manifestations of culture</li> </ul>

	<ul style="list-style-type: none"> <li>- Inside and outside perspectives on culture</li> <li>- English as a lingua franca for intercultural encounters</li> </ul>
<b>Prerequisites</b>	Completion of all previous MTI courses
<b>Assessment Methods</b>	- Course immanent assessment method, i.e. active participation in class activities and timely completion of assignments
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Lewis, R.D. et al (2012) When Cultures Collide 3rd ed., Nicholas Brealey International</li> <li>- Additional current handouts and audio-visual support</li> </ul>
<b>Attendance</b>	Optional

## Dealing with Customers

<b>Degree programme</b>	MTI
<b>Semester</b>	4
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	The course prepares the students for negotiation and selling processes and focuses on consultative and solution oriented models.
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- explain the principles and phases of solution-oriented negotiation and selling processes (for example Harvard principled negotiation).</li> <li>- describe objections client orientated (for example demand, motives, utility) and to argue solution orientated.</li> <li>- design a negotiation process with several stages using predefined tools (for example questioning techniques) and to implement it in simple close to reality negotiation pitches.</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Principles of negotiating and selling</li> <li>- Harvard principled negotiation</li> <li>- Psychology of persuasion</li> <li>- Solution oriented negotiation conversation: Preparation, needs, argumentation, dealing with objections, closing</li> <li>- Roles in the negotiation and selling process</li> <li>- Conflicts in negotiation and selling situations</li> </ul>
<b>Prerequisites</b>	Completion of all previous MTI courses

<b>Assessment Methods</b>	- Course immanent assessment method (grade)
<b>Recommended Reading and Material</b>	- Cialdini Robert B. (2007): Die Psychologie des Überzeugens, Bern: Verlag Hans Huber - Roger Fisher/ William Ury (2012): getting to yes, London: Random House Business Books
<b>Attendance</b>	Optional

## Professional English

<b>Degree programme</b>	MTI
<b>Semester</b>	4
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	The students acquire the skills necessary to complete their master's studies, such as writing abstracts and techniques for successful presentations and negotiations
<b>Learning outcome</b>	After passing this course successfully students are able to ... - write abstracts in compliance with given formal and language-related guidelines - present one of their term papers in english to the exam committee and to defend their master's thesis
<b>Course contents</b>	- Structure of an abstract vs. German summary - Writing an abstract - Presentation techniques and relevant language - Building an English presentation in PechaKucha format
<b>Prerequisites</b>	Completion of all previous MTI courses
<b>Assessment Methods</b>	- Course immanent assessment method, i.e. active participation in class activities and timely completion of assignments
<b>Recommended Reading and Material</b>	- Maderdonner, O. / et al (2014): Abstract Writing, Skriptum - Maderdonner, O. / et al (2014): Presentation Essentials, Skriptum - Additional current handouts and audio-visual support
<b>Attendance</b>	Optional

# FACULTY OF INFORMATION TECHNOLOGIES & BUSINESS SOLUTIONS

## Bachelor Degree Programs

### Business Informatics (full-time)

#### Technical and Creative Communication

<b>Degree programme</b>	BWI
<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	Starting from the Common European Framework of Reference for Languages B1+, we aim at developing and strengthening the vocabulary of the students' field of study along with the language skills required for technical and creative communication
<b>Teaching methods</b>	Lecture and Exercises
<b>Learning outcome</b>	After passing this course successfully students are able to ... <ul style="list-style-type: none"><li>- analyze the influences of inventions on society in order to appraise their impacts, both positive and negative</li><li>- use strategies, such as analogies from everyday life, to present and write descriptions of technical processes which are coherent and consequential</li><li>- choose language, including scientific terminology, which is appropriate for a particular audience</li><li>- understand the importance of using language which is suitably formal or informal when speaking and writing</li></ul>
<b>Course contents</b>	- Impact analyses - inventions and their impacts on society

	<ul style="list-style-type: none"> <li>- Technical process descriptions</li> <li>- Knowing your audience</li> <li>- Choosing language and content to suit your audience</li> <li>- Register - formal language compared to informal language</li> </ul>
<b>Prerequisites</b>	Common European Framework of Reference for Languages Level B1+ Completion of previous semester course
<b>Assessment Methods</b>	- Course immanent assessment method, i.e. active participation in class activities and timely completion of assignments
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Maderdonner, O. / et al (2014): Technical and Creative Communication, Script</li> <li>- Connolly, P. / Kingsbury, P. et al. (2014): eSNACK, learning platform</li> <li>- Additional current handouts and audio-visual support</li> </ul>
<b>Attendance</b>	Compulsory

## Business Communication

<b>Degree programme</b>	BWI
<b>Semester</b>	4
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	Business Communication
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- demonstrate a knowledge of the key principles of writing Business English, such as gender neutral English and suitable structure and style</li> <li>- write a CV in English</li> <li>- fill in an online application form successfully in English</li> <li>- write a letter of job application</li> <li>- talk convincingly about the impact of different adverts</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- CV and covering letter</li> <li>- Job interview</li> <li>- Presenting and understanding the key concepts behind advertising</li> <li>- Business communication</li> </ul>



<b>Prerequisites</b>	Completion of previous course
<b>Assessment Methods</b>	- Course immanent assessment method, i.e. active participation in class activities and timely completion of assignments
<b>Recommended Reading and Material</b>	- Maderdonner, O. (2014): English for Business, Script - Additional current handouts and audio-visual support
<b>Attendance</b>	Compulsory

## English Certificate

<b>Degree programme</b>	BWI
<b>Semester</b>	6
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	This intensive seminar will help students better understand the system of multiple choice tests and increase their chances for a better score by developing appropriate strategies with specific consideration of computer and internet based tests.
<b>Learning outcome</b>	After passing this course successfully students are able to ... - use standardized test taking strategies - express themselves (both orally and through writing) more efficiently - especially when discussing complicated topics
<b>Course contents</b>	- Detailed explanation of registration/sectional directions/multiple choice test strategies - Tips on recognizing key words and difficult questions, time saving techniques, eliminating answers, intelligent guessing, reducing common errors, reading and listening for gist/detail, developing vocabulary, essay writing - Paper and computer simulations of TOEFL tests
<b>Prerequisites</b>	Common European Framework of Reference for Languages Level B2 Completion of previous semester course
<b>Assessment Methods</b>	- Course immanent assessment method, i.e. active participation in class activities and timely completion of assignments
<b>Recommended Reading</b>	- The Official Guide to the TOEFL Test

<b>and Material</b>	
<b>Attendance</b>	Compulsory

## Business Informatics (part-time)

### Customer Relationship Management

<b>Degree programme</b>	BWI
<b>Semester</b>	6
<b>Course methods</b>	ILV, FL
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

### English Certificate

<b>Degree programme</b>	BWI
<b>Semester</b>	6
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	This intensive seminar will help students better understand the system of multiple choice tests and increase their chances for a better score by developing appropriate strategies with specific consideration of computer and internet based tests.
<b>Learning outcome</b>	After passing this course successfully students are able to ... - use standardized test taking strategies - express themselves (both orally and through writing) more efficiently - especially when discussing complicated topics
<b>Course contents</b>	- Detailed explanation of registration/sectional directions/multiple choice test strategies - Tips on recognizing key words and difficult questions, time saving techniques, eliminating answers, intelligent guessing, reducing common errors, reading and listening for gist/detail, developing

	vocabulary, essay writing - Paper and computer simulations of TOEFL tests
<b>Prerequisites</b>	Common European Framework of Reference for Languages Level B2 Completion of previous semester course
<b>Assessment Methods</b>	- Course immanent assessment method, i.e. active participation in class activities and timely completion of assignments
<b>Recommended Reading and Material</b>	- The Official Guide to the TOEFL Test
<b>Attendance</b>	Compulsory

## Computer Science

### IT Projektarbeit 2

<b>Degree programme</b>	BIF
<b>Semester</b>	2
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Students practice group work and project management concepts while working on a one semester software project.
<b>Learning outcome</b>	After passing this course successfully students are able to ... - carry out IT projects in small groups according to classical IT project management methods. - create project documents from templates - roughly estimate efforts in ITP projects - independently apply topics learned from other IT courses into their own projects - work together in teams and coordinate activities - present project results in english language
<b>Course contents</b>	- Working on semester projects and applying fundamentals of IT project management techniques - Creation of basic project management documents, especially: work

	breakdown structure, project schedule, work packages, rough specification, cost estimation, status reports, - Selection of suitable development environments - Collecting practical experience in group work
<b>Prerequisites</b>	Basic methods of software project management Practical experiences with programming languages
<b>Assessment Methods</b>	- The completion of the project is being judged as well as the presentations and the results.
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- DeMarco, T., Martin, D., 2007. Der Termin: ein Roman über Projektmanagement, Nachdr. ed. Hanser, München.</li> <li>- Geirhos, M., 2015. IT-Projektmanagement: was wirklich funktioniert - und was nicht; 1. Aufl., 2., korrigierter Nachdr. ed, Galileo computing. Galileo Press, Bonn.</li> <li>- Mangold, P., 2011. IT-Projektmanagement kompakt, 3., erw. Aufl., Nachdr. ed, kompakt-Reihe. Spektrum Akad. Verl, Heidelberg.</li> <li>- Tiemeyer, E., Bauer, N. (Eds.), 2014. Handbuch IT-Projektmanagement: Vorgehensmodelle, Managementinstrumente, Good Practices, 2., überarb. und erw. Aufl. ed. Hanser, München.</li> <li>- Carl, D. (Ed.), 2008. Mashups programmieren: [Grundlagen, Konzepte, Beispiele], Dt., Orig.-Ausg., 1. Aufl. ed. O'Reilly, Beijing.</li> <li>- Meckel, M., Stanoevska-Slabeva, K. (Eds.), 2008. Web 2.0: die nächste Generation Internet, 1. Aufl. ed, Kommunikation und Management. Nomos, Baden-Baden.</li> </ul>
<b>Attendance</b>	Partly
<b>Comments</b>	The supervision is done on an individual basis in synchronous or asynchronous settings and is supported by modern communication tools. The course is not displayed or partially displayed in the timetable and no attendance records are kept.

## IT Projektarbeit 4

<b>Degree programme</b>	BIF
<b>Semester</b>	4
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	4.50
<b>Incoming places</b>	Limited

<b>Course description</b>	Project Based Learning in Computer Science. The course intended to combine acquired isolated knowledge of various lectures and to put it to practical use. Projects may be proposed by students or can be chosen from suggested projects. Participation in projects at the university or in companies is also possible. The projects need to match the requirements of the current semester (levels and workload). Projects need to have a real customer.
<b>Teaching methods</b>	Project Based Learning
<b>Learning outcome</b>	After passing this course successfully students are able to ... - apply learning outcomes of courses from previous semesters in a chosen project - acquire needed knowledge and skills under guidance - complete the project successfully
<b>Course contents</b>	- Practical application of the content of other courses in a project
<b>Prerequisites</b>	- All lessons of previous semesters
<b>Assessment Methods</b>	- Project results
<b>Attendance</b>	Not required
<b>Comments</b>	The supervision is done on an individual basis in synchronous or asynchronous settings and is supported by modern communication tools. The course is not displayed or partially displayed in the timetable and no attendance records are kept.

## Transport and Environment

### Creative English

<b>Degree programme</b>	BVU
<b>Semester</b>	4
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	Starting from the Common European Framework of Reference for Languages B2, we aim at developing and strengthening the students'
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	vocabulary along with the language skills required for persuasive and creative communication
<b>Teaching methods</b>	Seminar
<b>Learning outcome</b>	After passing this course successfully students are able to ... - successfully apply the discourse and techniques of argumentation and persuasion; - analyze and interpret literary texts in the English language.
<b>Course contents</b>	- Persuasive speaking and writing - Debating - Analysis and interpretation of literary texts
<b>Prerequisites</b>	- Common European Framework of Reference for Languages Level B1+ - Completion of previous semester course
<b>Assessment Methods</b>	- Active participation in class activities and timely completion of assignments
<b>Recommended Reading and Material</b>	- Maderdonner, O. / et al (2014): Technical and Creative Communication, Skriptum - Connolly, P. / Kingsbury, P. et al. (2014): eSNACK, Lernplattform - Aktuelle Handouts und audiovisuelle Unterstützung - Additional current handouts and audio-visual support
<b>Attendance</b>	Attendance is compulsory.

## Master Degree Programs

### Information Systems Management

#### Business Process Management

<b>Degree programme</b>	MWI
<b>Semester</b>	2
<b>Course methods</b>	ILV, FL
<b>Language</b>	English
<b>ECTS Credits</b>	5.00
<b>Incoming places</b>	Limited

## Integrated Corporate Management

Degree programme	MWI
Semester	2
Course methods	ILV, FL
Language	English
ECTS Credits	3.00
Incoming places	Limited

## Negotiation Techniques

Degree programme	MWI
Semester	2
Course methods	SE
Language	English
ECTS Credits	2.00
Incoming places	Limited

## Scientific Working and Scientific Methods

Degree programme	MWI
Semester	2
Course methods	ILV, FL
Language	English
ECTS Credits	5.00
Incoming places	Limited

## Information Management and IT Security

### Scientific Writing

Degree programme	MIC
Semester	4

<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	The focus of the course is an overview of academic language and formal criteria required for writing and presenting a conference paper, and writing an abstract
<b>Teaching methods</b>	Teaching methods will be used to give the students opportunities to improve and refine their written language skills. Mini- lectures will be used for input on writing techniques and use of language. However, students will also be given in-class activities to actively engage in using the language in order to enhance language awareness and sensitivity. These activities may include pair activities, group activities, etc. Students will be encouraged to approach written language analytically and critically, for example by giving constructive feedback after in-class writing activities, comparing and analyzing texts, etc. Students will be encouraged to use appropriate language when presenting
<b>Learning outcome</b>	After passing this course successfully students are able to ... <ul style="list-style-type: none"> <li>- structure a conference paper according to the formal criteria given</li> <li>- write a conference paper according to the language related criteria given</li> <li>- write an abstract according to the formal related criteria given</li> <li>- write an abstract according to the language related criteria given</li> <li>- present a conference paper</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- The role, content, structure, and style of a conference paper</li> <li>- The role, content, style and types of scientific abstracts</li> <li>- Language-related criteria of a conference paper and an abstract</li> <li>- Writing a conference paper and abstract</li> <li>- Presenting the conference paper</li> </ul>
<b>Prerequisites</b>	Completion of previous semester courses
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- Active participation in class activities and timely completion of assignments</li> </ul>
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Göschka, M. et al (2014) Guidelines for Scientific Writing, Skriptum</li> <li>- Additional current handouts</li> </ul>
<b>Attendance</b>	Attendance is compulsory at the first session (17.50- 21.00).In the subsequent sessions, only the students presenting their conference



	papers are expected to be present.
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## Advanced English Communication

<b>Degree programme</b>	MIC
<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	We aim at conveying the language-related criteria and techniques required for leading and participating in discussions and writing a summary on current issues and topics in the Cell and Tissue Engineering profession
<b>Teaching methods</b>	Active participation and discussionFulfillment of writing assignments and presentation
<b>Learning outcome</b>	After passing this course successfully students are able to ... - upon completion of this course, the students will be able to: - lead a professional discussion in English, i.e. to apply appropriate language and techniques for effective research, formulation of questions, moderation, summarizing etc.; - write a summary of the facts and main arguments
<b>Course contents</b>	- Language and techniques for leading a professional discussion - Defining, researching, presenting, and leading a discussion on an appropriate professional topic; - Vocabulary work-up based on research sources for the discussion topic - Writing a summary of the main facts and arguments pertaining to the discussion topic
<b>Prerequisites</b>	Common European Framework of Reference for Languages Level B2
<b>Assessment Methods</b>	- Course immanent assessment method, i.e. active participation in class activities and timely completion of assignments
<b>Recommended Reading and Material</b>	- Göschka, M. et al (2014) Guidelines for Scientific Writing, Skriptum - Harvard Business Review 20-Minute Manager Series: Running Meetings

	<ul style="list-style-type: none"> <li>- Aktuelle Handouts</li> <li>- Additional current handouts</li> </ul>
<b>Attendance</b>	Compulsory

## Software Engineering

### Selected Topics Software Engineering (Elective Course)

<b>Degree programme</b>	MSE
<b>Semester</b>	4
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Introduction to the Semantic Web and Linked Data
<b>Teaching methods</b>	Seminar and distand learning
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- explain the main concepts related to the semantic web,</li> <li>- explain how to publish, share, and query data on the semantic Web.</li> </ul>
<b>Course contents</b>	<p>- Day 1. Units 1 and 2. Introduction to the SW. Motivation. Main definitions. The web as a database. The web of documents vs. the web of data.</p> <p>Day 1. Units 3 and 4. The Semantic Web stack. The RDF data model. Triples, RDF graphs, Data sets. Blank nodes. Data types. Reification. Languages: N3 and Turtle. RDFS: inference basics. Class practice RDF.</p> <p>3. Day Units 5 and 6. The SPARQL query language. Basic Graph patterns (BGP). SPARQL 1.1 syntax. Formas: SELECT, CONSTRUCT, ASK, DESCRIBE. Agregation. FILTER, OPTIONAL clauses. Subqueries. UNION. SPARQL Update, SPARQL Protocol.</p> <p>Day 2. Units 7 and 8. Linked Data principles. Linked Data 5-star. Open Data. data acquisition: Open Refine, R2RML (RDB2RDF). Vocabularies. Endpoints. real-world examples. Publishing statistical data: the QB vocabulary.</p> <p>Distance Work. There are three projects. First, a list of exercises to be solved by the</p>

	students, about basic SW concepts (6 units). A second project in modeling a database in RDF, and querying it in SPARQL (10 units). The third project is about representing and querying statistical data on the SW (4 units).
<b>Prerequisites</b>	Bachelor level in computer science
<b>Assessment Methods</b>	- The final course grade will be the average of the marks of the three projects.
<b>Recommended Reading and Material</b>	<p>- 1. Renzo Angles and Claudio Gutierrez. Subqueries in SPARQL. In Pablo Barceló and Val Tannen, editors, AMW, volume 749 of CEUR Workshop Proceedings. CEUR- WS.org, 2011.2. Marcelo Arenas and Jorge Pérez. Querying semantic web data with sparql. In Maurizio Lenzerini and Thomas Schwentick, editors, PODS, pages 305–316. ACM, 2011.3. Dave Beckett. N-Triples, 2004.4. Dave Beckett and Tim Berners-Lee. Turtle - Terse RDF Triple Language, 2011.5. Tim Berners-Lee. Notation 3, 2006.6. C. Bizer, T. Heath, and T. Berners-Lee. Linked data-the story so far. International Journal on Semantic Web and Information Systems (IJSWIS), 5:1–22, 2009.7. R. Cyganiak. A relational algebra for SPARQL. Digital Media Systems Laboratory, HP Laboratories Bristol, 1:2005–170, 2005.8. S. Das, S. Sundara, and R. Cyganiak. R2RML: RDB to RDF Mapping Language, 2012.9. Peter Hayes and B. McBride. RDF Semantics, 2004.10. Pascal Hitzler, Markus Krotzsch, and Sebastian Rudolph. Foundations of Semantic Web Technologies. Chapman &amp; Hall/CRC, 2009.11. B. Kampgen and A. Harth. No size fits all - running the star schema benchmark with SPARQL and RDF aggregate views. In The Semantic Web: Semantics and Big Data, volume 7882 of LNCS, pages 290–304. Springer, 2013.12. J. Pérez, M. Arenas, and C. Gutierrez. Semantics and Complexity of SPARQL. ACM Transactions on Database Systems (TODS), 34(3):1–45, 2009.13. A. Vaisman and E. Zimanyi. Data Warehouse Systems: Design and Implementation. Springer, 2014.</p>
<b>Attendance</b>	Required in face to face units
<b>Comments</b>	<p>- The lesson is done in a cooperation with ITBA Buenos Aires.</p> <p><b>- Please note that the course will only take place if there are enough students registered.</b></p> <p>- The course will take place on two/ three days in May.</p>

# FACULTY OF ENGINEERING & ENVIRONMENTAL TECHNOLOGIES

## Bachelor Degree Programs

### International Business and Engineering

#### Investition & Finanzierung

<b>Degree programme</b>	BIW
<b>Semester</b>	4
<b>Course methods</b>	ILV, FL
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	The course provides an overview of capital budgeting and the financing of projects.
<b>Learning outcome</b>	After passing this course successfully students are able to ... <ul style="list-style-type: none"> <li>- perform investment analysis.</li> <li>- evaluate the viability of investments using different capital budgeting methods.</li> <li>- value the consequences of different financing instruments.</li> <li>- compare the viability of different financing instruments.</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Capital Budgeting:</li> <li>- NPV</li> <li>- IRR</li> <li>- MIRR</li> <li>Finance:</li> <li>- Internal Financing</li> <li>- External Financing</li> <li>- Equity</li> <li>- Loans</li> <li>- Bonds</li> </ul>
<b>Prerequisites</b>	No prerequisites required
<b>Assessment Methods</b>	- Written exam (100%) Exam contents: • Topics presented during

	<p>class• Calculations performed during class• Contents of the literature as indicated</p> <ul style="list-style-type: none"> <li>- Written exam (100%)Exam contents:</li> <li>- Topics presented during class</li> <li>- Calculations performed during class</li> <li>- Contents of the literature as indicated</li> </ul>
<b>Recommended Reading and Material</b>	<p>- Jonathan Berk, Peter DeMarzo, Corporate Finance, Pearson 3/e 2014 Eugene F. Brigham, Michael C. Erhardt, Financial Management – Theory and Practice, Thomson 2015 Karl Knezourek, Investment, 2015 Karl Knezourek, Finance, 2015</p>
<b>Attendance</b>	<p>Attendance of the course is mandatory. Students are allowed to miss a maximum of 20% of classes, otherwise they will lose their first exam attempt. Classes start on time. Students are reminded to arrive on time. Students who arrive late for a lecture or leave early will receive 0% attendance for that class.</p>

## Scientific Writing & Publishing

<b>Degree programme</b>	BIW
<b>Semester</b>	4
<b>Course methods</b>	SE, FL
<b>Language</b>	English
<b>ECTS Credits</b>	4.50
<b>Incoming places</b>	Limited

<b>Course description</b>	<p>This course will examine the structure and aspects of scientific writing. The aim of the course is to increase the students' awareness of definable features and functions of technical writing and to provide opportunities in which to exercise these skills.</p>
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- demonstrate their qualifications in the job application process</li> <li>- cite other authors' work in compliance with paper guidelines;</li> <li>- structure and write abstracts and/or short scientific papers according to the language-related and formal criteria given</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Structuring a scientific paper</li> <li>- Correct citation of other authors' findings</li> <li>- Language-related peculiarities of a scientific paper</li> <li>- The three phases of writing</li> </ul>

	- Abstract writing
<b>Prerequisites</b>	- Professional and technical communication 1 + 2- English for Business and Engineering
<b>Assessment Methods</b>	- Course immanent assessment method
<b>Attendance</b>	Compulsory

## Business Informatics

<b>Degree programme</b>	BIW
<b>Semester</b>	6
<b>Course methods</b>	ILV, FL
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	In this course students will learn about the basic topics, methods and goals of information systems.
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- name the main tasks and typical job areas of business informatics</li> <li>- reason the need of modelling of processes and requirements</li> <li>- explain the tasks of business process management</li> <li>- model business processes with predefined modeling techniques (Process map, value added chain diagram, event driven process chain)</li> <li>- visualise system requirements in Use Case Diagrams, based on short descriptions</li> <li>- develop Use Case Specifications following a predefined style (RUP style)</li> <li>- explain the process of ERP selection</li> <li>- orientate themselves in a selected ERP system (Microsoft Dynamics Nav)</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Business Informatics and main Tasks</li> <li>- Business process management and modeling</li> <li>- System requirements and modeling</li> <li>- ERP selection</li> <li>- Usage of one ERP System</li> </ul>
<b>Prerequisites</b>	None

<b>Assessment Methods</b>	- Course immanent assessment and final written exam
<b>Recommended Reading and Material</b>	- Provided material in moodle course
<b>Attendance</b>	Compulsory

## Business Studies

<b>Degree programme</b>	BIW
<b>Semester</b>	2
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	This course is designed to provide students with an understanding of the context in which businesses operate and the interdependency of different areas of business.
<b>Learning outcome</b>	After passing this course successfully students are able to ... - explain the nature, purpose and forms of organisations and how they interact with the environment and their stakeholders. - describe how organisational strategies, aims and objectives are interlinked and how the development of management affects leadership, structure and organisational behaviour.
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Purpose and nature of Business</li> <li>- Types of businesses in private and public sector</li> <li>- Stakeholders and their objectives</li> <li>- Business aims, objectives and strategies</li> <li>- Development of Management</li> <li>- Organisational structure</li> <li>- Production and finance functions</li> </ul>
<b>Prerequisites</b>	Basics of macroeconomics
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- Course immanent assessment method and final written exam</li> <li>- Final test 80%</li> <li>- Moodle Quizzes 20%</li> </ul>
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Ebert, R.J./Griffin, R.W. (2011): Business Essentials, Pearson Education</li> <li>- Hall, D./Jones, R./Raffo, C./Anderton, A. (2010): Business Studies,</li> </ul>

	Pearson Education.
<b>Attendance</b>	Compulsory

## Professional & Technical Communication 2

<b>Degree programme</b>	BIW
<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	As in the first semester English course, this course is designed to give you weekly opportunities to practice and improve both your language skills and communication skills. The course aims to examine and explore how technology and society connect. To this end, you will write and present an impact analysis and a technical description, thus giving you opportunities to practice and improve your writing and presentation skills. In addition, you will look at literature of various genres to become aware of how writing in literature differs from writing in engineering and technology for example.
<b>Learning outcome</b>	After passing this course successfully students are able to ... - structure and describe a technical process in English for a given target group; - illustrate and explain abstract technical concepts through real-life examples; - analyse and interpret literary texts in the English language.
<b>Course contents</b>	- Audience adaptation in terms of language and Content - Impact Analysis - Technical process descriptions - Distinguishing the three main types of discourse
<b>Prerequisites</b>	Professional and technical communication 1
<b>Assessment Methods</b>	- Course immanent assessment
<b>Attendance</b>	Compulsory



# Urban Renewable Energy Technologies

## Technical English

<b>Degree programme</b>	BEE
<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Starting from the Common European Framework of Reference for Languages B1+, we aim at developing and strengthening the vocabulary of the students' field of study along with the language skills required for technical and creative communication
<b>Learning outcome</b>	After passing this course successfully students are able to ... - structure and describe a technical process in English for a given target group; - illustrate and explain abstract technical concepts through real-life examples; - analyse and interpret literary texts in the English language.
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Distinguishing the three main types of discourse</li> <li>- Audience adaptation in terms of language and content</li> <li>- Impact analysis</li> <li>- Technical process descriptions</li> <li>- Use of persuasive language</li> <li>- Analysis and interpretation of literary texts</li> </ul>
<b>Prerequisites</b>	Common European Framework of Reference for Languages Level B1+ Completion of previous semester course
<b>Assessment Methods</b>	- Course immanent assessment method, i.e. active participation in class activities and timely completion of assignments
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Maderdonner, O. / et al (2014): Technical and Creative Communication, Skriptum</li> <li>- Connolly, P. / Kingsbury, P. et al. (2014): eSNACK, Lernplattform</li> <li>- Aktuelle Handouts und audiovisuelle Unterstützung</li> <li>- Additional current handouts and audio-visual support</li> </ul>
<b>Attendance</b>	Compulsory

## Scientific writing

<b>Degree programme</b>	BEE
<b>Semester</b>	4
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	The students acquire the language skills necessary to critically analyze formal aspects of scientific texts and apply given formal language-related features of technical and scientific texts
<b>Learning outcome</b>	After passing this course successfully students are able to ... - identify given formal and language-related features of technical and scientific texts - apply given formal and language-related features of technical and scientific texts - write abstracts in compliance with given formal and language-related guidelines
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Formal and language-related aspects of technical and scientific texts</li> <li>- avoiding common mistakes</li> <li>- Abstract writing</li> <li>- The scientific writing process</li> </ul>
<b>Prerequisites</b>	Common European Framework of Reference for Languages Level B2 Completion of previous semester course
<b>Assessment Methods</b>	- Course immanent assessment method, i.e. active participation in class activities and timely completion of assignments
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Maderdonner, O. / et al (2014): Abstract Writing, Skriptum</li> <li>- Connolly, P. / Kingsbury, P. et al. (2014): eSNACK, Lernplattform</li> <li>- Additional current handouts and audio-visual support</li> </ul>
<b>Attendance</b>	Compulsory

# Master Degree Programs

## International Business and Engineering

### Global Economy und Case Studies 2

<b>Degree programme</b>	MIW
<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Students engage with the impact of global economic developments on selected countries and societies through guest lectures and seminar papers
<b>Teaching methods</b>	Seminar
<b>Learning outcome</b>	After passing this course successfully students are able to ... <ul style="list-style-type: none"><li>- analyse the connections between economic theories and government policies</li><li>- analyse the impact of globalisation on society and the environment</li><li>- use given guidelines to write term papers about current economic topics</li></ul>
<b>Course contents</b>	<ul style="list-style-type: none"><li>- Guest lectures by diplomatic representatives of selected countries</li><li>- Political and economic challenges in threshold countries</li><li>- Globalisation strategies of multinational corporations</li><li>- Seminar papers on global economic topics</li></ul>
<b>Prerequisites</b>	Global Economy 1
<b>Assessment Methods</b>	<ul style="list-style-type: none"><li>- Active participation and quality of written contributions including term paper</li></ul>
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"><li>- Maderdonner, O. / et al (2014): Global Economy and Case Studies 2, Script</li><li>- Additional current handouts and audio-visual support</li></ul>
<b>Attendance</b>	Compulsory

## Int. Marketing und Product Management

<b>Degree programme</b>	MIW
<b>Semester</b>	2
<b>Course methods</b>	ILV, FL
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	<p>Internationalization, globalization and culturalization are currently known as key success factors of market and brand leadership. According to the current meaning students shall gain an overview of decision fields and peculiarities of international marketing in theory comparison and in the dispute with practice-oriented decision-making situations based on case studies. In particular, students should learn to understand the strategic challenges of market-oriented internationalization strategies and shall name the resulting consequences and requirements on the analysis, Market Selection- and positioning decision and apply. Using practical examples, the students will be sensitized between mainstream marketing and International Marketing with respect to the differences in the marketing mix and should – from the perspective of an acting marketing head - acquire knowledge to build, implement and guide a comprehensive internationalization process from the perspective of marketing communication.</p>
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- explain the main spheres of activity of internationalization by Kotler and implement their consequence on the basis of practical cases decisions (Case Studies).</li> <li>- apply cultural influences on the models of Hofstede, Hall and Thomas as an evaluation basis for environmental analysis and market selection to analyze their influence on the assessment of market attractiveness and to develop appropriate market selection programs.</li> <li>- assess different brands from the FMCG, IGM and DLM regarding their internationalization and positioning strategies and identify the differences in the respective marketing mix.</li> <li>- implement the essential decisions of internationalization based on a Case Study in objective, market selection and program design</li> </ul>

	<p>(marketing mix development) and to justify their choices from the perspective of marketing managers.</p> <ul style="list-style-type: none"> <li>- identify the essential model and approach differences in the product, price, distribution and communication policy between mainstream marketing and international marketing, to interpret their impact on the company's success and its market position and to develop plans for an independent marketing mix based on given project tasks in the context of an internationalization strategy at the level of the market leaders.</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Introduction to the global product and brand management</li> <li>- Global product strategies and their origins</li> <li>- Management of global brands during the product life cycle</li> <li>- Standardization versus adaption</li> <li>- Analysis of various branding strategies based on familiar examples</li> </ul>
<b>Prerequisites</b>	- Basic Knowledge of Mainstream Marketing and Business Administration- English speaking and writing   Level C1
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- written exam (75%)</li> <li>- exams via Moodle (each 5%, total 25%)</li> </ul>
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Hollensen (2012): Essentials of Global Marketing, Pearson</li> <li>- Müller/Gelbrich (2004): Interkulturelles Marketing, Vahlens</li> <li>- Usunier/Lee (2012): Marketing Across cultures, Pearson</li> </ul>
<b>Attendance</b>	Attendance is compulsory

## Marketing Cases

<b>Degree programme</b>	MIW
<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	<p>This marketing course supports the deepening of already acquired basic knowledge in international marketing. By using a computer-based marketing simulation (<a href="http://www.marketplace.com">www.marketplace.com</a>) consolidates this course all relevant marketing principles and forces students working in teams (3-5 people take on the role of marketing managers during a global product launch) to make market decisions relevant to</p>
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	business performance. The simulation calls for the development of a sustainable market strategy and forces ongoing marketing tactical decisions whose consequences impact is documented by the ongoing shift of market shares. The use of game theory allows practice compliant deepening of learning content through msed application in a competitive environment and direct feedback through the immediate impact of marketing decisions made.
<b>Teaching methods</b>	The course is organized around a marketing simulation game and class discussions. This combination aims to provide the student with a variety of skills needed by (marketing) managers.
<b>Learning outcome</b>	After passing this course successfully students are able to ... - develop marketing strategies for a global product launch by means of a computer-based simulation - design and modify an international Marketing Mix to meet, assess and control the impact of marketing decisions on market-relevant indicators (market share) - transfer already acquired marketing skills in an entrepreneurial challenge to achieve market performance implement.
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Marketing decisions regarding global launch</li> <li>- Product Strategies</li> <li>- Pricing and- price discrimination</li> <li>- Determination of the markets</li> <li>- Sales Promotion</li> <li>- Communication activities</li> <li>- Social skills ( teamwork, conflict behavior ... )</li> </ul>
<b>Prerequisites</b>	- Englisch in Wort und Schrift   Level C1- Int. Marketing and product management
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- Delivery of quarterly data</li> <li>- Final report</li> </ul>
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- <a href="http://www.marketplace.com">www.marketplace.com</a></li> <li>- Folienskriptum</li> <li>- Hollensen (2012): Essentials of Global Marketing, Pearson</li> <li>- Müller/Gelbrich (2004): Interkulturelles Marketing, Vahlens</li> <li>- Usunier/Lee (2012): Marketing across cultures, Pearson</li> </ul>
<b>Attendance</b>	Attendance is compulsory

# Mechatronics/Robotics (full-time)

## International project management

<b>Degree programme</b>	MMR
<b>Semester</b>	2
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	<p>- This course is as well an introduction to project portfolio management and multi project management as to international project management- It explains some of the critical success factors for managing projects of in heterogeneous project portfolio and in an international environment - especially those that are not present or perhaps not that critical in a domestic project- International project management covers different aspects such as culture, management, team, communication and expatriates</p>
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- identify, categorize, evaluate, select and prioritize the components of a project portfolio</li> <li>- identify and analyze risks in a project portfolio and develop responses to risks in a project portfolio</li> <li>- balance a project portfolio regarding the relevant indicators of a concrete company scenario, e.g., time patterns and schedule, regional balance, target market priorities, utilization of resources, etc.</li> <li>- monitor and control project portfolio performance</li> <li>- evaluate the influence of culture on international projects</li> <li>- explain the necessity of different management styles in international projects</li> <li>- analyze team management according to specific situations in international projects including the ability to define adequate counter-actions</li> <li>- explain the challenges of collaboration in virtual teams</li> <li>- identify communication problems in international projects including the ability to define adequate counter-actions</li> <li>- suggest appropriate solutions to diverse problems in international projects</li> </ul>

<b>Course contents</b>	<ul style="list-style-type: none"> <li>- The lecture will concentrate on 2 aspects of multi project management and 5 aspects of international project management:</li> <li>- Structuring project portfolio and program management</li> <li>- Controlling project portfolios in the multi project management</li> <li>- Culture</li> <li>- Success Factors of international projects</li> <li>- Team management in international projects</li> <li>- Communication</li> <li>- Expatriates</li> </ul>
<b>Prerequisites</b>	Basic Knowledge of Project Management.
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- The grades evaluate the academic knowledge of the topic and concepts as well as the ability to recognize and apply these concepts in 'real-world' circumstances</li> <li>- Grades are based on the outcome of the preparation of the topic, case studies and final exam</li> </ul>
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- ADLER, Nancy J., &amp; GUNDERSEN, Allison (2007), International Dimensions of Organizational Behavior. Ohio: Thomson South-Western</li> <li>- KÖSTER, Kathrin (2009), International Project Management (London: Sage)</li> <li>- LIENTZ, Bennet, REA, Kathryn (2003), International Project Management (San Diego: Academic Press)</li> <li>- LOMNITZ, Gero (2004), Multiprojektmanagement (Frankfurt: redline)</li> <li>- Portfolio and Multi Project Management</li> </ul>
<b>Attendance</b>	Attendance is compulsory

## Mobile and Service Robotics 1

<b>Degree programme</b>	MMR
<b>Semester</b>	2
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Introduction to mobile and service robotics, foundations of algorithms and their implementation
<b>Learning outcome</b>	After passing this course successfully students are able to ...



	<ul style="list-style-type: none"> <li>- explain basic concepts of mobile robotics, e.g., kinematics and localization, and to assign these concepts to a given mobile robot</li> <li>- analyze and implement deterministic and statistical methods of positioning according to a specific application scenario, to evaluate advantages and disadvantages of relevant technical concepts, to decide on which method to use for which application, and subsequently to implement an adequate technical concept for a specific mobile robotics application</li> <li>- select, plan and implement methods for navigation and the related map representation of the robotic system</li> </ul>
<b>Course contents</b>	- Introduction to mobile robotics; Locomotion principles, Mobile Robot kinematics Perception (infrared, sonar, laser, vision based sensors), Localization (map representation, kalman filter localization, autonomous map building), Planning and navigation (path planning, obstacle avoidance, navigation architectures) Service Robot: Components, Manipulation, Mobility, Sensing, Planning, Control, Design. Case studies from Applications
<b>Prerequisites</b>	Mobile robotics (Bacc.), sensors
<b>Assessment Methods</b>	- Weekly Projekts, seminars, examination
<b>Recommended Reading and Material</b>	- 1. Roland Siegwart, Illah R. Nourbakhsh: Introduction to Autonomous Mobile Robots
<b>Attendance</b>	Compulsory

## Mechatronics/Robotics (part-time)

### International project management

<b>Degree programme</b>	MMR
<b>Semester</b>	2
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	This course is an introduction to project portfolio management and to
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	international project management. It explains some of the critical success factors of managing projects in heterogeneous project portfolio environments and in international projects – especially those that are not present or perhaps not that critical in a domestic project.
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- identify, categorize, evaluate, select and prioritize the components of a project portfolio</li> <li>- identify and analyze risks in a project portfolio and develop responses to risks in a project portfolio</li> <li>- balance a project portfolio regarding the relevant indicators of a concrete company scenario, e.g., time patterns and schedule, regional balance, target market priorities, utilization of resources, etc.</li> <li>- monitor and control project portfolio performance</li> <li>- evaluate the influence of culture on international projects</li> <li>- explain the necessity of different management styles in international projects</li> <li>- analyze team management according to specific situations in international projects including the ability to define adequate counter-actions</li> <li>- explain the challenges of collaboration in virtual teams</li> <li>- identify communication problems in international projects including the ability to define adequate counter-actions</li> <li>- suggest appropriate solutions to diverse problems in international projects</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Differences between projects, project portfolios and programs</li> <li>- Program management and multi project management</li> <li>- Responsibilities in programs and project portfolios</li> <li>- Roles in project portfolios</li> <li>- Stakeholders of project portfolios</li> <li>- Project portfolios and strategy</li> <li>- Processes of project portfolio management</li> <li>- What is culture?</li> <li>- Why do international projects fail?</li> <li>- Leadership in international projects</li> <li>- Multicultural teams in projects</li> <li>- Managing virtual project teams</li> <li>- International communication</li> </ul>
<b>Prerequisites</b>	Basic Knowledge of Project Management.
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- Course immanent assessment method and end exam Case studies, contribution in class and end exam</li> </ul>

<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Adler, Nancy J., Gundersen, Allison (2007): International Dimensions of Organizational Behavior, 5th edition, Ohio: Thomson South-Western</li> <li>- Binder, Jean (2007): Global Project Management: Communication, Collaboration and Management Across Borders, Farnham: Ashgate Publishing</li> <li>- Hofstede, Geert, Hofstede, Gert Jan (2004): Culture and Organizations: Software of the Mind, 3rd edition, New York: McGraw-Hill</li> <li>- Hofstede, Gert Jan, Pedersen, Paul B., HOofstede, Geert (2002): Exploring Culture: Exercises, Stories and Synthetic Cultures, Boston: Nicholas Brealey</li> <li>- Köster, Kathrin (2009): International Project Management, London: Sage</li> <li>- Lientz, Bennet, REA, Kathryn (2002): International Project Management, San Diego: Academic Press</li> <li>- Lomnitz, Gero (2008): Multiprojektmanagement. Projekte erfolgreich planen, vernetzen und steuern, 3. Auflage, Frankfurt am Main: Moderne Industrie</li> <li>- Solomon, Charlene, Schell, Michael (2009): Managing Across Cultures: The Seven Keys to Doing Business with a Global Mindset, New York: McGraw-Hill</li> </ul>
<b>Attendance</b>	Attendance is compulsory
<b>Comments</b>	Teaching language is English

## Mobile and Service Robotics 1

<b>Degree programme</b>	MMR
<b>Semester</b>	2
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	The Course covers basic and advanced topics in mobile and service robotics, in particular the functional principles and the implementation of technical algorithms including implementation issues, and moreover the application of statistic methods in robotics
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<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- explain basic concepts of mobile robotics, e.g., kinematics and localization, and to assign these concepts to a given mobile robot</li> <li>- analyze and implement deterministic and statistical methods of positioning according to a specific application scenario, to evaluate advantages and disadvantages of relevant technical concepts, to decide on which method to use for which application, and subsequently to implement an adequate technical concept for a specific mobile robotics application</li> <li>- select, plan and implement methods for navigation and the related map representation of the robotic system</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Introduction to mobile robotics (locomotion, mobile robot kinematics, basic sensor technology)</li> <li>- Localization and map representation</li> <li>- Probabilistic robotics: representation of uncertainty, error propagation, sensor and actor modelling)</li> <li>- practical exercises, implementation of methods</li> <li>- Group seminar paper regarding the design of a mobile robot</li> </ul>
<b>Prerequisites</b>	Fundamentals of mobile robotics, sensors, statistics and linear algebra (level: bachelor program)
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- Practical exercises</li> <li>- Seminar thesis</li> <li>- Presentation</li> <li>- End exam</li> </ul>
<b>Recommended Reading and Material</b>	- Roland Siegwart, Illah R. Nourbakhsh (2010): Introduction to Autonomous Mobile Robots, The MIT Press, Massachusetts Institute of Technology, Cambridge, Massachusetts 02142, ISBN 0-262-01535-8
<b>Attendance</b>	Attendance is compulsory

## Renewable Urban Energy Systems

### English-Negotiating

<b>Degree programme</b>	MEE
<b>Semester</b>	2
<b>Course methods</b>	SE

<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	Students are taught the necessary principles to negotiate effectively using the Harvard Negotiation Model
<b>Teaching methods</b>	Negotiation case studies particular to your industry as well as video analysis are used.
<b>Learning outcome</b>	After passing this course successfully students are able to ... - adapt the language and content to the negotiation partner - use relevant negotiation techniques and theory using the Harvard model - negotiate fluently and confidently in English
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Checkliste for Negotiations</li> <li>- Preparation and research methods</li> <li>- Useful English phrases for meetings and negotiations</li> <li>- Specific negotiation techniques</li> <li>- External resources</li> <li>- Body language and interpersonal intelligence</li> <li>- Dealing with obstacles</li> </ul>
<b>Prerequisites</b>	Common European Framework of Reference for Languages Level B2+
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- Active participation in class</li> <li>- Activities and timely completion of assignments</li> </ul>
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Daly, Kevin / VanderHart, Chanda (2011): Skriptum</li> <li>- Additional current handouts and audio-visual support</li> </ul>
<b>Attendance</b>	Attendance is compulsory (80%)

# FACULTY OF LIFE SCIENCE TECHNOLOGIES

## Bachelor Degree Programs

### Biomedical Engineering

#### English 2

<b>Degree programme</b>	BBE
<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	2.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Starting from the Common European Framework of Reference for Languages B1+, we aim at developing and strengthening the vocabulary of the students' field of study along with the language skills required for technical and creative communication
<b>Learning outcome</b>	After passing this course successfully students are able to ... <ul style="list-style-type: none"><li>- structure and describe a technical process in English for a given target group;</li><li>- illustrate and explain abstract technical concepts through real-life examples;</li><li>- analyse and interpret literary texts in the English language.</li></ul>
<b>Course contents</b>	<ul style="list-style-type: none"><li>- Distinguishing the three main types of discourse</li><li>- Audience adaptation in terms of language and content</li><li>- Impact analysis</li><li>- Technical process descriptions</li><li>- Use of persuasive language</li><li>- Analysis and interpretation of literary texts</li></ul>
<b>Prerequisites</b>	Common European Framework of Reference for Languages Level B1+ Completion of previous semester course
<b>Assessment Methods</b>	<ul style="list-style-type: none"><li>- Course immanent assessment method, i.e. active participation in class activities and timely completion of assignments</li></ul>

<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Maderdonner, O. / et al (2014): Technical and Creative Communication, Script</li> <li>- Connolly, P. / Kingsbury, P. et al. (2014): eSNACK, learning platform</li> <li>- Additional current handouts and audio-visual support</li> </ul>
<b>Attendance</b>	Attendance is mandatory in this course, only 20% of absence is tolerated. In case you miss more than 20% of the class you lose the first try in the exam.
<b>Comments</b>	Attendance is mandatory in this course, only 20% of absence is tolerated. In case you miss more than 20% of the class you lose the first try in the exam.

## Medical Data Engineering

<b>Degree programme</b>	BBE
<b>Semester</b>	4
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Databases, Security, Operating-Systems, Austrian electronic insurance card system (eCard, GIN).
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- conceptualise software for healthcare that uses the services of the "Gesundheits- Informations- Netz" (GIN, Austrian eCard system, electronic health insurance card)</li> <li>- generate and use structured data in healthcare, especially medical records as defined in the CDA implementation guides for the Austrian Electronic Healthcare Record ELGA</li> <li>- conceptualise database applications for healthcare</li> </ul>
<b>Course contents</b>	- Gesundheits-Informations Netz (GIN), software engineering for healthcare, Database Design, Structured data in healthcare
<b>Prerequisites</b>	Software development.
<b>Assessment Methods</b>	- Written exam. Results from work on the projects.
<b>Recommended Reading and Material</b>	- Datenbanksysteme Autor: Heide Faeskorn-Woyke / Birgit Bertelsmeier / Petra Riemer / Elena Bauer ISBN: 978-3-8273-7266-6

	e-bookDatenbanksystemeAutor: Heide Faeskorn-Woyke / Birgit Bertelsmeier / Petra Riemer / Elena BauerISBN: 978-3-8632-6632-5Andrew S. TanenbaumISBN: 978-3-8273-7342-7
<b>Attendance</b>	Attendance is mandatory in this course, only 20% of absence is tolerated. In case you miss more than 20% of the class you lose the first try in the exam.

## Neural Engineering

<b>Degree programme</b>	BBE
<b>Semester</b>	4
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Basics of Neuroprosthetics and Biosignal Detection
<b>Teaching methods</b>	ILV - Lecture with practical exercises
<b>Learning outcome</b>	After passing this course successfully students are able to ... - Basic knowledge in:NeuroprostheticsParameters and applications of functional electrical stimulation
<b>Prerequisites</b>	Basics in:ElectronicElectrical engineeringPhysiology
<b>Assessment Methods</b>	- Written exam
<b>Comments</b>	Attendance is mandatory in this course, only 20% of absence is tolerated. In case you miss more than 20% of the class you lose the first try in the exam.

## Engineering Heart, Lung and Circulation

<b>Degree programme</b>	BBE
<b>Semester</b>	4
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited



<b>Course description</b>	This integrated course provides an overview on most important diagnostic and therapeutic tools and devices for heart, lung and circulatory system, and trains a simple example for a risk analysis of such devices
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- select appropriate methods for pressure- and flow-measurement in Lung and Circulation for given settings and to explain this selection;</li> <li>- compare different methods for ECG-recording and to recognize signal distortions and take methods to eliminate such distortions</li> <li>- describe the main components of pacemakers and the settings for different cardiac pathologies and to explain the reasons for these settings</li> <li>- describe the workflow of spirometric and oxymetric investigations and to compare the advantages and limitations of these methods</li> <li>- describe the important aspects of electrical safety of given device settings and to recognize correlated problems</li> <li>- perform simple risk analyses of devices in lung and cardiovascular medicine.</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Basics of Fluid Dynamics in respect of fluids in circulation and lung</li> <li>- Invasive and noninvasive technologies for pressure measurement</li> <li>- Invasive and noninvasive technologies for flow measurement</li> <li>- ECG: Physiological background, most important pathophysiological phenomena, ECG-recording, basic circuits</li> <li>- Spirometry, Oxymetry</li> <li>- Cardiac pacemakers: Basics, Components, modes of operation</li> <li>- Safety requirements of devices and installations in respect of cardiac safety</li> <li>- Applied risk analysis for devices in heart, lung, circulatory applications</li> </ul>
<b>Prerequisites</b>	Basics in Physics Anatomy and Physiology of Lung, Heart and Circulation (Overview)
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- Seminar Work 30%</li> <li>- Written Exam 70%, both parts need to be positive</li> </ul>
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Oertel H, Ruck S: Bioströmungsmechanik, Vieweg 2012;</li> <li>- Bronzino R, Patterson J: Handbook of Biomedical Engineering, CRC 2015</li> <li>- Tschaut RJ (Hrsg): Extrakorporale Zirkulation in Theorie und Praxis, Papst 2005</li> <li>- Kay PH, Munsch CM: Techniques in extracorporeal circulation, Arnold 2004</li> </ul>

	- Boltz A, Urabszek W: Technik in der Kardiologie, Springer 2002
<b>Attendance</b>	Attendance is mandatory in this course, only 20% of absence is tolerated. In case you miss more than 20% of the class you lose the first try in the exam.
<b>Comments</b>	Attendance is mandatory in this course, only 20% of absence is tolerated. In case you miss more than 20% of the class you lose the first try in the exam.

## Cell Culture Techniques

<b>Degree programme</b>	BBE
<b>Semester</b>	4
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	Cell Culture Techniques - Introduction
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- explain standard techniques for aseptic cultivation of eukaryotic cells in detail, to highlight possibilities to recognize contaminations and to suggest necessary actions to prevent further spreading</li> <li>- explain construction and function of instruments used in cell culture and to pinpoint possible malfunctions</li> <li>- calculate concentrations of reagent solutions, to suggest sufficient labeling of containers in cell culture, and to enumerate legal requirements handling of waste</li> <li>- evaluate critically the replacement of animal testing by cell culture methods and to discuss pro's and con's in a specific field of application (e.g., cancer research, virology, drug testing, tissue engineering, stem cell biology, gene therapy) based on scientific literature</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Theory of cell culture standard techniques (mechanic and enzymatic cell detachment, composition of cell culture media, adherent and suspension cell cultures, finite and immortalised cell lines, primary cells), equipment of cell culture lab, types of contamination and their specific detection, cell counting and calculation of cell number, replacement of animal testing by cell</li> </ul>

	culture based assays in different fields of applications presented by students
<b>Prerequisites</b>	General and organic chemistry, physics, electronics, biochemistry and molecular biology, instrumented analysis in laboratory medicine
<b>Assessment Methods</b>	- Written examination, presentation of recent papers by students and discussion
<b>Recommended Reading and Material</b>	- Freshney, R. (2010): Culture of Animal Cells - A Manual of Basic Technique and Specialized Applications, John Wiley & Sons-Verlag - Handouts of lectures
<b>Attendance</b>	Attendance is mandatory in this course, only 20% of absence is tolerated. In case you miss more than 20% of the class you lose the first try in the exam.
<b>Comments</b>	Attendance is mandatory in this course, only 20% of absence is tolerated. In case you miss more than 20% of the class you lose the first try in the exam.

## Medical Application of Embedded Systems

<b>Degree programme</b>	BBE
<b>Semester</b>	4
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	- Basics of microcontroller programming and embedded systems software design - Project work in the sector of biomedical applications
<b>Learning outcome</b>	After passing this course successfully students are able to ... - name important microcontrollers components; - implement register-level programming in C - debug C-programs for microcontrollers
<b>Course contents</b>	- bit manipulation, special function registers, using peripheral units of a microcontroller: GPIO, UART, ADC
<b>Prerequisites</b>	C-programming skills
<b>Assessment Methods</b>	- Exam

	<ul style="list-style-type: none"> <li>- Project outcome</li> <li>- Participation in the lecture</li> </ul>
<b>Recommended Reading and Material</b>	- Richard H. Barnett, Sarah Cox, Larry O'Cull: Embedded C Programming and the Atmel AVR Paperback – June 5, 2006 2nd edition, ISBN-13: 978-1418039592 ISBN-10: 1418039594
<b>Attendance</b>	Compulsory
<b>Comments</b>	Attendance is mandatory in this course, only 20% of absence is tolerated. In case you miss more than 20% of the class you lose the first try in the exam.

## Bioinformatics

<b>Degree programme</b>	BBE
<b>Semester</b>	4
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	Basics of Bioinformatics
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- search in literature data bases</li> <li>- perform basic sequence comparisons on DNA and protein levels</li> <li>- construct protein structures in 3D</li> </ul>
<b>Course contents</b>	- literature data bases, sequence comparisons (BLAST) on protein and DNA level, protein prediction tools, protein structures
<b>Prerequisites</b>	Modules: - "Biochemie & Molekularbiologie" - "Einführung in die Biomedizinische Informatik"
<b>Assessment Methods</b>	- Tasks to be fulfilled by the students
<b>Recommended Reading and Material</b>	- Seminar slides
<b>Attendance</b>	Attendance is mandatory in this course, only 20% of absence is tolerated. In case you miss more than 20% of the class you lose the first try in the exam.
<b>Comments</b>	Attendance is mandatory in this course, only 20% of absence is tolerated. In case you miss more than 20% of the class you lose the

	first try in the exam.
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## Immunology

<b>Degree programme</b>	BBE
<b>Semester</b>	4
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	2.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Introduction to Immunology
<b>Learning outcome</b>	After passing this course successfully students are able to ... - explain basic connections of immunological interactions. - differentiate between bacterial and viral infections. - define the problems of allergies, autoimmune diseases and transplantations.
<b>Course contents</b>	- Innate and adaptive immune system - Inflammation - Allergy - Autoimmune diseases - Transplantation
<b>Prerequisites</b>	Biochemistry & molecular biology functional anatomy and physiology pathophysiology
<b>Assessment Methods</b>	- Written end exam
<b>Recommended Reading and Material</b>	- Charles A. Janeway jr. u. a. : Immunologie, 5. Auflage, Spektrum Akademischer Verlag GmbH, Heidelberg, Berlin, 2002
<b>Attendance</b>	Attendance is mandatory in this course, only 20% of absence is tolerated. In case you miss more than 20% you lose the first attempt in the exam.

## Molecular Genetics

<b>Degree programme</b>	BBE
<b>Semester</b>	4
<b>Course methods</b>	SE

<b>Language</b>	English
<b>ECTS Credits</b>	2.50
<b>Incoming places</b>	Limited

<b>Course description</b>	Lecture explaining the basics of genetics with focus on molecular genetics and gene technology, including selected advanced topics like genome research.
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- specify and to compare general molecular mechanisms in pro- and eukaryotic cells.</li> <li>- describe the fundamental biological processes of replication, transcription and translation on a molecular genetic level.</li> <li>- recapitulate the different biological properties of proteins, RNA and DNA.</li> <li>- describe the molecular interactions which drive the expression of genes.</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Introduction and Basics</li> <li>- Cell Cycle and Mitosis/Replication</li> <li>- Sexual Reproduction and Meiosis/Recombination</li> <li>- Transcription</li> <li>- Translation</li> <li>- Bacterial genetics (Parasexuality)</li> <li>- Gene Regulation</li> <li>- DNA analysis (methods)</li> </ul>
<b>Prerequisites</b>	Biochemistry and molecular biology
<b>Assessment Methods</b>	- Written end exam
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Molecular Biology of the Cell Bruce Alberts et al. 5th Edition (2008) Garland Science ISBN 978-0815341116</li> <li>- Genetik - Allgemeine Genetik - Molekulare Genetik - Entwicklungsgenetik Wilfried Janning; Elisabeth Knust Auflage: 1. (2004) Thieme Verlag ISBN 3131287713 - Molekulare Genetik Rolf Knippers Auflage: 9. (2006) Thieme Verlag ISBN: 3134770091</li> </ul>
<b>Attendance</b>	Attendance is mandatory in this course, only 20% of absence is tolerated. In case you miss more than 20% you lose the first attempt in the exam.

## Pharmacokinetics and Toxicology

<b>Degree programme</b>	BBE
<b>Semester</b>	4
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	Basics of Pharmacokinetics
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- explain all categories (absorption, distribution, metabolism, excretion) of pharmacokinetics illustrated by examples and to perform simple calculations of pharmacokinetic parameters (e.g., plasma concentration, apparent volume of distribution)</li> <li>- distinguish acute from chronic toxicity, to explain the different types of toxic responses and dose-response curves</li> <li>- give examples for toxicity testing and the different types of toxins</li> <li>- adapt the principles of pharmacokinetics to the different types of chemotherapy including personalized treatment/medicine</li> </ul>
<b>Prerequisites</b>	molecular biology and biochemistry
<b>Assessment Methods</b>	- written exam
<b>Recommended Reading and Material</b>	- Katzung: Pharmacology & Toxicology Goodman & Gilman's: Manual of Pharmacology and Therapeutics
<b>Attendance</b>	Attendance is mandatory in this course, only 20% of absence is tolerated. In case you miss more than 20% of the class you lose the first try in the exam.
<b>Comments</b>	Attendance is mandatory in this course, only 20% of absence is tolerated. In case you miss more than 20% of the class you lose the first try in the exam.

## Biological Signals and Medical Sensors 1

<b>Degree programme</b>	BBE
<b>Semester</b>	4
<b>Course methods</b>	ILV

<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	In the course "Biological and Medical signal sensor 1" the knowledge acquired in the field of physics, electronics and instrumentation are responsible for the implementation and practical. The result is a circuit design, which is then built up in the following course "Biological and Medical Sensors 2" and put into operation.
<b>Learning outcome</b>	After passing this course successfully students are able to ... - simulate and design electronic circuits for biological processing - design and experimental set-up basic electronic circuits and validate and characterize them with modern measuring instruments. - construct prototypes with CAD / CAM tools based on concrete tasks
<b>Course contents</b>	- Project work
<b>Prerequisites</b>	- Medical Electronics - Medicine Electronics Laboratory - Medical Physics - Fundamentals of Medical Measurement - Technology
<b>Assessment Methods</b>	- Course immanent assessment method
<b>Recommended Reading and Material</b>	- Tietze-Schenk (2012): Halbleiter- Schaltungstechnik, Springer Verlag
<b>Attendance</b>	Yes

## Radiation Physics

<b>Degree programme</b>	BBE
<b>Semester</b>	4
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Basics of atomic and nuclear physics, radiation physics and technology in nuclear medicine
<b>Learning outcome</b>	After passing this course successfully students are able to ... - apply knowledge on atomic and nuclear physics, radiation physics and technology in nuclear medicine to biomedical engineering.



	<ul style="list-style-type: none"> <li>- outline the basic interactions between ionizing radiation and electron hull.</li> <li>- reproduce the fundamental models of nuclear physics and radioactivity.</li> <li>- explain the principles of signal processing in nuclear medicine technology.</li> <li>- apply basic knowledge on radiopharmaceuticals in a practical context.</li> <li>- participate in projects on technology related to nuclear medicine.</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Historical overview and development of atomic physics</li> <li>- Elementary charge, Bohr model</li> <li>- X-ray, auger effect</li> <li>- Wave-particle duality</li> <li>- Photoelectric effect, Compton scattering, pair production</li> <li>- Quantum numbers</li> <li>- Periodic table</li> <li>- Heisenberg uncertainty principle, Schrödinger equation</li> <li>- Historical overview and development of nuclear physics</li> <li>- Nuclear models</li> <li>- Radioactivity and nuclear reactions</li> <li>- Research and applications in nuclear physics</li> <li>- Basics of nuclear medicine</li> <li>- Radiation detectors, Gamma camera</li> <li>- Scintigraphy, PET, SPECT, Multi-modality imaging</li> <li>- Radiopharmaceuticals and their production</li> <li>- Dosimetry in Nuclear Medicine</li> </ul>
<b>Prerequisites</b>	No prerequisites are required;
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- End exam</li> <li>- Oral exam</li> </ul>
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Christopher J. Foot, Atomic Physics, Oxford University Press ISBN-10: 0198506961</li> <li>- W. N. Cottingham, D. A. Greenwood, An Introduction to Nuclear Physics, Cambridge University Press, ISBN-10: 0521657334</li> <li>- Simon R. Cherry, R. W. Blowey, Michael E. Phelps, Physics in Nuclear Medicine, Saunders, ISBN-10: 072168341X</li> <li>- Michael E. Phelps, PET: Physics, Instrumentation, and Scanners, Springer New York, ISBN-10: 1441921834 The power point slides will be available for the students.</li> </ul>
<b>Attendance</b>	Attendance is mandatory in this course, only 20% of absence is tolerated. In case you miss more than 20% of the class you lose the

	first try in the exam.
<b>Comments</b>	Attendance is mandatory in this course, only 20% of absence is tolerated. In case you miss more than 20% of the class you lose the first try in the exam.

## Medical Imaging and Analysis

<b>Degree programme</b>	BBE
<b>Semester</b>	4
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	The lecture is a comprehensive and compact introduction to medical image processing. All methods are illustrated in practical lessons by simple MATLAB examples. necessary.
<b>Learning outcome</b>	After passing this course successfully students are able to ... - develop simple prototypes for basic image processing in defined clinical situations - understand the functionality in commercially available software and to use it adequately
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Basic physics of imaging with a view on image processing</li> <li>- Clinical application examples</li> <li>- Data storage and -formats</li> <li>- Operations in intensity space</li> <li>- Filtering operations in the spatial domain, Fourier transform, linear filter theory, convolution theorem</li> </ul>
<b>Prerequisites</b>	- Applied Mathematics (Basics of calculus, vector algebra, basics matrix operations) - Physics of electromagnetism - Basic knowledge of programming in interpreters
<b>Assessment Methods</b>	- Multiple Choice Test
<b>Recommended Reading and Material</b>	- W. Birkfellner, with contributions by M. Figl, J. Hummel, Z. Yaniv and Ö. Güler: Applied Medical Image Processing – A Basic Course, 2nd Edition, CRC Press, ISBN: 978-1-4665-5557-0
<b>Attendance</b>	Attendance is recommended

## Safety and Communication in Medical Data Engineering

<b>Degree programme</b>	BBE
<b>Semester</b>	4
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Fundamentals of medical software engineering and quality assurance
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- apply the standardised methods of software development.</li> <li>- plan and implement basic tasks of software testing.</li> <li>- transfer knowledge about ISO/IEC 62304, ISO 13485, IEEE 829 from theory to practical use.</li> <li>- explain the communication chain according to the Continua Health Alliance.</li> <li>- implement a client/server communication using the TCP/IP.</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Fundametal test process</li> <li>- V-model</li> <li>- Standards for medical software developement</li> <li>- Standards for software testing</li> <li>- Basics of data communication</li> <li>- IDE features (debugging, unit testing, etc.)</li> </ul>
<b>Prerequisites</b>	Structured Programming in Biomedical Engineering Object-oriented programming in biomedical engineering
<b>Assessment Methods</b>	- Course immanent assessment method (active repetition of course contents, software project and documentation) and end exam
<b>Recommended Reading and Material</b>	- Standards (ISO/IEC 62304, ISO 13485, IEEE 829)
<b>Attendance</b>	Attendance is mandatory in this course, only 20% of absence is tolerated. In case you miss more than 20% you lose the first attempt in the exam.
<b>Comments</b>	This course is coordinated with the course Medical Data Engineering in order to reach a high level of synergies for the students

	participation.
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## Telemedicine & eHealth

<b>Degree programme</b>	BBE
<b>Semester</b>	4
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	In this course you will acquire basic knowledge about the application of information and communications technologies (ICT) in the healthcare system ( = eHealth) in general and for medicine at a distance ( = telemedicine) in particular.
<b>Learning outcome</b>	After passing this course successfully students are able to ... - classify existing and future healthcare ICT systems according to a variety of schemes - name the core properties of different system elements (health records, networks) and analyse their critical performance criteria - understand the different levels of interoperability and choose proper standards and integration profiles for different application fields - address and balance risks and opportunities of healthcare ICT applications
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Introduction to the field and definition of terms: eHealth, mHealth, pHealth, telemedicine</li> <li>- Challenges in the healthcare system and proposed eHealth solutions</li> <li>- Core technologies (networks, mobile and wireless)</li> <li>- Legal and political framework</li> <li>- Interoperability and standards</li> <li>- The electronic health record / ELGA</li> <li>- Patient centred health care (home-, health- and telemonitoring)</li> <li>- Information and communications technologies in biomedical research</li> <li>- Future aspects and resources for further studies</li> </ul>
<b>Prerequisites</b>	Informationsmanagement in der Medizin / BBE-3
<b>Assessment Methods</b>	- Course immanent assessment method and end exam

<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Handouts based on the lecturer's presentation</li> <li>- Handouts from the student's presentations</li> </ul>
<b>Attendance</b>	Attendance is mandatory in this course, only 20% of absence is tolerated. In case you miss more than 20% of the class you lose the first try in the exam.

## Biomechanics

<b>Degree programme</b>	BBE
<b>Semester</b>	4
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	- Introduction to Biomechanics - Calculations and Analysis of biomechanical examples
<b>Teaching methods</b>	Lectures with examples and discussion
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- LE1 calculate and interpret biomechanical examples like the internal and external forces of the hip or the knee joint</li> <li>- LE2 specify mechanical properties of soft and hard biological tissues</li> </ul>
<b>Course contents</b>	- Forces, Moment and Equilibrium, Free Body Diagram, Anthropometry, COG, COM, COP, Kinematics and kinetics of movements, Calculations of combinations of movements, Moment of Inertia, Examples of biomechanics in sports and medicine, Mechanic of hard tissues, Musculoskeletal soft tissue mechanics, Biomechanics of lower limb prosthesis, Finite Elements Analysis
<b>Prerequisites</b>	Basics of physics, mathematics and anatomy
<b>Assessment Methods</b>	- Course immanent assessment method and end exam
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Benno M. Nigg und Walter Herzog (Eds.): Biomechanics of the Musculo-skeletal System, Second Edition. Wiley 1999. ISBN 0-471-97818-3.</li> <li>- Hans A. Richard und Gunter Kullmer: Biomechanik, Grundlagen und Anwendungen auf den menschlichen Bewegungsapparat, Wiesbaden 2013. ISBN 978-3-8348-0384-9</li> </ul>

	- Duane Knudson: Fundamentals of Biomechanics, Second Edition. Chico 2007. ISBN 978-0-387-49311-4
<b>Attendance</b>	Compulsory

## Circuitdesign and Signal Analysis

<b>Degree programme</b>	BBE
<b>Semester</b>	4
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	In the course "Circuit Design and Signal Analysis", the student designs and assembles a simple biosignal amplifier. Therefore, in the theoretical part all necessary elements are discussed – passive electronic components, semiconductors, operational amplifier circuits and various designs of analog front end. Additionally in hands-on sessions, basic electronic circuits are tested and a biosignal amplifier is developed.
<b>Learning outcome</b>	After passing this course successfully students are able to ... <ul style="list-style-type: none"> <li>- analyze passive networks for direct current and sinusoidal alternating current</li> <li>- design basic rectifier circuits for hardware protection</li> <li>- calculate the gain and phase shift of linear high or low pass filters</li> <li>- design dual or single supplies for operational amplifier circuits</li> <li>- evaluate analog front end circuits based on instrumentation amplifiers with simulation tools</li> <li>- design and assemble a simple biosignal amplifier including an analog front end circuit and linear filter of first order.</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Passive components, semiconductors</li> <li>- AC and DC linear network analysis</li> <li>- Complex signal analysis</li> <li>- Rectifier circuits, transistor as a switch</li> <li>- Operational amplifier – amplifier and filter circuits</li> <li>- Instrumentation amplifier for bioelectrical measurements</li> <li>- Hardware development</li> <li>- Design of supplies for analog and digital circuits</li> </ul>

	- Assembling and evaluation of an biosignal amplifier
<b>Prerequisites</b>	Basics in electrical engineering
<b>Assessment Methods</b>	- Laboratory reportsWritten exam
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Glisson TH (2011), Introduction to Circuit Analysis and Design, Springer Netherlands, ISBN: 978-90-481-9442-1</li> <li>- Mulukutla SS (2001), Introduction to Electrical Engineering, Oxford University Press, ISBN: 978-0195136043</li> <li>- Presentations slides as pdf document.</li> </ul>
<b>Attendance</b>	Attendance is mandatory in this course, only 20% of absence in the theoretical classes is tolerated. Attendance of hands-on sessions is mandatory.

## Sports Equipment Technology

### Talking business in English

<b>Degree programme</b>	BST
<b>Semester</b>	4
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	Starting from the Common European Framework of Reference for Languages B2, students acquire relevant terms, concepts and language skills necessary to be competitive in the job market
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- present projects successfully in English;</li> <li>- negotiate projects successfully in English;</li> <li>- conduct various forms of business communication.</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Presenting a start-up company, negotiating with potential investors (role plays)</li> <li>- Executive summary of a business plan</li> </ul>
<b>Prerequisites</b>	Completion of previous course

<b>Assessment Methods</b>	- Course immanent assessment method, i.e. active participation in class activities and timely completion of assignments
<b>Recommended Reading and Material</b>	- Maderdonner, O. (2014): English for Business, Skriptum - Additional current handouts and audio-visual support
<b>Attendance</b>	Compulsory

## Master Degree Programs

### Biomedical Engineering Sciences

#### Informatics of Biological Systems

<b>Degree programme</b>	MBE
<b>Semester</b>	2
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	4.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Computer Science provides for modern and essential methods for analyzing and researching biological systems. The course presents computer aided methods in context of biomedical examples.
<b>Teaching methods</b>	Seminar / Workshop Problem based learning
<b>Learning outcome</b>	After passing this course successfully students are able to ... - describe biological systems - apply presented computer-aided methods in context of biomedical questions. - select computer aided methods for successfully investigating biomedical systems
<b>Course contents</b>	- Introduction Bioinformatics, Computational Biology and Systems Theory - State of the art technologies(Data Mining, Web Technologies, Algorithms, analytical methods) - practical tasks (adapted to students background)



<b>Prerequisites</b>	- Basic computer science background- Basic programming skills- Basic biomedical background
<b>Assessment Methods</b>	- Continuous evaluation of tasks and final exam
<b>Recommended Reading and Material</b>	- Provided per topic in course
<b>Attendance</b>	Attendance is not required except for assessment of tasks and final exam.

## Ethics

<b>Degree programme</b>	MBE
<b>Semester</b>	2
<b>Course methods</b>	VO
<b>Language</b>	English
<b>ECTS Credits</b>	1.00
<b>Incoming places</b>	Limited

<b>Course description</b>	The course imparts basic knowledge of ethics in medicine to the students. The focus is on raising the awareness of the relevance of ethical questions in engineering and medicine and their ethical impacts on society and the training of ethical decision-making and argumentation.
<b>Teaching methods</b>	Seminar: Theory Inputs Case Studies Group work Ethical arguing Discussions
<b>Learning outcome</b>	After passing this course successfully students are able to ... - outline selected basic terms and principles of medical ethics (for example moral status, allocation ethics, concepts of health and disease/disabilities) by the means of simple examples. - apply ethical standards to latest research developments in selected actual case studies in medicine and engineering. - describe the steps of ethical decision-making and argumentation and to apply them in selected case studies for ethical assessment of conflicting issues in the field of research and medicine.
<b>Course contents</b>	- Fundamental positions of ethical decision-making and argumentation - Experiments with human subjects and animals - Ethics issues of resource allocation

	<ul style="list-style-type: none"> <li>- Ethical concepts to health-disease/illness-disabilities</li> <li>- Intercultural ethical aspects of medicine and engineering</li> <li>- Medical information systems (eHealth, data security, privacy, confidentiality)</li> </ul>
<b>Prerequisites</b>	-
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- Course with an immanent character (grade):</li> <li>- Introduction into a chosen topic by the student</li> <li>- Hand out</li> <li>- The student is leading a discourse about the chosen in the group</li> </ul>
<b>Recommended Reading and Material</b>	- Literature at the beginning of the course
<b>Attendance</b>	Attendance is compulsory

## Writing Skills for Biomedical Papers

<b>Degree programme</b>	MBE
<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.50
<b>Incoming places</b>	Limited

<b>Course description</b>	In scientific life it is crucial to present and publish the outcome of research. It is inevitable to know, understand and apply the standards when preparing papers and presentations. A basic understanding of “scientific life” and research is given with focus on strategies to efficiently write and publish scientific papers. Finally we talk about scientific conferences and how to “survive” presentations in front of a specialist audience.
<b>Teaching methods</b>	Upfront teaching Group work Students presentation
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- do a highly selective literature search in databases with a focus on PubMed</li> <li>- prepare a scientific publication according to the IMRAD research paper format</li> <li>- act as a reviewer according to the guidelines of scientific journals</li> <li>- evaluate / choose a scientific conference as proper platform to</li> </ul>

	<p>present own scientific work and find his or her way through</p> <ul style="list-style-type: none"> <li>- prepare and give a short scientific presentation (7-10 min) to a specialist audience and chair a session</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Typical pathway to scientific results</li> <li>- What to do before a scientific paper is written</li> <li>- IMRAD structure of scientific papers</li> <li>- Scientific writing – how to</li> <li>- Specific literature search, Inside PubMed</li> <li>- Pathway to get a publication accepted</li> <li>- The review process, duties of a reviewer</li> <li>- Practicing: Sample review of two papers, discussion in groups</li> <li>- The Scientific Conference</li> <li>- Good Paper and Poster Presentation</li> <li>- Practicing: Preparation of a presentation for a scientific conference</li> <li>- Practicing: Giving the presentation + critical feedback from the audience</li> <li>- Practicing: Chairing a session</li> </ul>
<b>Prerequisites</b>	Basic writing skills
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- Self-written abstract</li> <li>- Review report on other students abstracts</li> <li>- Short Scientific Presentation: evaluated by the teacher and students</li> <li>- Review report on other presentations</li> <li>- Written exam</li> </ul>
<b>Recommended Reading and Material</b>	- See literature in the campus system.
<b>Attendance</b>	Attendance is compulsory

## Study Design and Biostatistics

<b>Degree programme</b>	MBE
<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	A collection of mathematical methods for planning experiments,
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	obtaining data, organizing, summarizing, presenting, analyzing them statistically, interpreting, and drawing conclusions based on the data.
<b>Teaching methods</b>	LectureExamples
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- describe, compare and graphically present statistical data-sets</li> <li>- describe the basic concepts of discrete and normal propability</li> <li>- name estimates and calculate Sample sizes</li> <li>- do hypothesis-testing and test claims about two population propotions</li> <li>- do correlation and regression analyses</li> <li>- calculate the „goodness-of-fit“</li> <li>- do an analysis of variance for (one-way and two-way ANOVA)</li> </ul>
<b>Course contents</b>	- Describing, Exploring, and Comparing Data, Probability Distributions, Normal Probability Distributions, Estimates and Sample Sizes, Overview and Basics of Hypothesis Testing, Inferences from Two Samples, Correlation and Regression, Analysis of Variance
<b>Prerequisites</b>	The only mathematical prerequisite needed for the material found in the outline is arithmetic and some basic algebra.
<b>Assessment Methods</b>	- Homework (50%)written exam (50%)both parts have to be positive
<b>Recommended Reading and Material</b>	- Elementary Statistics, Mario F. TriolaPublication Date: January 6, 2011   ISBN-10: 0321694503   ISBN-13: 978-0321694508   Edition: 11
<b>Attendance</b>	Compulsory

## eHealth

<b>Degree programme</b>	MBE
<b>Semester</b>	2
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	4.00
<b>Incoming places</b>	Limited

<b>Course description</b>	<ul style="list-style-type: none"> <li>- We want to understand what "eHealth" actually is, which applications exist- What needs to be done to implement it, on the legal side, in IT systems, in the medical system- evaluation e.g. costs</li> <li>- benefit- We will look at eHealth with the eyes of politicians, patients,</li> </ul>
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	economists, industry, medical experts The course uses “Problem Based Learning” (PBL). Students will experience the views of different stakeholders in an additional business role game.
<b>Teaching methods</b>	The course will use problem based learning, triggered by brief presentations from the lecturer As a result this students will develop exam questions for the final exam At the end of the semester a role game will enable us to understand how the stakeholders act
<b>Learning outcome</b>	After passing this course successfully students are able to ... - explain typical eHealth applications from a medical and engineering point of view - critically consider literature and other sources of information for evaluating eHealth applications - consider the views of different stakeholders in designing eHealth applications
<b>Course contents</b>	- Recent examples of requirements and applications of eHealth - basic introduction into legal and reimbursement issues - engineering concepts for eHealth
<b>Prerequisites</b>	- Basic knowledge of software development- Familiarity with the medical field
<b>Assessment Methods</b>	- Students document PBL findings as exam questions - Final exam
<b>Recommended Reading and Material</b>	- eHealth Action Plan 2012-2020 ( <a href="http://ec.europa.eu/health/ehealth/docs/com_2012_736_en.pdf">http://ec.europa.eu/health/ehealth/docs/com_2012_736_en.pdf</a> ) - see results of PBL of recent years - see download
<b>Attendance</b>	The course uses PBL therefore attendance is mandatory
<b>Comments</b>	Attendance to relevant events (congresses, workshops: eHealth Summit, HL7 Jahrestagung, IHE Day, ...) can be accredited for the course, contact the lecturers.

## Artificial Intelligence

<b>Degree programme</b>	MBE
<b>Semester</b>	2
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	4.00

<b>Incoming places</b>	Limited
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<b>Course description</b>	This Lecture builds up knowledge about the algorithms and the basics of artificial intelligence (AI) and soft computing
<b>Teaching methods</b>	TheoryExamplesExcercises
<b>Learning outcome</b>	After passing this course successfully students are able to ... - describe agents and environments. - name the concept of rational behavior. - destinguish between different problem environments. - distinguish between agent structures. - name problem-solving agents - design a kind of goal-based agent - distinguish between problem types - do a graph search with partial information - find a defined problem formulation - name the basic search algorithms including: - uninformed search strategies - constraint satisfactory search - informed search strategies - define the first heuristic functions for the informed search - know, how to apply simulated annealing techniques - know how to apply evolutionary algorithms
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Basic algorithms of artificial Intelligence</li> <li>- Agents</li> <li>- Problem Solving strategies</li> <li>- Informed Search</li> <li>- Constrain Satisfactory Problems</li> <li>- Games</li> </ul>
<b>Prerequisites</b>	- C/C++/C# are essential !- Algorithms (Sedgewick)
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- Written examination (moodle)</li> <li>- Exercisesboth has to be positive</li> </ul>
<b>Recommended Reading and Material</b>	- Künstliche IntelligenzAutor: Stuart Russell / Peter NorvigSeiten: 1312ISBN: 978-3-8689-4098-5
<b>Attendance</b>	Attendance not required
<b>Comments</b>	Good programming skills are essential to pass this course. Please visit the warmup Programming course if needed!

## Electromagnetic Compatibility

<b>Degree programme</b>	MBE
<b>Semester</b>	2
<b>Course methods</b>	ILV

<b>Language</b>	English
<b>ECTS Credits</b>	4.00
<b>Incoming places</b>	Limited

<b>Course description</b>	The course is subdivided in two parts:- Part 1 covers physical fundamentals of Electromagnetic Compatibility (EMC) related to electrical appliances including regulatory basics for product conformity- Part 2 focuses on effects of electromagnetic fields (EMF) on the human body, including regulatory basics for limiting personal exposure against EMFs, as well as electromagnetic influences on implants
<b>Teaching methods</b>	Lessons and practical homework (1 assignment, chosen from several proposals)The course will be held in 10 units (6:35 - 9:00 p.m. each)One of these units will be held as an excursion to the EMC labs in Seibersdorf (approx. 35 km southeast of Vienna)For a detailed schedule of the units, please see semester planDetails about the excursion will be negotiated in the course between lecturer and students
<b>Learning outcome</b>	After passing this course successfully students are able to ... <ul style="list-style-type: none"> <li>- identify potential problems of electromagnetic compatibility during product development</li> <li>- apply the fundamental EMC design rules in practice</li> <li>- name the most important directives, standards and guidelines relevant for EMC conformity assessment of medical equipment and use them to assess the properties of a device in view of the underlying legal requirements</li> <li>- estimate the relevance of exposure situations in practice</li> <li>- name the technical possibilities of exposure assessment, their advantages and drawbacks and their limitations</li> <li>- identify potentially hazardous situations regarding electromagnetic interference with electronic implants in practice</li> <li>- name the most important directives, standards and guidelines relevant for limiting personal exposure against electromagnetic fields</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Part 1 (Lamedschwandner):</li> <li>- Introduction to Electromagnetic Compatibility (EMC)</li> <li>- EMC conformity assessment</li> <li>- European Union directives and CE marking of products</li> <li>- The EMC directive</li> <li>- EMC standards</li> <li>- EMC test methods</li> </ul>

	<ul style="list-style-type: none"> <li>- Functional safety and EMC</li> <li>- Development of electrical appliances with respect to EMC</li> <li>- Design basics</li> <li>- Printed circuit board design</li> <li>- Cabling, grounding and shielded cables</li> <li>- EMC filters, ferrites and box shielding</li> <li>- Economic EMC design principlePart 2 (Schmid):</li> <li>- Biophysical basics</li> <li>- Effects of electromagnetic fields on the human body</li> <li>- Excitation of cells by induced currents (low frequency fields)</li> <li>- Tissue heating by power absorption (radio frequency and microwave fields)</li> <li>- Other reported, but not yet established effects</li> <li>- Safety limits and regulatory basics</li> <li>- Exposure assessment methods</li> <li>- Electromagnetic interference with implants</li> <li>- Malfunction of electronic implants</li> <li>- Concentration of currents by metallic implants</li> <li>- Movement of ferromagnetic implants in strong magnetic fields</li> </ul>
<b>Prerequisites</b>	Fundamentals of electrical engineering
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- Solution and Presentation of homework (50%)</li> <li>- Written exam (50%)</li> </ul>
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Lamedschwandner K. EMC for MBE – Part 1, Chapter 1-3. Presentation Slides. Available in download section of the course</li> <li>- Paul CR. 2006. Introduction to Electromagnetic Compatibility, 2nd Edition, Wiley, New York, ISBN: 978-0-471-75500-5</li> <li>- Schmid G. EMC for MBE. Part 2, EMF Safety. Presentation Slides. Available in download section of the course</li> </ul>
<b>Attendance</b>	Attendance is compulsory

## Advanced Optics

<b>Degree programme</b>	MBE
<b>Semester</b>	2
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	4.00
<b>Incoming places</b>	Limited



<b>Course description</b>	Optics in medicine
<b>Teaching methods</b>	The course is splitted into theoretical and practical part. Pratical part will be hold in cooperation with renowned partners from medicine and industry.
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- perform basic calculations with Maxwell equations (Derivation of wave equation, continuum equation and plane waves as solution of wave equation, Snells law, Fresnel equations and Brewsters law)</li> <li>- define basic properties and interactions of electromagnetic waves (polarization)</li> <li>- analyse simple optical systems based on thin element approximation (thin lenses, image generation with lenses, thick lenses, optical FFT)</li> <li>- define optical aberrations</li> <li>- explain setup and functionality of lasers</li> <li>- explain most important interactions of light and tissue</li> <li>- list and explain important applications in medical engineering (electron microscopy, phase contrast microscopy, SNOM, optical measurement of blood sugar, OCT, endoscopy, optical tweezers, laser surgery)</li> <li>- draw the basic components of the human eye and list typical methods to correct ametropia</li> <li>- depict basic principles of OCT and explain the functionality of different data acquisition systems in OCT</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Introduction, overview on trends in modern optics of recent years (lasers, metamaterials, diffractive optics)</li> <li>- mathematical basics, Maxwell equations, Followings of Maxwell equations, derivation of wave equation, deviation of continuum equation, deviation of plane waves as solutions of wave equation, Snells law, Fresnel equations, Brewsters law</li> <li>- basic properties and interactions of electomagneticl waves (polarization)</li> <li>- thin element approximation (thin lenses, image generation with lenses, thick lenses, optical FFT)</li> <li>- optical aberrations (spherical aberration, chromatical aberration, astigmatism, coma, distortions)</li> <li>- setup and functionality of lasers</li> <li>- most important interactions of light and tissue</li> <li>- Important optical applications in medical engineering (electron microscopy, phase contrast microscopy, SNOM, optical measurement of blood sugar, OCT, endoscopy, optical tweezers,</li> </ul>

	laser surgery) - basic setup of the human eye and correction methods of ametropia - basic principles of OCT and functionality of different data acquisition systems in OCT
<b>Prerequisites</b>	- Vector analysis- vector fields- Ordinary differential equations
<b>Assessment Methods</b>	- written exam
<b>Recommended Reading and Material</b>	- MAX BORN & EMIL WOLF (1991) Principles of Optics, PERGAMON PRESS - MILES V. KLEIN & THOMAS E. FURTAK (1986) Optics, WILEY & SONS - EUGENE HECHT (1988) Optics, ADDISON-WESLEY - BERGMANN SCHÄFER, Editor: HEINZ NIEDRIG (1993) Lehrbuch der Experimentalphysik, OPTIK, Part 3, 9th. edition - THE VIRTUAL JOURNAL FOR BIOMEDICAL OPTICS - PHYSICS IN MEDICINE AND BIOLOGY
<b>Attendance</b>	Attendance is compulsory (80%)

## Project Management and Leadership Skills

<b>Degree programme</b>	MBE
<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.00
<b>Incoming places</b>	Limited

<b>Course description</b>	This course provides an overview of both the latest practical and the current theoretical leadership theories. One of the course's fundamental components will be the reflection of own behaviour regarding particular issues concerning leadership in project management.
<b>Teaching methods</b>	Theory inputTeamworkRole play
<b>Learning outcome</b>	After passing this course successfully students are able to ... - identify and to explain tasks and instruments of leadership (for example delegation, agreement on objectives). - explain classical management models (for example leading continuum, Maturity Model) and to apply to practical examples.

	- describe different assumptions about human nature (for example McGregor) and to derive the consequences for the leading of co-workers.
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Leadership styles and instruments (for example staff appraisal)</li> <li>- Motivation, promotion and development of employees</li> <li>- Leadership functions versus professional tasks</li> <li>- Consequence of “not leading”</li> <li>- Role of the leader in a change process</li> <li>- Dealing with crises, success and failures</li> </ul>
<b>Prerequisites</b>	Team Management Skills
<b>Assessment Methods</b>	- An individual reflection paper about the leadership issues encountered in the semester and how the knowledge about leadership was applied.
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Daft, R. (2008): New Era of Management, Mason/Ohio:Thomson</li> <li>- Pettinger, R. (2007): Introduction to Management, Houndmills/Hampshire: Palgrave Macmillan</li> <li>- Schermerhorn, J. (2008): Management, Hoboken/New Jersey: John Wiley</li> </ul>
<b>Attendance</b>	Attendance is compulsory
<b>Comments</b>	This course may reflect team experiences from elsewhere, e.g from the Project Related Teamwork course.

## Processes for Medical Device and System Design

<b>Degree programme</b>	MBE
<b>Semester</b>	2
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	4.00
<b>Incoming places</b>	Limited

<b>Course description</b>	The course introduces the main processes and steps of implementing quality management systems for design and development and putting to market of medical devices. It provides the necessary steps for addressing regulatory issues in an application oriented perspective.
<b>Teaching methods</b>	Lectures will introduce the topics. Students will extend their

	knowledge and skills in small assignments.
<b>Learning outcome</b>	After passing this course successfully students are able to ... - describe and handle processes to address regulatory issues of medical devices, regarding especially the "Medical Device Directive" - use quality management systems to address regulatory issues in a structured way - describe and perform measures of risk management, generally and in the sense of a "Medical IT-Network Risk Manager" (IEC 80001-1).
<b>Course contents</b>	- Medical Device Directive and Harmonised Standards (ISO 13485, ISO 14971, EN 60601-x, IEC 80001-1, ...). Case examples and experiences from the steps of medical device development, from the initial concept to market. Classification, methods for evaluation of conformity). Risk analysis, risk analysis case file. software as medical device, CE mark, accredited and notified bodies. Basic introduction to further regulations (EMC, biocompatibility, RoHS...). Basic of clinical trials. EU- vigilance system. IVD`s, AIMDD. International requirements (FDA, CMDCAS, GxP, UL, ...).
<b>Prerequisites</b>	- Basic concepts of device or software development. - Basic concepts of quality.
<b>Assessment Methods</b>	- Final exam and smaller assignments
<b>Recommended Reading and Material</b>	- See download and semesterplan
<b>Attendance</b>	The course includes discussions and assignments, so attendance is necessary to participate in assignments and discussions. In case students miss lectures they must contact the lecturers and agree on measures to handle the situation.

## Seminar for Degree Candidates

<b>Degree programme</b>	MBE
<b>Semester</b>	4
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	2.00
<b>Incoming places</b>	Limited

<b>Course description</b>	The course will help groups of students to prepare their masters
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	thesis by providing a platform for exchange and feedback.
<b>Teaching methods</b>	Students will present and discuss their diploma theses in small groups under the guidance of a lecturer The groups will provide feedback on the content and on the presentation
<b>Learning outcome</b>	After passing this course successfully students are able to ... - document and present own research work according to the requirements of scientific congresses and the master exam - provide constructive feedback on the work of others
<b>Course contents</b>	- Presentations of own work - Feedback to the work of others
<b>Prerequisites</b>	- Scientific work- Methods and technologies of biomedical engineering
<b>Assessment Methods</b>	- Course immanent assessment method
<b>Attendance</b>	Attendance is mandatory. Attendance via teleconferencing is possible, e.g. if the master thesis is written in a foreign country.
<b>Comments</b>	Use this course to polish your presentation for the final panel exam.

## Tissue Engineering and Regenerative Medicine

### Bioreactors in Tissue Engineering

<b>Degree programme</b>	MTE
<b>Semester</b>	2
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	4.00
<b>Incoming places</b>	Limited

<b>Course description</b>	The students obtain knowledge about bioreactors in Tissue Engineering and Regenerative Medicine applications. Furthermore basic concepts regarding design and triggered cellular and tissue effects will be discussed.
<b>Teaching methods</b>	VO - Basics and Theorie SE - Discussion of Examples and Modells for Bioreactors SE - Discussion of Design Concepts and outcomes

<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- define the term „Bioreactorsystems in Tissue Engineering“ and differentiate them from bioreactors in biotechnology</li> <li>- define the common bioreactor types and explain their working principle.</li> <li>- explain the main idea of the “in vivo bioreactor” concept with examples from the course.</li> <li>- define the two main rationales to use bioreactors in tissue engineering.</li> <li>- evaluate advantages and disadvantages of different bioreactor systems in regard to their application for a specific tissue type.</li> <li>- develop a basic bioreactor system for a certain organ/tissue and simulate elementary processes inside the bioreactor.</li> <li>- explain common types of sensors for bioreactor systems and apply these sensors on a specific bioreactor application.</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Mechanics</li> <li>- Electronics</li> <li>- Control Design</li> <li>- Feedback Control Basics</li> <li>- Literature discussion</li> <li>- Introduction to Bioreactor Technology</li> <li>- Interdisciplinary Approach on the Design of Bioreactors for Tissue Engineering</li> <li>- Key Parameters involved in Bioreactor Design</li> <li>- Scaffolds and Constructs for Stem Cell Moulding</li> <li>- Control and Feedback Control in Mechatronics for Mechanical Stimulation</li> <li>- Mechanotransduction - Signalling Pathways</li> <li>- Biosensors and Actors for Bioreactors</li> <li>- Biochemical Basics for Nutrition and Growth of living Cells</li> <li>- Functional Tissue Engineering"- "in-vivo" Bioreactors</li> </ul>
<b>Prerequisites</b>	- Cell biology- Basic knowledge on Mechanics, Electronics,
<b>Assessment Methods</b>	- Course immanent assessment method and end exam
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Gordana Vunjak-Novakovic, R. Ian Freshney (2006): Culture of Cells for Tissue Engineering, Wiley</li> <li>- Ulrich Meyer, Thomas Meyer, Jörg Handschel, Hans Peter Wiesmann (2009): Fundamentals of Tissue Engineering and Regenerative Medicine, Springer</li> <li>- C. Kasper, M. Van Griensven, R. Pörtner (2008): Bioreactor Systems for Tissue Engineering, Springer</li> </ul>

	- Relevant publications will be provided via CIS
<b>Attendance</b>	Attendance is mandatory in this course, only 20% of absence is tolerated. In case you miss more than 20% you lose the first try in the exam.

## Ethics in Engineering and Medicine

<b>Degree programme</b>	MTE
<b>Semester</b>	2
<b>Course methods</b>	SE
<b>Language</b>	English
<b>ECTS Credits</b>	1.00
<b>Incoming places</b>	Limited

<b>Course description</b>	The course imparts basic knowledge of bioethics to the students. Ethical questions in bioengineering and biomedicine including their impacts on society and the training of ethical decision-making and argumentation take center stage.
<b>Teaching methods</b>	Seminar: - Theory Inputs- Case Studies- Group work- Ethical arguing- Discussions
<b>Learning outcome</b>	After passing this course successfully students are able to ... - outline selected basic terms and principles of biomedical ethics (for example moral status, allocation ethics, concepts of health and disease/disabilities) by the means of simple examples. - apply ethical standards to latest research developments in selected actual case studies in bioengineering and biotechnology. - describe the steps of ethical decision-making and argumentation and to apply them in selected case studies for ethical assessment of conflicting issues in the field of biomedical research and medicine.
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Fundamental positions of bioethical decision-making and argumentation</li> <li>- Experiments with human subjects and animals</li> <li>- Ethics issues of resource allocation</li> <li>- Ethical concepts to health-disease/illness-disabilities</li> <li>- Intercultural ethical aspects of bioengineering and biotechnology</li> <li>- Medical information systems (e-health, data security, privacy, confidentiality)</li> </ul>

<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- Course with an immanent character (grade):</li> <li>- Introduction to a chosen topic by the student</li> <li>- Handouts</li> <li>- The student is leading a discourse about the chosen topic in the group</li> </ul>
<b>Recommended Reading and Material</b>	- Provided by the lecturer at the beginning of the course
<b>Attendance</b>	Attendance is mandatory in this course, only 20% of absence is tolerated. In case you miss more than 20% compensation work is required.

## Biotechnology

<b>Degree programme</b>	MTE
<b>Semester</b>	2
<b>Course methods</b>	ILV
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	Design and optimisation of recombinant protein production
<b>Teaching methods</b>	Basics and theory are presented in interactive lectures. Selected topics are elaborated and presented by students. Case studies are presented in Seminars and Excursions.
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- design a bioprocess for recombinant protein production using microbial and/or mammalian cell systems starting from gene to the purified product.</li> <li>- design and describe the operation of different types of bioreactors</li> <li>- select the appropriate expression host and vector system</li> <li>- define strategies for host and product development</li> <li>- explain the concept and principles of bioprocess design (up- and downstream processing)</li> <li>- apply high level data exploration and interpretation using examples</li> <li>- combine the acquired knowledge with state of the art scientific progress</li> <li>- describe, interpret, apply and present the function and interactivity of complex systems</li> </ul>



<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Upstream processing:</li> <li>- production organisms - overview</li> <li>- cultivation equipment (bioreactor, monitoring)</li> <li>- process operation</li> <li>- case study - process design</li> </ul>
<b>Prerequisites</b>	Basics in biology, mathematics, physics
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- Written exams</li> <li>- Immanent assessment of presentations</li> </ul>
<b>Recommended Reading and Material</b>	<ul style="list-style-type: none"> <li>- Bioprocess Engineering Principles, Pauline M Doran, Academic Press ISBN-12-220855-2 ISBN 0-12-220856-0 pbk</li> <li>- Horst Chmiel, Bioprozesstechnik, ISBN: 3827416078</li> </ul>
<b>Attendance</b>	Attendance is mandatory in this course, only 20% of absence is tolerated. In case more than 20% are missed the first try in the exam is lost.

## Gene Regulation and Signal Transduction

<b>Degree programme</b>	MTE
<b>Semester</b>	2
<b>Course methods</b>	VO
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	This course provides necessary information to understand cellular signalling and how genes are regulated. The topics cover aspects of signal transduction in the context of tissue engineering and regenerative medicine.
<b>Teaching methods</b>	Lecture presenting basics and applied examples.
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- explain the basic principles of DNA/protein interaction</li> <li>- specify components and regulation of important signaling pathways (e.g. Raf-MEK-ERK, PI3K-AKT-mTOR; apoptosis) and mechanisms of mechanotransduction</li> <li>- interpret and analyze results from typical signaling experiments (Western blots, IPs...)</li> <li>- explicate the relevance of signal transduction in Tissue Engineering</li> </ul>

<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Signaling pathways (RAF-MEK-ERK, mTOR/AKT, Wnt/beta-catenin)</li> <li>- Apoptosis</li> <li>- Mechanotransduction</li> <li>- Aspects of cellular signaling in Tissue Engineering</li> </ul>
<b>Prerequisites</b>	Molecular Biochemistry and Cell Biology
<b>Assessment Methods</b>	- Final written exam
<b>Recommended Reading and Material</b>	- Current scientific literature suggested by lecturers
<b>Attendance</b>	This course is not subject to obligatory attendance.

## Study Design and Biostatistics

<b>Degree programme</b>	MTE
<b>Semester</b>	2
<b>Course methods</b>	VO
<b>Language</b>	English
<b>ECTS Credits</b>	3.00
<b>Incoming places</b>	Limited

<b>Course description</b>	The first part of the course provides an overview including details of different study design concepts. Subsequently, some selected parts of biostatistics are discussed. Additionally students present scientific literature in an oral presentation and receive detailed feedback on their presentation skills.
<b>Teaching methods</b>	<ul style="list-style-type: none"> <li>- Lecture format- Occasional take-home readings- Discussions in classroom</li> </ul>
<b>Learning outcome</b>	<p>After passing this course successfully students are able to ...</p> <ul style="list-style-type: none"> <li>- define general rules/key points of an appropriate study design</li> <li>- identify types of models/study design approaches utilized in various areas of pre- and clinical research</li> <li>- define and critically assess the influence of key advantages and weaknesses of most commonly modeling systems used in pre- and clinical research</li> <li>- define basic rules/definitions used in biomedical descriptive statistics</li> <li>- perform a critical preliminary assessment of (quantitative) data as</li> </ul>

	<p>well as selection of appropriate tests for statistical evaluation of (quantitative) data</p> <ul style="list-style-type: none"> <li>- define most common do's and don't's in a power point presentation</li> <li>- define/practically apply the optimal tactics for an effective scientific meeting-type talk</li> <li>- apply a "damage control" in the post-talk question/answer period</li> </ul>
<b>Course contents</b>	<ul style="list-style-type: none"> <li>- Study design overview for 1) in vitro, 2) in vivo and 3) clinical study sections</li> <li>- Detailed description of study types, their applicability and pro-and cons for each section.</li> <li>- Selected (introductory) study design-related aspects of biostatistics: types of data, distributions/normality, hypothesis testing, data transformation, appropriate approach/selection of statistical tests</li> <li>- Curriculum also includes graded data presentation training (a.k.a. Power Talk Training) by students in a form of a 10min power point (PP) talk/each (followed by a detailed feedback from the lecturer)</li> </ul>
<b>Prerequisites</b>	<ul style="list-style-type: none"> <li>- An open mind and mental flexibility- Positive thinking and eagerness to interact with the lecturer- Knowledge of the basic statistical concepts</li> </ul>
<b>Assessment Methods</b>	<ul style="list-style-type: none"> <li>- Final grade will combine 50% of the test score and 50% of the PP talk.</li> </ul>
<b>Attendance</b>	<p>Attendance is mandatory in this course, only 20% of absence is tolerated. In case more than 20% are missed the first try in the exam is lost.</p>
<b>Comments</b>	<p>Students must get approval of the topics to present from the lecturer; titles/topics need to be sent to the lecturer at least 3 days before the scheduled talk. The order of individual talks is to be decided by students.</p>