ENGLISH COURSES
SUMMER SEMESTER 2019
UNIVERSITY OF APPLIED SCIENCES UPPER AUSTRIA
HAGENBERG CAMPUS
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# German 1

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<th><strong>Assessment Methods and Criteria</strong></th>
<th><strong>Mode of Delivery</strong></th>
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<td>2</td>
<td>Bettina Preßlauer</td>
<td>Written Exam, homework, attendance</td>
<td>Face to Face</td>
</tr>
</tbody>
</table>

### Prerequisites
- 

### Course contents
- acquisition of basic German for everyday life (greeting, introducing oneself and getting into contact with others, shopping,...); development of communication skills and intercultural competence
- interactive learning methods, team- and group activities
- basic knowledge of the German language and the Austrian culture; ability to use German in simple everyday situations

### Recommended or required reading
- dictionary
# German 2

<table>
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<td>Bettina Preßlauer</td>
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<td>Face to Face</td>
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## Prerequisites
basic German: level A1 or higher for DEU2

## Course contents
use of German in different situations of everyday life and work; development of communication skills in the target language and intercultural competence

interactive learning methods, team- and group activities

knowledge of the German language in everyday life and the Austrian culture

## Recommended or required reading
dictionary
<table>
<thead>
<tr>
<th>Course Unit Code</th>
<th>Type of Course Unit</th>
<th>ECTS- Credits</th>
<th>Name of Lecturer</th>
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**Prerequisites**

level B1 or higher

**Course contents**

use of German in different situations of everyday life and work; development of communication skills in the target language and intercultural competence

interactive learning methods, team- and group activities

knowledge of the German language in everyday life and the Austrian culture

**Recommended or required reading**

dictionary
Communication and Knowledge Media

KWM


The Internet offers endless possibilities for communication, networking and collaboration – anywhere, any-time, whether for personal or professional purposes. The big challenge facing companies – as well as individual users – is choosing which of the huge range of technologies and platforms suits the user best. Our full-time, interdisciplinary degree programme focuses on the technical and creative imperatives for the most efficient exploitation of new media. Students will be equipped with the technical and creative skills, including knowledge of the social sciences, to act as experts on digital communications. Graduates with such expertise are highly sought after in a wide range of areas, including corporate communications, online marketing, media and web design, web programming, further education and e-learning.
## Operating Systems and IT-Security

<table>
<thead>
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<th>Course Unit Code</th>
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<td>KWM132/KWM133</td>
<td>lecture/exercise</td>
<td>1/1</td>
<td>Face to Face</td>
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<td>course</td>
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<table>
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<th>Assessment Methods and Criteria</th>
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<tr>
<td>Andreas Böhler</td>
<td>written examination/continuous assessment</td>
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<table>
<thead>
<tr>
<th>Prerequisites</th>
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</thead>
<tbody>
<tr>
<td>Basic knowledge of operating systems, computer hardware/software and networking. No special prerequisites</td>
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<table>
<thead>
<tr>
<th>Course contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>The lecture and exercises start with an introduction into the operating system “GNU/Linux” and then detail the installation and administration of a secure system. Focus is shifted towards IT security at the end of the term.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Recommended or required reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>As we focus on a free operating system, the documentation is freely available on the Internet. Links will be presented, wherever appropriate, during the lecture.</td>
</tr>
<tr>
<td>Course Unit Code</td>
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<tr>
<td>KWM183</td>
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</tbody>
</table>

**Assessment Methods and Criteria**
- continuous assessment and mid-term revision

**Prerequisites**
A sound knowledge of English, a minimum of B2-level

**Course contents**
In this course you will learn how to effectively deliver elevator pitches and how to talk shop proficiently. In addition, a number of grammar-related topics are covered (gerund, conditionals, adjectives).

**Recommended or required reading**
Exploiting the unlimited opportunities in the field of digital media requires mastery of creative design, smart contents, and fluency with the latest technology. This unique, full-time degree programme provides you with the technical expertise as well as the design and communication skills to take on any challenge in your chosen area – be it on the Web, in multimedia, 3D modelling, animation, computer games, audio & video production, or cross-publishing. You will acquire a solid grounding in the theory and practice of digital media. Hands-on experience with professional equipment will provide you with the technical and creative skills for implementing innovative and exciting media projects.
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<td>MTD172</td>
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<td>Face to Face</td>
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</table>

**Name of Lecturer**
Jeremiah Diephuis

**Assessment Methods and Criteria**
Continuous Assessment

**Prerequisites**
A former student says: I liked this course a lot, it was not very technical. The main technologies used in this course were how to construct and analyse a story. You do not need any special knowledge, just read many books.

**Course contents**
The course focuses on writing and presenting for different contexts in the media industry. Story analysis and development, screenplays, Interactive Storytelling, Game Design and an overview of careers in the media industry are addressed.

**Recommended or required reading**
### 3D Character Animation

<table>
<thead>
<tr>
<th>Course Unit Code</th>
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<th>ECTS- Credits</th>
<th>Mode of Delivery</th>
<th>Assessment Methods and Criteria</th>
<th>Prerequisites</th>
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<tr>
<td>MTD252</td>
<td>Integrated Course</td>
<td>5</td>
<td>Face to Face</td>
<td>Oral or Written Examination</td>
<td>- Basics in animation</td>
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<td>- Knowledge of the software „Maya“</td>
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<td></td>
<td>- Portfolio with 3D animations (please send renderings (images) and movies in a PDF, no sourcefiles (.blend). Thank you!)</td>
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</table>

#### Course contents

Technical and design basics of 3D animation and character animation—character animation, rigging and facial animation. Technical basics: IK, FK, rigging, skinning, limited rigs, flexible rigs, dynamic / parametric rigs & facial animation; Character animation, Motion Analysis, Introduction: Facial Animation, 3D Animation Principles for character animation; Introduction to Particles and Dynamics; Critical Review of Dynamics “Animation vs. Simulation” (flag, hair, clothing, etc.); Character animation with simple rigs; Low Budget Motion Capture (Kinect and similar); Technical animation (Scientific-Visualization: process sequences with limited degrees of freedom, Parametric Arrays, Geodata to 3D Landscape).

#### Recommended or required reading

- [Link to reading material]
- [Additional resources for learning]

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**Bachelor**

MTD
### Interaction and Game Programming

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<thead>
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<tr>
<td>MTD260</td>
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<td>A transcript must be provided to select courses in this area. The professor will review and decide whether to approve participation in the course.</td>
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<table>
<thead>
<tr>
<th>Name of Lecturer</th>
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<th>Mode of Delivery</th>
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<tbody>
<tr>
<td>Roman Divotkey</td>
<td>Oral or Written Examination</td>
<td>Face to Face</td>
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</table>

**Course contents**

Development of concurrent and distributed algorithms, synchronization of threads, network programming (sockets, multiplexed IO, asynchronous IO). Basics of game programming, architecture of games and interactive applications, introduction to game physics and artificial intelligence for games.
# Computer Graphics 2

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<td>MTD262</td>
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<th>Name of Lecturer</th>
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<th>Mode of Delivery</th>
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<tbody>
<tr>
<td>Michael Haller</td>
<td>Oral or Written Examination</td>
<td>Face to Face</td>
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<table>
<thead>
<tr>
<th>Prerequisites</th>
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<tbody>
<tr>
<td>Computer Graphics 1</td>
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</tbody>
</table>

## Course contents

Real-time graphics, particle systems, real-time animation, curves (Bezier, B-splines, Catmull-Rom, NURBS), collision detection (Bounding Spheres, AABB, OBB), shadow (shadow volumes, shadow maps), stencil buffer, reflections, Culling, BSP tree, face culling, portal culling, detail culling, advanced texturing (bump mapping, cubemaps, lightmaps), mixed reality.

## Recommended or required reading

Recommendations by former exchange students: I liked this course, it was not too technical. We mainly used OpenGL and Visual Studio. A presentation has to be prepared by the students.
Generative Arts

Course Unit Code
MTD272

Type of Course Unit
Integrated Course

ECTS- Credits
5

Name of Lecturer
Leo Lass

Assessment Methods and Criteria
Oral or Written Examination

Mode of Delivery
Face to Face

Prerequisites

Course contents
Use of algorithmic / procedural techniques for the synthesis of audio-visual objects. Dealing with current data flow programming environments that gradually introduce basic objects and their functionality using specially developed tutorial patches, implementation of MIDI controllers, synthesizers and real-time audio effects, interaction of audio and video in terms of complex media installations, use of creative input devices such as game controllers for controlling audio / video applications.

Commentary from a past student:
“The course gives a general introduction to generative art... The class ... chose to do a larger project. For this project, it is open to the student to choose which software/technologies he/she uses... Generative Art itself is basically programming, but in a much more fun way... It’s creative programming, so there is always a direct outcome to see/ hear.” ... The students projects included: a room with invisible walls and if you touch them, sound is generated, different kinds of music/ sound visualisation, live projection mapping, a synthesizer that is controlled with your face expressions, procedural trees.

... I really really really liked it (it was one of my favourite classes). It was a nice opportunity for me to dive into this world, where programming and design/art are mixed together.”

Recommended or required reading
# Online Multimedia

<table>
<thead>
<tr>
<th>Course Unit Code</th>
<th>Type of Course Unit</th>
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<tbody>
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<th>Assessment Methods and Criteria</th>
<th>Mode of Delivery</th>
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<tbody>
<tr>
<td>Rimbert Rudisch-Sommer</td>
<td>Oral or Written Examination</td>
<td>Face to Face</td>
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</table>

## Prerequisites
Sound knowledge of CSS, jQuery, HTML and JavaScript

## Course contents
Advanced JavaScript Concepts, like
- prototypal inheritance
- closures
- JavaScript Event Loop
- Promises
- ES2015 and later standard

Features and APIs of HTML-5, like:
- Native Audio/Video Integration
- Canvas / 2D
- Data Storage
- Offline Web Applications (Caching)
- Geolocation
- Messaging/Workers
- RealTime (WebSockets)
- Web Components

Frontend Frameworks for Single Page Applications, like Backbone.js

## Recommended or required reading
Usability & Interaction Design

Course Unit Code
MTD282

Type of Course Unit
Integrated Course

ECTS- Credits
5

Name of Lecturer
Michael Lankes

Assessment
Oral or Written Examination

Mode of Delivery
Face to Face

Prerequisites
A transcript must be provided to this course

Course contents
The course “Usability & Interaction Design” deals with the design, creation and evaluation of interface concepts. It has a strong focus on visual interface design strategies and practices. Students will create sketches, mock-ups, and low-fi prototypes that aim at specific user groups. Topics such as HCI (human-computer interaction) basics, user experience design, prototyping and other special aspects in HCI will be covered.

Recommended or required reading
Information technology today covers all aspects of the best healthcare provision. It has a crucial role in identifying the causes of illness, developing new drugs, and improving medical interventions. Graduates of our full-time degree programme will be equipped to develop and deploy software medical doctors and molecular biologists need to fulfill highly complex tasks. Expertise in informatics, data science, life sciences etc. is highly sought after worldwide, not only in the health sector, the pharmaceutical industry and molecular-biological research, but also across the IT sector. After their first year, students choose to specialise in either medical informatics or bioinformatics.
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<th>Course Unit Code</th>
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<tr>
<td>Gregory Curtis</td>
<td>Mode of Delivery</td>
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**Prerequisites**

**Course contents**

**Recommended or required reading**
Smartphones, smartwatches, tablets and apps are an integral part of our daily lives. They make countless routines easier and also more entertaining. Mobile computing is the technology of future and will change the way we use technological devices. Voice and gesture control systems are today in common use, just like social media. This is just the beginning of a sea change, in which mobile devices, communications and apps are set to play a key role alongside new business models. Our full-time Mobile Computing degree programme will enable you to play an active part in this revolution. Students will acquire in-depth knowledge of communications technology, informatics and application development for mobile devices. You’ll be equipped to devise innovative services and apps and professionally manage projects in the field.

# Software Development Using Android

<table>
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<th>ECTS- Credits</th>
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<tr>
<td>Jens Krösche</td>
<td>Oral or Written Examination</td>
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</table>

## Prerequisites
Students attending this course must have -- at least -- basic knowledge of object oriented programming using Java.

## Course contents
Based on a sound Java knowledge, this course will deal with the development of applications for mobile devices. As the main Java-based mobile platform Google's Android will be the target platform for the lecture. Students will learn what aspects are needed and what tools are used to create Android applications. On this behalf multiple topics like application components, UI aspects, persistency, connectivity, localization/sensors, and distribution are discussed and trained in different examples. The lecture is evaluated based on a small prototype that needs to be designed and programmed by the students at the end of the lecture.

Taking into account the current Android version, the development of smartphone applications is discussed based on the following topics:
- Activity 1, Resources, View/Layout/Interaction, Context, Sensors, Manifest, Intent, Notification, Inter-Component Communication
- Activity 2, Fragments, ActionBar 1, Multimedia 1, Receiver, MultiTasking, Location 1, Service 1, AppWidgets, Animation

## Recommended or required reading

Please note that all Software Development Courses take place at the same time.
## Software Development Using iOS/Swift

<table>
<thead>
<tr>
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<td>Oral or Written Examination</td>
<td>Face to Face</td>
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</table>

### Prerequisites

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### Course contents

- Introduction to iOS Platform, Swift
- UIKit & Data
- Concurrency and Network
- Animations
- ObjectiveC
- UICollectionView
- Notifications and Localization
- Location and MapKit
- App Store Submission and Tools

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### Recommended or required reading

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**Please note that all Software Development Courses take place at the same time.**
### Android-Advanced

<table>
<thead>
<tr>
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<th>Type of Course Unit</th>
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<th>Mode of Delivery</th>
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<tr>
<td></td>
<td>Integrated Course</td>
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<td>Face to Face</td>
</tr>
</tbody>
</table>

**Name of Lecturer:**

**Assessment Methods and Criteria:** Oral or Written Examination

**Mode of Delivery:**

**Prerequisites**

**Course contents**

- Web-Technology
- Wireless Communication (WLAN, BT, BLE)
- Persistenz (Datenbanken, Cloud, …)
- Security
- Testing
- Ausrollen
- Monetarisierung
- NDK
- OpenGL ES/Vulkan
- Google Play services (Location, Fit, SSO, …)
- Android Devices: Wear, Auto, Things, TV
- Android Jetpack-

**Recommended or required reading**
### Course Unit Code
- **Name of Lecturer**: JMA2 iOS-Advanced
- **Mode of Delivery**: Bachelor

### Assessment
- **Assessment Methods and Criteria**: Oral or Written Examination
- **Mode of Delivery**: Face to Face

### Prerequisites

### Course contents
- **Profiling with Instruments**
- **Energy Debugging**
- **Testing Frameworks, Testflight**
- **Mobile Advertisements**
- **Monetization and In-App-Purchase**
- **Metal and Accelerate**
- **SpriteKit and SceneKit**
- **ARKit**
- **SiriKit**
- **Machine Learning on iOS**
- **Vision and Natural Language on iOS**
- **Privacy and Security**

### Recommended or required reading
## Project 1/3/5

<table>
<thead>
<tr>
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<th>ECTS- Credits</th>
<th>Mode of Delivery</th>
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<tr>
<td>PRO 1/3/5</td>
<td>Elective Course</td>
<td>6</td>
<td>Face to Face</td>
</tr>
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</table>

### Prerequisites

### Course contents

A modern and practical education is very important for us. Not only that enterprises value this fact, but also students often found a company themselves after or even already while their studies. Projects are therefore a good place to implement their own ideas as well as carry out interesting R&D projects and cooperations with companies.

In “Project 1” students do first steps in planning and implementing projects. This is the reason why not only the realization of the project, but also techniques of project management for a smooth working process in the team as well as tools for a flawless technical implementation are taught and learned.

### Recommended or required reading
Software is at the heart of information technology (IT), and all applications – whether for mobile phones, PCs or even modern cars – depend on instructions based on specially written programmes. This Bachelor’s degree programme provides a thorough grounding in the theory and practice of sophisticated software development, including relevant tools, methodologies, and teamwork and networking skills. Graduates will be equipped to not only develop but also implement, evaluate and adapt software at the cutting edge of all areas of application. After their first year, full-time students can choose between two key areas in which to specialise: Business Software or Web Engineering. Part-time students specialise in Web Engineering.
# Applied Mathematics for Web

<table>
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<tbody>
<tr>
<td>4_SEI</td>
<td>Integrated Course</td>
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<td>lectures and small exercises</td>
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<table>
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<tr>
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<th>Assessment Methods and Criteria</th>
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<tbody>
<tr>
<td>Jan Legerský</td>
<td>Written Examination</td>
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</table>

## Prerequisites
High school math and basics of programming

## Course contents
Basic concepts of graph theory including examples of special graph types, substructures, weighting, adjacency matrices, paths, Euler, Hamilton, isomorphism, etc. Elementary graph algorithms (Dijkstra, A*, Kruskal) incl. examples and justification. Further applications of graph theory. Modelling the WWW and Google Page Rank. P vs. NP with examples (SAT, graph coloring) and basic terms of theoretical computer science.

## Recommended or required reading
Dedicated software is a key component in many health-related areas, such as DNA analysis, cancer research, virtual surgery and data mining in health databases. Applications in these areas require expertise in biomedical informatics, especially large-scale software architectures. Our full-time Master’s degree programme majors on biomedical know-how and software development while also expanding methodological and scientific skills. It equips students with this unique combination of skills, qualifying them to take on lead positions in the healthcare sector, molecular-biological and pharmaceutical research, and IT in general. Students can choose to specialise further in medical informatics or bioinformatics by selecting from a range of elective modules.
## Modelling and Simulation

<table>
<thead>
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<td>Lecture with Skills</td>
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<tbody>
<tr>
<td>Stephan Winkler</td>
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</tbody>
</table>

### Prerequisites
Secondary school certificate in Mathematics (A-levels), programming knowledge

### Course contents
The following topics are addressed in the lectures: Basics of modeling, linear and nonlinear systems, continuous and discrete modeling and simulation, modeling of biological systems and processes; deterministic simulations and stochastic simulations; Monte Carlo methods; population dynamics; predator prey models; models for the progress of epidemiical diseases; compartment models: pharmakokinetiks, one-compartment-models, two-compartment-models, kinetiks of insulin; analysis of biosystems: haemodynamics, cardiovascular systems simulations; controlled systems; gas exchange models in lungs; classification of models and computer simulations.

### Recommended or required reading

Note: This course can also be chosen from Bachelor students if they mee the prerequisites.
## Knowledge Engineering

<table>
<thead>
<tr>
<th>Course Unit Code</th>
<th>Type of Course Unit</th>
<th>ECTS- Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>KNE</td>
<td>Integrated Course</td>
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<thead>
<tr>
<th>Name of Lecturer</th>
<th>Assessment Methods and Criteria</th>
<th>Mode of Delivery</th>
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</thead>
<tbody>
<tr>
<td>Thomas Kern</td>
<td>Face to Face</td>
<td></td>
</tr>
<tr>
<td>Viktoria Dorfer</td>
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</tbody>
</table>

### Course contents

This course introduces relevant concepts and trends for knowledge representation and integration in biology and medicine, such as ontologies, data dictionaries and knowledge-based systems. The curriculum revolves around the following key topics: Fundamentals, frameworks, requirements and core benefits of knowledge engineering in biomedical applications; Knowledge acquisition, modeling and representation; Ontology engineering in medicine and bio-chemistry; Knowledge processing and automated reasoning; Biomedical text mining and information extraction strategies; Enabling technologies for the Semantic Web.

### Recommended or required reading

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# Selected Topics Systembiology

<table>
<thead>
<tr>
<th>Course Unit Code</th>
<th>Type of Course Unit</th>
<th>ECTS- Credits</th>
<th>Name of Lecturer</th>
<th>Assessment Methods and Criteria</th>
<th>Mode of Delivery</th>
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<tr>
<td>VBK</td>
<td>Integrated Course</td>
<td></td>
<td>Gerald Webersinke</td>
<td>Face to Face</td>
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<td>Thomas Schwarzl</td>
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<td></td>
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<td>Henryk Maciejewski</td>
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<td></td>
<td></td>
<td></td>
<td>Viktoria Dorfer</td>
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</tr>
</tbody>
</table>

**Prerequisites**

**Course contents**

Recent publications in system biology will be covered, presented and discussed in a lecture. An elaboration of the publication must also be prepared.

**Recommended or required reading**
The courses in the Master's Programme of Biomedical Informatics are in general held in German, but upon request they can be held in English. Please send your Transcript of Records together with your Learning Agreement to check whether you have the necessary prerequisites to be able to participate in a course of our Master's Programme “Biomedical Informatics”.

Machine Learning/LVA-Leiter: Witold Jacak/Karin Pröll

Introduction to Technology Trends (Embedded Processors, Miniaturized Sensors, Wireless Communication and New Materials) and Ubiquitous Computing Characteristics and Systems, Sensor Fundamentals (e.g. Conditioning, Filtering and ADC/DAC), Sensor Characteristics (e.g. Sensitivity, Offset, Accuracy, Dynamic Range, Linearity and Noise), Sensor Types (e.g. Active vs. Passive Sensors, Resistive and Capacitive Sensors, Thermocouples, Piezoelectric, Hall Effect and CCD Sensors), Spatial Sensors and Applications (Accelerometers, Tilt Sensing and Dead Reckoning with Accelerometers, Gyroscopes, Digital Compass and Tilt-Compensated Compass, Orientation Sensors, Wireless Indoor Positioning Techniques and Technologies), Mobile Ad-Hoc Networks and Routing Protocols (e.g. Flooding, Distance Vector Routing, DSDV Routing, DSR and Zone Routing), Wireless Communication Technologies (e.g. WLAN/IEEE 802.11, Bluetooth/IEEE 802.15.1, ZigBee/IEEE 802.15.4, RFID and NFC), Wireless Sensor Networks (e.g. Communication Architecture, Sensor Nodes, Applications, Design Characteristics, Power Scavenging, Time Synchronization, Distributed Localization and Simulation Environments).

5 ECTS.

Software Entwicklung: Service Engineering/LVA-Leiter: Peter Obermüller

Architecture of distributed software systems, O/R mapping (basic concepts, Hibernate, JPA), light-weight containers (Spring), message queues (JMS), web services (SOAP, JAX-WS), Enterprise JavaBeans 3.0 (programming model, JPA, MDB, JCA, web services), introduction to SOA (WS-* protocols, BPEL, SCA, SDO, interoperability with the .NET platform).

5 ECTS.
Elective Specialization: Ambient Assisted Living/LVA-Leiter: Werner Kurschl/Sebastian Pimminger

Concepts of mobile systems and examples of mobile applications in the medical environment, like mobile information systems (electronic patient record, monitoring), mobile knowledge management, mobile control and planning systems, mobile telemedicine, mobile tele-homecare systems, context and context-sensitive systems (like context models, context distribution and context processing (context toolkit, aware home, media cup etc.), design and implementation aspects (wireless communication, mobility, portability etc.), mobile software technologies (e.g. Java for mobile devices – J2ME, Microsoft .NET Compact Framework, Google Android), wireless communication technologies (Bluetooth, ZigBee, WLAN, GSM, UMTS, HSDPA, etc.), concepts and technologies for the localization of objects and people (e.g. GPS, radio frequency identification (RFID), triangulation and trilateration using WLAN, GSM, infrared transmitters, Bluetooth or ultrasonic beacons). Concepts of pervasive computing, smart dust and wireless sensing networks, security and safety aspects of mobile systems.
5 ECTS.

Elective Specialization: Artificial Intelligence/LVA-Leiter: Stephan Dreiseitl

Architectures for intelligent systems, layers and components; deductive method for the design of intelligent systems, search algorithms, constraint satisfaction problem, propositional and predicate logic as language for representation and inference; methods for knowledge representation, planning algorithms, insecure reasoning with Bayesian lattices and Markov chains, statistical decision theory and learning algorithms.
5 ECTS.
Online media is now central to corporate communication strategies and life-long learning, and keeping abreast of Internet development is of crucial importance. Meeting the challenge of web technological innovation is essential for command of the global knowledge society, and demands not only intercultural competence but also expertise in knowledge management. Our full-time, interdisciplinary Master's degree programme equips students with exactly that mix of skills, combining social sciences, media studies, web design and web programming. A wide range of elective modules allows further specialisation in the following areas: communications, web, learning and/or organisations.
### Intercultural Communication

<table>
<thead>
<tr>
<th>Course Unit Code</th>
<th>Type of Course Unit</th>
<th>ECTS- Credits</th>
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</thead>
<tbody>
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<td>KWM510</td>
<td>Integrated Course</td>
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<th>Name of Lecturer</th>
<th>Assessment Methods and Criteria</th>
<th>Mode of Delivery</th>
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</thead>
<tbody>
<tr>
<td>Martina Gaisch</td>
<td></td>
<td>Face to Face</td>
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</tbody>
</table>

**Prerequisites**

- a minimum English level of B2

**Course contents**

- ethnocentric reflection, implicit bias, intercultural theories, cross-cultural comparison

**Recommended or required reading**


**Note:** This course can also be chosen from Bachelor students.
## Virtual Teams

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<th>Course Unit Code</th>
<th>Type of Course Unit</th>
<th>ECTS- Credits</th>
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</thead>
<tbody>
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<th>Assessment Methods and Criteria</th>
<th>Mode of Delivery</th>
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</thead>
<tbody>
<tr>
<td>Martina Gaisch</td>
<td>continuous assessment and final test</td>
<td>classroom teaching</td>
</tr>
</tbody>
</table>

**Prerequisites**

English level of B2

**Course contents**

opportunities and challenges of virtual team work, including a hands-on example of virtual collaboration

**Recommended or required reading**

Note: This course can also be choosen from Bachelor students.
### Community Building and Management

<table>
<thead>
<tr>
<th>Course Unit Code</th>
<th>Type of Course Unit</th>
<th>ECTS- Credits</th>
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<tbody>
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<th>Assessment Methods and Criteria</th>
<th>Mode of Delivery</th>
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</thead>
<tbody>
<tr>
<td>Martina Gaisch</td>
<td>final reflection paper</td>
<td>classroom teaching</td>
</tr>
</tbody>
</table>

### Prerequisites

English level of B2

### Course contents

mechanisms, concepts and critical factors of community building.

### Recommended or required reading

Note: This course can also be choosen from Bachelor students.
Energy is the underlying heartbeat of the global economy – a critical factor in the production of nearly all goods and services in the modern world. Clearly, given the critical role of energy, the driving imperatives in any economy are ensuring security of supply, maintaining competitiveness and overseeing the transition to a low-carbon future.

Key requirements in this respect are the strategic management of supply and improving its overall generation and distribution. Impacting on these challenging goals will be a variety of factors, including advances in renewables, e-mobility and green technologies, to name only a few. Managing this changing environment is no easy task. That will require intelligent IT solutions and therefore well-educated IT experts able to design and/or operate future smart grids, smart city infrastructures and enhanced energy supply systems.

Energy Informatics (ENI) is the application of information technologies to this highly demanding field and the focus of this English-taught Master's degree programme.
Energy Generation, Distribution & Storage

Course Unit Code
ENI405

Type of Course Unit
Integrated Course

ECTS- Credits
5

Name of Lecturer
Lauss Bernhard
Anta Adolfo

Assessment
Oral or Written Examination

Mode of Delivery
Face to Face

Prerequisites

Course contents

- Power generation: Fossil, nuclear and renewables; harmonics and load system feedback; economic aspects of operation; plant deployment planning; maintenance and monitoring energy demand; forecasts; load fluctuations energy transmission and distribution; concepts and technologies; components; high voltage DC systems grid stability and load flow control; smart grid - a critical infrastructure; primary, secondary and tertiary control (e.g. PV and wind systems impact); load flow control; grid control (voltage, active / reactive power; frequency); protection and failure prevention and interruption; settling up after black out energy storage; hydro; batteries; hydrogen; flywheels; power to gas.
- Centralized versus distributed concepts
- Smart grid aspects: Idea; safety and emergency operation features.

Recommended or required reading

Summer Semester 2019
### Smart Grid Field Components

<table>
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<tr>
<th>Course Unit Code</th>
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<th>Mode of Delivery</th>
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<tbody>
<tr>
<td>Wolfgang Hribernik</td>
<td>Oral or Written Examination</td>
<td>Face to Face</td>
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<tr>
<td>Stephan Hutterer</td>
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</tbody>
</table>

#### Prerequisites

#### Course contents

- Electricity meters (single phase, poly phase, CT), gas meters, water meters, cooling/heating meters: measuring principles, smart meter architectures, smart meter protocols (M-Bus, OMS, DLMS/COSEM, OSGP, meters and more, ...), homologation and verification.
- Load management components (ripple control)
- Gateways
- Power quality measurement components (EN 50160, ...)
- Switchgears, protection devices, automation devices, relevant standards (IEC 61850, ...)
- Charging stations and protocols (open charge point protocol, ...)

#### Recommended or required reading
## IT Security

<table>
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<tr>
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<tbody>
<tr>
<td>ENI503</td>
<td>Integrated Course</td>
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<td>Face to Face</td>
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<thead>
<tr>
<th>Name of Lecturer</th>
<th>Assessment Methods and Criteria</th>
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<tbody>
<tr>
<td>Robert Kolmhofer</td>
<td>Oral or Written Examination</td>
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<tr>
<td>Peter Burgstaller</td>
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<tr>
<td>Alexander Leitner</td>
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</tbody>
</table>

### Prerequisites

### Course contents

Terms and definitions in IT security, introduction into network security and cryptography and security aspects of Industrial Control Systems as well as an introduction into Smart Grid Security. Protection targets and security objectives, trends in IT security, cyber threats and threat analysis, introduction into risk management methods (topics, methods and standards like ISO 31000 and NIST SP300-80). An introduction into information security management (topics, methods and security standards like ISO 2700x family and BSI Grundschutz) and business continuity management. Additionally relevant international frameworks and models, like:

- Austrian Cyber-Security-Strategy (in German) (ÖSCS, 2013, BKA, BM.I, BMLVS)
- Cyber-Security Risk Analysis (in German) (KSÖ, BM.I, 2011)
- Austrian Programme for Critical Infrastructure Protection (AP-CIP, 2008, BM.I)
- NIST Cyber-Security Framework (NIST-Guidelines for Smart Grid Cyber Security)
- NIST Guideline to Intrusion Detection and Prevention Systems
- NESCOR Guide to Penetration Testing for Electrical Utilities
- Schweizer IKT-Risikoanalyse

will be discussed.

### Recommended or required reading
**Course Unit Code**
ENI504

**Type of Course Unit**
Integrated Course

**ECTS- Credits**
5

**Name of Lecturer**
Veichtlbauer

**Assessment Methods and Criteria**
Oral or Written Examination

**Mode of Delivery**
Face to Face

**Prerequisites**

**Course contents**
Functionality of Operation Support, Business Support and Customer Information Systems: Headend systems (HES), grid management system (GMS), meter data management (MDM), energy data management (EDM), geographic information system (GIS), enterprise resource planning system (ERP), customer information systems (CIS).

- Principles of scalable architectures
- Common Information Model (CIM)
- Ongoing Standardization

**Recommended or required reading**
### International Project Management

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<th>Name of Lecturer</th>
<th>Mode of Delivery</th>
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<tr>
<td>ENI505</td>
<td>Integrated Course</td>
<td>5</td>
<td>Christoph Dopplinger</td>
<td>Face to Face</td>
<td>Oral or Written Examination</td>
</tr>
</tbody>
</table>

**Prerequisites**

**Course contents**

Intercultural competences:
Global awareness, cultural dimensions and standards, negotiation styles and insights into cultural communication practices, management of multicultural projects based on case studies and critical incidents.

- **Leadership skills:**
  Leadership theory, leading with cultural intelligence, common traits in leaders, change management and decision making processes, conflict resolution.

- **International project management:**
  Characteristics of international projects, pitfalls and success factors, project concept creation, force field analysis.

**Recommended or required reading**
Electromobility

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<tbody>
<tr>
<td>ENI510</td>
<td>Integrated Course</td>
<td>5</td>
<td>Andreas Reinhardt</td>
<td>Oral or Written Examination</td>
<td>Face to Face</td>
</tr>
</tbody>
</table>

**Prerequisites**

**Course contents**

Types of electrical cars: Full electric vehicles, hybrid systems.
- Basic topologies
- Comparison of electric and combustion engine concepts
- Dominant energy consumption effects
- Environmental impact
Influence on carbon dioxide balance with respect to power generation and life cycle, nitric oxide impact, noise aspects.
- Electrical drives
Basic drive concepts (motor types, wheel hub concepts), energy efficiency aspects.
- Battery systems
Operational behaviour, lifetime aspects, range aspects, future technologies.
- Auxiliary consumers in cars and aspects of consumption decreasing
Air condition, defroster, lighting, etc.
- Safety aspects
Electrical arcs, battery safety.
- Charging aspects
Normal charging, quick charging, load feedback and harmonics problems, smart grid integration concepts.

**Recommended or required reading**
IT systems of the future will need to instinctively respond to user needs and competencies. This cutting-edge, part-time degree programme gives graduates of information technology studies the chance to refine their skills in developing more accessible and user-friendly technologies. The interdisciplinary curriculum draws primarily on social sciences and IT, including areas such as interaction design, natural-user interface development, image processing, as well as prototyping. Graduates will learn problem solving and full-spectrum consultancy skills that are key to the conceptualisation and deployment of practical applications in this dynamic field.

Note for applicants: The main language of tuition on this study programme is German, although some modules may be offered in English.
## Augmented Reality

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<th>Course Unit Code</th>
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<th>ECTS- Credits</th>
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<td></td>
<td>Integrated Course</td>
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<th>Name of Lecturer</th>
<th>Assessment Methods and Criteria</th>
<th>Mode of Delivery</th>
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<tbody>
<tr>
<td>Christoph Anthes</td>
<td>Project and oral exam</td>
<td>Face to Face tutorials</td>
</tr>
</tbody>
</table>

### Prerequisites

Programming skills are recommended but not required.

### Course contents

Augmented Reality describes the enhancement of the real environment with virtual computer generated content. The real world has to be observed and measured to determine the position and orientation of the display. Basics of computer vision and computer graphics provide the basis for AR applications. Additional requirements are appropriate interaction techniques as well as the adaptation of the virtual content on the real world.

The course consists of two parts – the fundamentals, algorithms and applications will be presented in the theoretical part. Additionally a practical part will focus on topics like Unity development, usage of AR hardware and programming with an AR software package. The practical components are important for the final project, which has to be handed in after the completion of the course.

The goal is to teach the interested student the technology and the creation of successful AR applications. The students should be able to develop AR applications for mobile devices and the HoloLens on their own.

### Recommended or required reading

- Schmalstieg, D. & Hollerer, T., Augmented Reality: Principles and Practice, Addison-Wesley Professional, 2015
- Bimber, O. & Raskar, R., Spatial Augmented Reality -- Merging Real and Virtual Worlds, A K Peters LTD, 2005
The increasing complexity of information technology is making unceasing demands on data control and co-ordination. Planning, developing and implementing sophisticated systems to meet company targets is a serious challenge for IT managers. Access to data anywhere, anytime, common usage of information and user-friendliness are prime objectives. This requires experts with software development, business intelligence and analytical IT skills as well as know-how in management, law and team leadership. This part-time Master’s degree programme equips students with exactly these skills and is particularly suitable for people with a first degree in information technology, who aim at taking up management positions in the IT business.
Software Monitoring and Evolution

Course Unit Code
SWE2 V

Type of Course Unit
Integrated Course

ECTS- Credits
1,5

Name of Lecturer
Harry Sneed

Assessment
Methods and Criteria

Mode of Delivery
Face to Face

Prerequisites

Course contents
This lecture focuses on both the maintenance of software life-cycles and the laws of software evolution. The main areas of emphasis are as follows: differences between maintenance and development projects, role of release managers, change management, reverse and re-engineering, re-factoring, change patterns and software evolution. A particular stress is to be laid on an integrated approach to software maintenance by also addressing non-technical aspects such as organization and management. Best practices of software maintenance and its maintainability are conveyed.

Recommended or required reading
The English-taught Master in Interactive Media offers a wide range of subjects focusing on the technology and engineering behind interactive media, computer games and cutting-edge online media. Graduates acquire the essential knowledge and professional skills necessary to take on innovative and complex projects in the media industry.

The programme features both a substantial project component and an extensive selection of specialized courses that couple theoretical concepts with practical experience at the highest level.

In addition to providing an industry-oriented education, the programme aims to develop graduates' communication skills and refine their systematic approaches to problem solving.
### Artificial Intelligence

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<th>Type of Course Unit</th>
<th>ECTS- Credits</th>
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<th>Assessment Methods and Criteria</th>
<th>Mode of Delivery</th>
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<tbody>
<tr>
<td>Stephan Dreiseitl</td>
<td>Written exam, exercise sheets</td>
<td>Face to Face</td>
</tr>
</tbody>
</table>

#### Prerequisites

#### Course contents
Architectures for intelligent systems, layers and components; deductive method for the design of intelligent systems, search algorithms, constraint satisfaction problem, propositional and predicate logic as language for representation and inference; methods for knowledge representation, planning algorithms, insecure reasoning with Bayesian lattices and Markov chains, statistical decision theory and learning algorithms.

#### Recommended or required reading
Network Distributed Systems

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<th>Course Unit Code</th>
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<th>Assessment Methods and Criteria</th>
<th>Mode of Delivery</th>
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<tbody>
<tr>
<td>Volker Christian</td>
<td>Oral or Written Examination</td>
<td>Face to Face</td>
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</table>

**Prerequisites**

Profound Programming Knowledge (C++ / Java)

**Course contents**


**Recommended or required reading**
## Computer Vision

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<tr>
<th>Course Unit Code</th>
<th>Type of Course Unit</th>
<th>ECTS- Credits</th>
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<td>Integrated Course</td>
<td>6</td>
<td>Face to Face</td>
<td>Final Report and Written Exam</td>
</tr>
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</table>

### Prerequisites
Introductory course in digital image processing. Fundamentals of digital image processing, programming experience in Java.

### Course contents
Introduction to fundamental techniques in computer vision. Localization and classification of 2D objects, shape descriptions, image matching, colour and texture analysis, segmentation, invariant features, curve fitting, dynamic contours, feature detection and tracking, 3D geometry, camera calibration, scene and object reconstruction, self-localization, object recognition.

### Recommended or required reading
Rich Internet Applications

<table>
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<tr>
<td>IM530</td>
<td>Integrated Course</td>
<td>6</td>
<td>Face to Face</td>
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</table>

**Name of Lecturer**
- Rimbert
- Rudisch-Sommer

**Assessment Methods and Criteria**
- Assignments and Written Exam

**Prerequisites**
- Sound object oriented programming experience, and
- Some database know-how (relational and nosql), as well as
- Some web development skills (html, css, javascript and the principles of AJAX calls and DOM manipulation).
- Experience with any kind of web framework (symphony, laravell, zend, … or jee) would be helpful.

**Course contents**
WebApps & REST-APIs with (RAD-)frameworks like Ruby on Rails, Spring Boot Reactive WebApps with Scala & Play Framework.

**Recommended or required reading**
Hypermedia User Experience Engineering

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<td>IM531</td>
<td>Integrated Course</td>
<td>6</td>
<td>Face to Face</td>
</tr>
</tbody>
</table>

Name of Lecturer: Niebrzydowski & Wieser

Assessment Methods and Criteria: Projects

Prerequisites:

- Good foundation in HTML & CSS (Experience with grid systems like Bootstrap) and JavaScript (experience with DOM manipulation, jQuery)
- Basic handling of the terminal / command prompt (navigating directories, calling programs and scripts, setting the system path, …)
- Git basics

Course contents:

Web-frontend development workflow (gulp, scss, …), ES2015, Vue.js, Telegram bots React.js, WebRTC, WebVR, using Chrome Dev Tools / Lighthouse, JavaScript outside of the web: Electron, Johnny five

Recommended or required reading
## Game Production

<table>
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<th>Course Unit Code</th>
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<th>Name of Lecturer</th>
<th>Mode of Delivery</th>
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<td>IM540</td>
<td>Integrated Course</td>
<td>6</td>
<td>Roman Divotkey</td>
<td>Face to Face</td>
<td>Project work and oral presentation</td>
</tr>
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</table>

### Prerequisites
Good skills in computer languages (C/C++, Java) and network programming. Basic knowledge in architectures for games and computer graphics.

### Course contents
In “Game Production”, a game project is carried out by a larger team of students from the initial planning phases to the final implementation. Usually, the team project is a 3D multi-user network game.

Project planning and management, teamwork, 3D games, network architecture, resource management.

### Recommended or required reading
Project 2

Course Unit Code  
IM590

Type of Course Unit  
Integrated Course

ECTS- Credits

Name of Lecturer  
Roman Divotkey

Assessment  
Methods and Criteria

Mode of Delivery  
Face to Face

Prerequisites

Course contents
Guided project work on topics provided by faculty members or proposed by the student. Working in teams (of size 2–4) is encouraged to foster project management and team collaboration skills. Each project is coached by at least one faculty member.

Recommended or required reading
Students of our international, English-taught Master in Mobile Computing will get a more in-depth insight of the almost limitless possibilities of a truly global, all-pervasive, mobile computing connectivity. The challenge is adapting ever newer technological applications and environmentally sensitive automated systems across the full spectrum of everyday activities – including sport, medicine and care of the elderly – to create ever more powerful and user-friendly synergies. Taste the future here, now!
# Artificial Intelligence

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<tr>
<th>Course Unit Code</th>
<th>Type of Course Unit</th>
<th>ECTS- Credits</th>
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<td>MC501</td>
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<tr>
<th>Name of Lecturer</th>
<th>Assessment Methods and Criteria</th>
<th>Mode of Delivery</th>
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<tr>
<td>Stephan Dreiseitl</td>
<td>Oral or Written Examination</td>
<td>Face to Face</td>
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## Prerequisites

- [ ]

## Course contents

Architectures for intelligent systems; search algorithms, constraint satisfaction problem, search in game playing, propositional and predicate logic as language for representation and inference; methods for knowledge representation, planning algorithms, uncertain reasoning with Bayesian networks and Hidden Markov models.

## Recommended or required reading

- [ ]
## Computer Vision

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<th>Name of Lecturer</th>
<th>Assessment Methods and Criteria</th>
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<tr>
<td>Wilhelm Burger</td>
<td>Final Report and Written Exam</td>
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### Prerequisites

Introductory course in digital image processing. Fundamentals of digital image processing, programming experience in Java.

### Course contents

Introduction to fundamental techniques in computer vision. Localization and classification of 2D objects, shape descriptions, image matching, colour and texture analysis, segmentation, invariant features, curve fitting, dynamic contours, feature detection and tracking, 3D geometry, camera calibration, scene and object reconstruction, self-localization, object recognition.

### Recommended or required reading
## Cross-Platform Development of Mobile Applications

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<td>Matthias Steinbauer</td>
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### Prerequisites

### Course contents
This course focuses on technical aspects (architecture, design, patterns in cross development frameworks) as well as the applicability of such frameworks in an industrial context (usability, look-and-feel, deployment) and gives an overview about commonly used crossplatform frameworks, including:

- Native cross-platform frameworks: Rhodes and RhoSync, PhoneGap, Titanium Mobile, QuickConnect-Family, Bedrock, Corona, MoSync SDK, Qt Mobility, Adobe Flash Lite, Adobe AIR, Unity, …
- HTML/HTML5/CSS/Javascript frameworks: Sencha Touch, JQTouch, iWebKit, iUI, xUI, Magic Framework, Dashcode, CiUI, Safire, iphone

### Recommended or required reading
# Home and Building Automation

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**Name of Lecturer**: Ulrich Norbisrath

**Assessment Methods and Criteria**
- Oral or Written Examination

**Mode of Delivery**: Face to Face

### Prerequisites
- technical bachelor
- programming knowledge
- git
- agile team-based programming
- Linux basics

### Course contents
Home and building automation has been around for a long while. It is a viable solution for equipping and controlling industrial buildings with lighting, HVAC, security, audio/video, and computer networks. There are also plenty of solutions starting to become viable for the consumer.

In this class, we will learn to critically reflect, assess, and employ the solutions available. We will also focus on the integration of building automation technology and develop our own creative solutions.

The class has 5 ECTS. This means that you should budget on average an amount of 180 hours of effort for this class. This is in contrast to 30 hours presence in class. It means that only a sixth of the expected hours is class time. Therefore, expect to work outside of the class approximately 5-6 hours extra for each classroom hour.

### Recommended or required reading
Interactive Technologies

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**Prerequisites**
Students attending this course must have basic procedural programming skills

**Course contents**
Introduction to (mobile) human-computer interaction and historical context; The human factor (e.g. sensors and responders, human perception and cognitive abilities, human performance); Interaction elements (e.g. input technologies, predictive text input, mental models and metaphors, modes); Designing interactive systems (e.g. user-centered design process, ideation techniques, sketching and storyboarding); Evaluation of interface designs (e.g. paper prototyping, design guidelines and principles, heuristic evaluation); Empirical research methods (e.g. designing HCI experiments, hypothesis testing, t-test); Interaction modeling (e.g. predictive models, linear prediction equation, Fitts’ law, Keystroke-Level Model).

**Recommended or required reading**
Course Unit Code
MC516

Type of Course Unit
Integrated Course

ECTS- Credits
5

Name of Lecturer
Stephan Selinger

Assessment
Oral or Written Examination

Mode of Delivery
Face to Face

Prerequisites

Course contents
Introduction to real-time systems (classification of real-time systems, worst-case execution time, scheduling, resources, real-time operating systems), modeling and simulation of real-time systems in UML, SPT profile, MARTE profile, fault-tolerant systems, modeling reliability and availability in UML, architecture and design patterns for mobile and real-time systems.

Graduates possess advanced knowledge in the area of UML Modeling and in the area of Domain-Specific Languages (DSLs) with a special focus on secure, mobile and embedded systems. The knowledge of software metrics, as well as the methodical testing of software systems, completes this know-how.

Recommended or required reading
Mobile Business is based on the assumption that the increasing power, functionality and pervasiveness of mobile computing devices leads to new opportunities for businesses. These opportunities include an improvement of customer service, a reduction of costs, a mobilization of the sales force, an increase of productivity in the field service, the emergence of new business models and new ways of gaining strategic competitive advantage in the marketplace. The purpose of this module is to introduce participants to the fundamental concepts, strategies and technologies associated with the implementation of mobile computing. Students will gain the ability to play an active role in the development of mobile business opportunities in the organizations in which they work. Although the emphasis is on commercial enterprises, many of the topics of this module can be applied to government agencies and non-profit organizations as well, as they also need mobile computing solutions to improve customer service, reduce costs and increase the productivity of their employees.

In order to tackle the challenges coming along with Mobile Business and to create value in the future, the following issues will have to be considered:

(i) Infrastructure remains the key driver of the business, as the marked increase in data traffic demands ever faster networks and exceeds the long-term price decline;
(ii) Next generation networks and consistently standardized IT are crucial for efficiency and success;
(iii) The mobile internet and online services present considerable opportunities for growth
(iv) Customers expect secure and universal access to all services from all devices;
(v) Cloud computing and dynamic computing offer major potential for growth;
(vi) Intelligent networks support the transformation process in industries such as energy, healthcare, media and transportation;

Recommended or required reading
Mobile Business and Marketing (cont)

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Name of Lecturer: Daniel Cronin

Assessment Methods and Criteria: Oral or Written Examination

Mode of Delivery: Face to Face

Prerequisites

Course contents

(vii) Strong positions in national competition are important to drive profitable business. According to these issues, the outline of the module is as follows:

- Maturing markets
- Saturation of mobile penetration in European markets
- Keep customers as the main challenge for MNOs
- New and more competitors Area of competition has broadened
- Facebook, Google, Microsoft and Apple are partners and competitors at the same time, in areas like:
  - Mobile operating systems
  - Search
  - Payment
  - Mobile advertisement
- Broadband for Gigabit society
- Increase of bandwidth demand
- Mobile Internet
- Growth of mobile internet business
- Digital life and work
- Online storage
- Cloud computing
- Sharing
- Digital social life
- Mobile workplace

Recommended or required reading
Most devices that shape our everyday lives – from computers and smartphones to coffeemakers and jet planes – depend on a guiding software code. This full-time degree programme takes graduates in practical and applied informatics to the next level. You will expand expertise in developing, implementing and evaluating high-performance software to meet the demand for an ever-expanding range of applications. Creation of high-end software is akin to building a house: you need both the skills of a craftsperson and the inspiration of an architect. This symbiotic combination is what defines the software architect. Our Master’s degree programme will empower students to become exactly that.
Artificial Intelligence

**Course Unit Code**
KI2

**Type of Course Unit**
Integrated Course

**ECTS- Credits**
5

**Name of Lecturer**
Stephan Dreiseitl

**Assessment Methods and Criteria**
Written exam, exercise sheets

**Mode of Delivery**
Face to Face

**Prerequisites**

**Course contents**
Architectures for intelligent systems; search algorithms, constraint satisfaction problem, search in game playing, propositional and predicate logic as language for representation and inference; methods for knowledge representation, planning algorithms, uncertain reasoning with Bayesian networks and Hidden Markov models.

**Recommended or required reading**

Bachelor and Master students of all programmes can join the course if places are left.
Abstract State Machines

Course Unit Code
ASM

Type of Course Unit
Integrated Course

ECTS- Credits
3

Name of Lecturer
Egon Börger

Assessment
Methods and Criteria

Mode of Delivery
Face to Face

Prerequisites

Course contents
The method built around the notion of Abstract State Machine (ASM) has been proved to be a scientifically well founded and an industrially viable method for the design and analysis of complex systems, which has been applied successfully to programming languages, protocols, embedded systems, architectures, requirements engineering, etc. The analysis covers both verification and validation, using mathematical reasoning (possibly theorem-prover-verified or model-checked) or experimental simulation (by running the executable models).

Recommended or required reading

Bachelor and Master students of all programmes can join the course if places are left.
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<tr>
<td>Gregory Curtis</td>
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Prerequisites

Course contents

Recommend or required reading
# Data Mining and Machine Learning

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<th>Course Unit Code</th>
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**Prerequisites**

- Data Warehousing

**Course contents**

**Recommended or required reading**

This course can only be chosen by Master students.