

# ENGLISH COURSES

## SUMMER SEMESTER 2020

UNIVERSITY OF APPLIED SCIENCES UPPER AUSTRIA

HAGENBERG CAMPUS



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# Language Course

## German Courses

# German 1

<b>Course Unit Code</b> DEU1	<b>Type of Course Unit</b> Integrated Course	<b>ECTS- Credits</b> 2
<b>Name of Lecturer</b> Bettina Preßlauer	<b>Assessment Methods and Criteria</b> Written Exam, home-work, attendance	<b>Mode of Delivery</b> Face to Face

## 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

What students say about this course: “An excellent course, mildly technical. Learn german from zero.”

## Recommended or required reading

dictionary

# German 2

<b>Course Unit Code</b> DEU2	<b>Type of Course Unit</b> Integrated Course	<b>ECTS- Credits</b> 1,5
<b>Name of Lecturer</b> Bettina Preßlauer	<b>Assessment Methods and Criteria</b> Written Exam, home-work, attendance	<b>Mode of Delivery</b> Face to Face

## 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

# German 3

**Course Unit Code**

DEU3

**Type of Course Unit**

Integrated Course

**ECTS- Credits**

1,5

**Name of Lecturer**

Bettina Preßlauer

**Assessment  
Methods and Criteria**
Written Exam, home-  
work, attendance
**Mode of Delivery**

Face to Face

**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



# Automotive Computing

AC

<https://www.fh-ooe.at/en/hagenberg-campus/studiengaenge/bachelor/automotive-computing/>

**Course Unit Code**

**Type of Course Unit**

**ECTS- Credits**

lecture/exercise  
course

**Name of Lecturer**

**Assessment  
Methods and Criteria**

**Mode of Delivery**

Face to Face

## Prerequisites

see: Mobile Computing Databases

## Course contents

## Recommended or required reading

<b>Course Unit Code</b>	<b>Type of Course Unit</b>	<b>ECTS- Credits</b>
	lecture/exercise course	5
<b>Name of Lecturer</b>	<b>Assessment Methods and Criteria</b>	<b>Mode of Delivery</b>
	written examination/ continuous assess- ment	Face to Face

## Prerequisites

Courses: Introduction to Programming, Objectoriented Programming, Algorithms and Data Structures

## Course contents

One focus of the module is the teaching of comprehensive knowledge of the basic technologies JavaScript, CSS and HTML and the corresponding development environments. Another cornerstone is the communication of the possible applications of corresponding web apps in the area of the modern IT infrastructure (IoT, progressive web apps, ...) both in terms of content and structure, taking into account the advantages and disadvantages. It is also important to take account of current trends in new technologies, frameworks (such as Sass, Bootstrap, React, Ember, AngularJS) and application domains.

## Recommended or required reading

1. Wolf J.: HTML5 und CSS3: Das umfassende Handbuch, Rheinwerk Computing, 2016
2. Gull C., Münz S.: HTML5 Handbuch, 10. aktualisierte Auflage, Franzis Verlag GmbH, 2014
3. Laborenz K.: CSS: Das umfassende Handbuch: Inkl. Responsive Webdesign, Animationen, Sass, 3. Auflage, Rheinwerk Computing, 2014
4. Laborenz K., Ertl A.: Responsive Webdesign: Anpassungsfähige Websites programmieren und gestalten, 2. Auflage, Galileo Computing, 2014
5. Ater T.: Building Progressive Web Apps: Bringing the power of native to the browser, O'Reilly UK Ltd., 2017
6. Ackermann P.: Professionell entwickeln mit JavaScript: Design, Patterns und Praxistipps für Enterprise-fähigen Code, Rheinwerk Computing, 2015
7. Varghese S.: Web Development with Go: Building Scalable Web Apps and RESTful Services, Apress, 2015



# Communication and Knowledge Media

## KWM

<https://www.fh-ooe.at/en/hagenberg-campus/studiengaenge/bachelor/communication-and-knowledge-media/>

The Internet in all its facets offers a variety of possibilities and opportunities, be it in terms of communication, collaboration, network or further education – independent of time and location. As a marketplace for information, innovation, services, and products, the Internet has become an integral part of modern economies and societies. Consequently, and in view of ever-growing digitalisation efforts, we are facing numerous apps, platforms and social networks, with new ones emerging every day.

To stay successful in an increasingly digital future, companies and organisations have to meet these new challenges. Therefore, they depend on experts, who are not only proficient in technology, but master skills that go way beyond technical expertise. Such experts are able to understand and actively shape communication, learning and working processes.

Graduates from this study programme are characterised by exactly these qualifications. Their training consists of competences from both social and computer sciences – a unique combination complemented by generic skills such as communication, cooperation, problem solving, project management, and design thinking. This set of abilities enables them to approach new media holistically and promote communication and knowledge transfer within the digital world.

<b>Course Unit Code</b> KWM132/KWM133	<b>Type of Course Unit</b> lecture/exercise course	<b>ECTS- Credits</b> 1/1
<b>Name of Lecturer</b> Andreas Böhler	<b>Assessment Methods and Criteria</b> written examination/ continuous assess- ment	<b>Mode of Delivery</b> Face to Face

## Prerequisites

Basic knowledge of operating systems, computer hardware/software and networking. No special prerequi

## Course contents

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.

## Recommended or required reading

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.

<b>Course Unit Code</b> KWM183	<b>Type of Course Unit</b> Integrated Course	<b>ECTS- Credits</b> 1
<b>Name of Lecturer</b> Annamaria Mähr	<b>Assessment Methods and Criteria</b> continuous assessment and mid-term revision	<b>Mode of Delivery</b> Face to Face

### 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

Swan, M. (2005). Practical English Usage (Vol. 95). Oxford: Oxford University Press.; Murphy, R. (2012). English Grammar in Use-Fourth Edition. Ernst Klett Sprachen.



# Media Technology and Design

## MTD

<https://www.fh-ooe.at/en/hagenberg-campus/studiengaenge/bachelor/media-technology-and-design/>

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.

<b>Course Unit Code</b> MTD172	<b>Type of Course Unit</b> Integrated Course	<b>ECTS- Credits</b> 2
<b>Name of Lecturer</b> Jeremiah Diephuis	<b>Assessment Methods and Criteria</b> Continuous Assessment	<b>Mode of Delivery</b> Face to Face

### 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

Bachelor

MTD

<b>Course Unit Code</b> MTD252	<b>Type of Course Unit</b> Integrated Course	<b>ECTS- Credits</b> 5
<b>Name of Lecturer</b> Jürgen Hagler	<b>Assessment Methods and Criteria</b> Oral or Written Examination	<b>Mode of Delivery</b> Face to Face

## Prerequisites

- Basics in animation
- Knowledge of the software „Maya“
- Portfolio with 3D animations (please send renderings (images) and movies in a PDF, no sourcefiles (.blend). Thank you!)

## 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.

## Recommended or required reading

# Interaction and Game Programming

Bachelor

MTD

<b>Course Unit Code</b> MTD260	<b>Type of Course Unit</b> Integrated Course	<b>ECTS- Credits</b> 5
<b>Name of Lecturer</b> Roman Divotkey	<b>Assessment Methods and Criteria</b> Oral or Written Examination	<b>Mode of Delivery</b> Face to Face

## Prerequisites

A transcript must be provided to select courses in this area. The professor will review and decide whether to approve participation in the course.

## 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.

## Recommended or required reading

<b>Course Unit Code</b>	<b>Type of Course Unit</b>	<b>ECTS- Credits</b>
MTD262 CGR2	Integrated Course	4,5
<b>Name of Lecturer</b>	<b>Assessment Methods and Criteria</b>	<b>Mode of Delivery</b>
Michael Haller	Homework & Project	Face to Face

## Prerequisites

Ability to read simple computer programs written in the C/C++ language and a basic knowledge of computer graphics concepts (for example, depth buffering, transformations etc.). No previous experience writing graphics applications is required.

Computer graphics application programmers who might be creating a computer game, a visualization program, or other interactive application that renders to an image or a computer monitor.

## Course contents

This course provides an accelerated introduction to programming OpenGL, emphasizing the most modern methods for using the library. In recent years, OpenGL has undergone numerous updates, which have fundamentally changed how programmers interact with the application programming interface (API) and the skills required for being an effective OpenGL programmer. The most notable of these changes, the introduction of shader-based rendering, has expanded to subsume almost all functionality in OpenGL.

This course builds from demonstrating the use of the most fundamental shader-based OpenGL pipeline to introducing numerous techniques that can be implemented using OpenGL.

## 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.

<b>Course Unit Code</b> MTD272	<b>Type of Course Unit</b> Integrated Course	<b>ECTS- Credits</b> 5
<b>Name of Lecturer</b> Leo Lass	<b>Assessment Methods and Criteria</b> Oral or Written Examination	<b>Mode of Delivery</b> 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

<b>Course Unit Code</b>	<b>Type of Course Unit</b>	<b>ECTS- Credits</b>
MTD280	Integrated Course	5
<b>Name of Lecturer</b>	<b>Assessment Methods and Criteria</b>	<b>Mode of Delivery</b>
Rimbert Rudisch-Sommer	Oral or Written Examination	Face to Face

## 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

Bachelor  
MTD

<b>Course Unit Code</b> MTD282	<b>Type of Course Unit</b> Integrated Course	<b>ECTS- Credits</b> 5
<b>Name of Lecturer</b> Michael Lankes	<b>Assessment Methods and Criteria</b> Projects	<b>Mode of Delivery</b> 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.

What students say about this course: “You will learn the techniques for designing websites and games.”

## Recommended or required reading

Norman, D. A. (2013). Design of Everyday Things: Revised and Expanded. MIT Press.  
Jenifer Tidwell (2005) Designing Interfaces: Patterns for Effective Interaction Design. O’Reilly Media.  
Alan Cooper. About Face 3: The Essentials of Interaction Design. Wiley.  
Steven Krug (2014) Don’t Make Me Think: A Common Sense Approach to Web Usability, 2nd Edition



# Medical and Bioinformatics

## MBI

<https://www.fh-ooe.at/en/hagenberg-campus/studiengaenge/bachelor/medical-and-bioinformatics/>

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.

**Course Unit Code**

Ken2

**Type of Course Unit**

Integrated Course

**ECTS- Credits****Name of Lecturer**

Maria Pree

**Assessment  
Methods and Criteria****Mode of Delivery****Prerequisites****Course contents**

Primarily—but not exclusively—by means of simulations, role plays, group work, pair work, presentations, research, debates, as well as video and audio work important elements of grammar will be reviewed, technical and general vocabulary skills will be expanded, and idiomatic expressions will be introduced. All this should lead to an improvement in each student's oral and written communication skills. Some of the areas of topicality include job application documents, job interviews, and current bioinformatics issues as well as those from other areas.

**Recommended or required reading**

**Course Unit Code**

TEN4

**Type of Course Unit**

Integrated Course

**ECTS- Credits****Name of Lecturer**Maria Pree & Sandra  
Zwirschmayr**Assessment  
Methods and Criteria****Mode of Delivery****Prerequisites****Course contents**

The skills acquired in the module English for Communication will be combined with those from the module Technical English to improve each student's written and oral communication skills.

Each student will choose a topic from the realm of bioinformatics, create a PowerPoint presentation for it, and deliver it; this will be followed by a group discussion of the content as well as feedback for the speaker. In addition, each student will critique one presentation in writing, and the instructor will do all of them via audio or video analysis. The areas of topicality include a short review of presentation techniques, rhetorical expression, pitfalls during a presentation, and critique writing.

**Recommended or required reading**



# Mobile Computing

## MC

<https://www.fh-ooe.at/en/hagenberg-campus/studiengaenge/bachelor/mobile-computing/>

It is obvious that smartphones and other mobile devices have become an integral part of our daily lives, enabling us to stay in touch with the digital world no matter when or where. However, the underlying technologies usually stay hidden for the users. What counts is the user experience (UX): Are the applications comprehensible and easy to use? Do they run stably? What happens in the case of a weak internet connection?

At the same time, our devices are getting more powerful. The increasing number of sensors, interfaces and specialized processors open up unprecedented possibilities for many different areas, such as Artificial Intelligence, Mobile Health and Games to mention just a few.

Students of Mobile Computing acquire in-depth knowledge of communications technology, informatics and programming. Special focus is put on application development for mobile devices.

<b>Course Unit Code</b> 4_SEA	<b>Type of Course Unit</b> Integrated Course	<b>ECTS- Credits</b> 5
<b>Name of Lecturer</b> Jens Krösche	<b>Assessment Methods and Criteria</b> Oral or Written Examination	<b>Mode of Delivery</b> Face to Face

## 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

What students say about this course: "We mostly used Android studio and Java. You should have some experience with Java beforehand. In this course you will learn to build an app from zero."

## Recommended or required reading

Please note that all Software Development Courses take place at the same time.

# Software Development Using iOS/Swift

Bachelor

MC

<b>Course Unit Code</b> 4_SEI	<b>Type of Course Unit</b> Integrated Course	<b>ECTS- Credits</b> 5
<b>Name of Lecturer</b>	<b>Assessment Methods and Criteria</b> Oral or Written Examination	<b>Mode of Delivery</b> Face to Face

## Prerequisites

## 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

## Recommended or required reading

Please note that all Software Development Courses take place at the same time.

# Web Development

Bachelor

MC

Course Unit Code

Type of Course Unit

ECTS- Credits

Name of Lecturer

Assessment  
Methods and Criteria

Mode of Delivery

## Prerequisites

## Course contents

see MTD Online Multimedia

## Recommended or required reading

# Alternative Programming Languages

Bachelor

MC

Course Unit Code

Type of Course Unit

ECTS- Credits

Name of Lecturer

Assessment  
Methods and Criteria

Mode of Delivery

## Prerequisites

## Course contents

Paradigm of modern programming languages; compiler theory, syntactic and structural composition, applicability; implementation techniques, integration and possibilities of embedment of a variety of modern programming language sorted by a specific operation purpose, e.g.:

- static data handling and Big-Data analysis (R)
- systems programming (Go, Rust)
- interpreted scripting languages (Python, Ruby, Perl)
- visualised languages (Kotlin, Scala, C#)
- clientsided web languages (JavaScript, Dart)

## Recommended or required reading

<b>Course Unit Code</b>	<b>Type of Course Unit</b>	<b>ECTS- Credits</b>
	Integrated Course	5
<b>Name of Lecturer</b>	<b>Assessment Methods and Criteria</b>	<b>Mode of Delivery</b>
	Oral or Written Examination	Face to Face

## 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

Note: Slight content changes are possible.

## Recommended or required reading

<b>Course Unit Code</b>	<b>Type of Course Unit</b>	<b>ECTS- Credits</b>
	Integrated Course	5
<b>Name of Lecturer</b>	<b>Assessment Methods and Criteria</b>	<b>Mode of Delivery</b>
	Oral or Written Examination	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

Bachelor  
MC

<b>Course Unit Code</b> PRO 1/3/5	<b>Type of Course Unit</b> Elective Course	<b>ECTS- Credits</b> 6
<b>Name of Lecturer</b> Coordinator: Stephan Selinger	<b>Assessment Methods and Criteria</b>	<b>Mode of Delivery</b> Face to Face

## 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 Engineering

## SE

<https://www.fh-ooe.at/en/hagenberg-campus/studiengaenge/bachelor/software-engineering/>

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.

**Course Unit Code**

17\_AMS4ILV

**Type of Course Unit**

Integrated Course

**ECTS- Credits**

2

**Name of Lecturer**

Jan Legerský

**Assessment  
Methods and Criteria**

Written Examination

**Mode of Delivery**

lectures and small  
exercises

**Prerequisites**

High school math and basics of programming

**Course contents**

Basic concepts of graph theory including examples of special graph types, substructures, weighting, adjacency and incidence matrices, paths, walks, Eulerian graphs, Hamiltonian graphs, isomorphism, etc. Elementary graph algorithms (Dijkstra, A\*, Kruskal) incl. examples and justification. Further applications of graph theory. Modelling the WWW and Google Page Rank. Network flows

**Recommended or required reading**



# Data Science and Engineering

## DSE

<https://www.fh-ooe.at/campus-hagenberg/studiengaenge/master/data-science-und-engineering/>

In 2017, the world was generating 2.7 billion gigabytes of data per day. And by 2020 forecasts say this figure could exceed 44 trillion gigabytes per year. This veritable flood of data harbours invaluable know-how that is just waiting to be accessed. Structuring the information, identifying patterns and applying the findings in a fast, efficient way is crucial for decision-making in a multitude of sectors ranging from biomedical research to finance and manufacturing. The curriculum of this Master's degree focuses on various areas in data analytics and computer science, including statistical methods, machine learning, data mining and visualisation. Students also acquire expertise in their chosen pathway: biomedical data analytics or data analytics for marketing and production.

# Modelling and Simulation

<b>Course Unit Code</b> MOS2VO MOS2UE	<b>Type of Course Unit</b> Lecture with Skills Practice	<b>ECTS- Credits</b> 5
<b>Name of Lecturer</b> Stephan Winkler	<b>Assessment Methods and Criteria</b>	<b>Mode of Delivery</b> Face to Face

## 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 epidemical 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 meet the prerequisites.

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".

Visual Analytics/LVA-Leiter: Gerald Lirk

Datenakquisition und -qualität/LVA-Leiter: Susanne Schaller

Computational Intelligence/LVA-Leiter: Stephan Winkler

Datenvisualisierung/LVA-Leiter: Thomas Schwarzl

Scientific Working/LVA-Leiter: Thomas Schwarzl

2 ECTS, 4. Semester

Structure and functions of forms of scientific working: protocol, report, thesis paper, master's thesis. Techniques of scientific working: scientific material; research (e.g. in libraries, catalogues, with publishers and in bibliographies; pyramid schemes, retrieval strategy); Techniques of presentation; abbreviations; reference list; conceptual planning; time management, material, presentation, programs for literature administration.



# Communication and Knowledge Media

## KWM

<https://www.fh-ooe.at/en/hagenberg-campus/studiengaenge/master/communication-and-knowledge-media/>

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 Online Collaboration

Master  
KWM

**Course Unit Code**

KWM510

**Type of Course Unit**

Integrated Course

**ECTS- Credits**

5

**Name of Lecturer**

Martina Gaisch

**Assessment  
Methods and Criteria****Mode of Delivery**

Face to Face

**Prerequisites**

English level should be B2 or above

**Course contents****Recommended or required reading**

Note: This course can also be chosen from Bachelor students.



# Energy Informatics

## ENI

<https://www.fh-ooe.at/en/hagenberg-campus/studiengaenge/master/energy-informatics/>

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 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

<b>Course Unit Code</b>	<b>Type of Course Unit</b>	<b>ECTS- Credits</b>
ENI405	Integrated Course	5
<b>Name of Lecturer</b>	<b>Assessment Methods and Criteria</b>	<b>Mode of Delivery</b>
Lauss Bernhard Anta Adolfo	Oral or Written Examination	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

<b>Course Unit Code</b>	<b>Type of Course Unit</b>	<b>ECTS- Credits</b>
ENI502	Integrated Course	5
<b>Name of Lecturer</b>	<b>Assessment Methods and Criteria</b>	<b>Mode of Delivery</b>
Kupzog Wolfgang Hribernik Stephan Hutterer	Oral or Written Examination	Face to Face

## 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

<b>Course Unit Code</b>	<b>Type of Course Unit</b>	<b>ECTS- Credits</b>
ENI503	Integrated Course	5
<b>Name of Lecturer</b>	<b>Assessment Methods and Criteria</b>	<b>Mode of Delivery</b>
Robert Kolmhofer Peter Burgstaller Alexander Leitner	Oral or Written Examination	Face to Face

### 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 trend analysis, introduction into IT 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)
- European Programme for Critical Infrastructure Protection (EP-CIP, 2006)
- 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

<b>Course Unit Code</b>	<b>Type of Course Unit</b>	<b>ECTS- Credits</b>
ENI504	Integrated Course	5
<b>Name of Lecturer</b>	<b>Assessment Methods and Criteria</b>	<b>Mode of Delivery</b>
Armin Veichtlbauer	Oral or Written Examination	Face to Face

## Prerequisites

Bachelor's degree or comparable higher education; at least 60 ECTS in Informatics and advanced programming skills (Java, C/C++)

## Course contents

- Interoperability and scalability of Smart Grid related ICT systems, including standardization and engineering activities
- Typical functionalities of Smart Grid related ICT systems, including smart metering, meter-data management, head-end systems, data aggregators, etc.
- Model-based engineering of control applications in the Smart Grid (e.g., 61499), based on the Smart Grid Architecture Model (SGAM)
- Requirements engineering in the Smart Grid with the IntelliGrid method, with special care on security requirements (e.g., BSI Protection Profile)
- Domain-specific languages (e.g., SGAM-Toolbox), Smart Grid components (e.g., circuit breaker) and actors (e.g., Distribution System Operators)
- Existing middleware solutions (e.g., OGEMA) and frameworks (e.g., OPC-UA), their data models (e.g., 61968/CIM) and protocols (e.g., 60870-5-104)

## Recommended or required reading

- James H Christensen et al: The IEC 61499 Function Block Standard: Software Tools and Runtime Platforms. In: ISA Automation Week 2012
- Smart Grid Coordination Group: Framework Document. CEN-CENELEC-ETSI Smart Grid Coordination Group, Nov. 2012
- Smart Grid Coordination Group: Smart Grid Reference Architecture. CEN-CENELEC-ETSI Smart Grid Coordination Group, Nov. 2012
- Smart Grid Coordination Group: Sustainable Processes. CEN-CENELEC-ETSI Smart Grid Coordination Group, Nov. 2012
- European Network of Transmission System Operators for Electricity (entso\_e): The harmonized electricity market role model. entso\_e, Jan. 2015
- OFFIS: DISCERN Use Case Management Repository User Guide. DISCERN, Apr. 2016

<b>Course Unit Code</b> ENI505	<b>Type of Course Unit</b> Integrated Course	<b>ECTS- Credits</b> 5
<b>Name of Lecturer</b> Christoph Dopplinger Anta Adolfo Andreas Aichhorn	<b>Assessment Methods and Criteria</b> Oral or Written Examination	<b>Mode of Delivery</b> Face to Face

## 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

<b>Course Unit Code</b> ENI510	<b>Type of Course Unit</b> Integrated Course	<b>ECTS- Credits</b> 5
<b>Name of Lecturer</b> Andreas Reinhardt	<b>Assessment Methods and Criteria</b> Oral or Written Examination	<b>Mode of Delivery</b> Face to Face

## 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



# Human-Centered Computing

## HCC

<https://www.fh-ooe.at/campus-hagenberg/studiengaenge/master/human-centered-computing/>

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 problemsolving and full-spectrum consultancy skills that are key to the conceptualisation and deployment of practical applications in this dynamic field.

<b>Course Unit Code</b>	<b>Type of Course Unit</b>	<b>ECTS- Credits</b>
	Integrated Course	5,5
<b>Name of Lecturer</b>	<b>Assessment Methods and Criteria</b>	<b>Mode of Delivery</b>
Christoph Anthes	Project and oral exam	Face to Face tutorials

## Prerequisites

Programming skills are 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

Grubert, J. & Grasset, R., Augmented Reality for Android Application Development, Packt Publishing, 2013

Craig, A. B., Understanding Augmented Reality: Concepts and Applications, Morgan Kaufmann, 2012

Kipper, G. & Rampolla, J., Augmented Reality: An Emerging Technologies Guide to AR, Syngress, 2012

Hainich, R. R. & Bimber, O., Displays - Fundamentals and Applications, CRC Press, 2011

Bimber, O. & Raskar, R., Spatial Augmented Reality -- Merging Real and Virtual Worlds, A K Peters LTD, 2005

IEEE Transactions on Visualization and Computer Graphics/ Proceedings of IEEE/ACM ISMAR (International Symposium on Mixed and Augmented Reality)

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



# Interactive Media

## IM

<https://www.fh-ooe.at/en/hagenberg-campus/studiengaenge/master/interactive-media/>

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.

<b>Course Unit Code</b> IM500	<b>Type of Course Unit</b> Integrated Course	<b>ECTS- Credits</b> 4,5
<b>Name of Lecturer</b> Stephan Dreiseitl	<b>Assessment Methods and Criteria</b> Written exam, exercise sheets	<b>Mode of Delivery</b> Face to Face

## Prerequisites

## Course contents

This course will provide an understanding of the fundamental concepts underlying modern intelligent systems. Topics covered will include intelligent agent design, informed and uninformed search algorithms, methods for solving constraint satisfaction problems, searching in game situations, planning algorithms, knowledge representation and inference using logic and probability theory, and Bayesian networks and Markov chains.

## Recommended or required reading

**Course Unit Code**

IM510

**Type of Course Unit**

Integrated Course

**ECTS- Credits**

4,5

**Name of Lecturer**

Volker Christian

**Assessment  
Methods and Criteria**

Oral or Written Examination

**Mode of Delivery**

Face to Face

**Prerequisites**

Profound Programming Knowledge (C++ / Java)

**Course contents**

Tasks, Threads, Thread-Synchronization, Interprocess-Communication, Signals, Pipes, FIFO, Message-Queues, Shared-Memory, OSI-Model, ICMP, TCP, UDP, Sockets, Server-Client Architectures, Multiplexed-IO, Asynchronous-IO, SUN-RPC, SUN-RMI, Object Serialization.

**Recommended or required reading**

<b>Course Unit Code</b> IM520	<b>Type of Course Unit</b> Integrated Course	<b>ECTS- Credits</b> 6
<b>Name of Lecturer</b> Wilhelm Burger	<b>Assessment Methods and Criteria</b> Final Report and Written Exam	<b>Mode of Delivery</b> Face to Face

## 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

<b>Course Unit Code</b> IM530	<b>Type of Course Unit</b> Integrated Course	<b>ECTS- Credits</b> 6
<b>Name of Lecturer</b> Rimbert Rudisch-Sommer	<b>Assessment Methods and Criteria</b> Assignments and Written Exam	<b>Mode of Delivery</b> Face to Face

## 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

Master

IM

<b>Course Unit Code</b> IM531	<b>Type of Course Unit</b> Integrated Course	<b>ECTS- Credits</b> 6
<b>Name of Lecturer</b> Manuel Wieser & Ralph Harrer	<b>Assessment Methods and Criteria</b> Projects	<b>Mode of Delivery</b> Face to Face

## 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

**Note:** This course is an elective course and will only come about if enough participants register.

<b>Course Unit Code</b> IM540	<b>Type of Course Unit</b> Integrated Course	<b>ECTS- Credits</b> 6
<b>Name of Lecturer</b> Roman Divotkey	<b>Assessment Methods and Criteria</b> Project work and oral presentation	<b>Mode of Delivery</b> Face to Face

## 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

Master  
IM

**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



# Mobile Computing

## MC

<https://www.fh-ooe.at/en/hagenberg-campus/studiengaenge/master/mobile-computing/>

Students of our international, English-taught Master in Mobile Computing will get an 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!

**Course Unit Code**

MC501

**Type of Course Unit**

Integrated Course

**ECTS- Credits**

5

**Name of Lecturer**

Stephan Dreiseitl

**Assessment  
Methods and Criteria**

Oral or Written  
Examination

**Mode of Delivery**

Face to Face

**Prerequisites****Course contents**

This course will be held for Software Engineering, Mobile Computing and Interactive Media collectively. See Interactive Media Artificial Intelligence for further details.

**Recommended or required reading**

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

<b>Course Unit Code</b> MC505	<b>Type of Course Unit</b> Integrated Course	<b>ECTS- Credits</b> 5
<b>Name of Lecturer</b> Wilhelm Burger	<b>Assessment Methods and Criteria</b> Final Report and Written Exam	<b>Mode of Delivery</b> Face to Face

## 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

<b>Course Unit Code</b> MC507	<b>Type of Course Unit</b> Integrated Course	<b>ECTS- Credits</b> 5
<b>Name of Lecturer</b> Matthias Steinbauer	<b>Assessment Methods and Criteria</b> Oral or Written Examination	<b>Mode of Delivery</b> Face to Face

## 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

1. S. Allen, V. Graupera, L. Lundrigan: Pro Smartphone Cross-Plattform Development. iPhone, BlackBerry, Windows Mobile, and Android Development and Distribution. Apress, 2010.
2. S. Logan: Cross-Platform Development in C++. Building Mac OS X, Linux, and Windows Applications. Addison-Welsley, 2008.
3. J. Bishop, N. Horspool: Cross-Platform Development: Software that Lasts. IEEE Computer, 39(10):26-35, 2006.
4. <http://rhomobile.com>
5. <http://www.phonegap.com>
6. <http://www.appcelerator.com>

<b>Course Unit Code</b>	<b>Type of Course Unit</b>	<b>ECTS- Credits</b>
DAB	Integrated Course	5
<b>Name of Lecturer</b>	<b>Assessment Methods and Criteria</b>	<b>Mode of Delivery</b>
Erik Sonnleitner	Oral or Written Examination	Face to Face

## Prerequisites

## Course contents

Based on the fundamental concepts of using and designing databases, the classic relational databases and SQL are treated first. In the context of the design of concrete relational databases (MySQL, Oracle, ...), aspects such as normalization, constraints, views, joins or transactions are treated, for example. Appropriately, tools such as ODBC and JDBC are presented, which allow access to the data of a database via programming interfaces.

In addition to classic relational databases, alternative concepts for data management, such as object-relational databases, NoSQL-DB, cloud or alternative online storage, are taken into account during the course.

## Recommended or required reading

1. Vossen, G.: Datenmodelle, Datenbanksprachen und Datenbank- managementsysteme, 5. Auflage. Oldenbourg 2008
2. Geisler, F.: Datenbanken – Grundlagen und Design, 4. Auflage. mitp 2011.
3. Beighley, L.: SQL von Kopf bis Fuß. O'Reilly 2008
4. Ullenboom, C.: Java SE8 Standard-Bibliothek: Insel 2: Das Hand- buch für Java-Entwickler. Galileo Computing 2014
5. Dietrich, S.W. und Urban, S.D.: Fundamentals of Object Databases – Object-Oriented and Object-Relational Design. Morgan & Clay- pool Publishers 2011
6. Sadalage, P.J. und Fowler, M.: NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Per- sistance, Addison Wesley 2012
7. Furht, B. und Escalante, A. (Hrsg.): Handbook of Cloud Computing. Springer 2010

# Home and Building Automation

<b>Course Unit Code</b>	<b>Type of Course Unit</b>	<b>ECTS- Credits</b>
MC509	Integrated Course	5
<b>Name of Lecturer</b>	<b>Assessment Methods and Criteria</b>	<b>Mode of Delivery</b>
Ulrich Norbistrath	Oral or Written Examination	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 of 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

1. Sauter T., Dietrich D., Kastner W.: EIB Installation Bus System, Publicis Corporate Publishing, 2001.
2. Jeronimo M, Weast Jack: UPnP\* Design by Example: A Software Designer's Guide to Universal Plug and Play, Intel Press, 2003
3. Zahariadis T.B.: Home Networking Technologies and Standards, Artech House Publishers, 2003.

<b>Course Unit Code</b>	<b>Type of Course Unit</b>	<b>ECTS- Credits</b>
MC510	Integrated Course	5
<b>Name of Lecturer</b>	<b>Assessment Methods and Criteria</b>	<b>Mode of Delivery</b>
Clemens Holzmann	Oral or Written Examination	Face to Face

## 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

1. D. Benyon: Designing Interactive Systems – A Comprehensive Guide to HCI and Interaction Design, 2nd Edition, Addison Wesley, 2010.
2. A. Dix, J. Finlay, G.D. Abowd, R. Beale: Human-Computer Interaction, 3rd Edition, Pearson Education Limited, 2004.
3. B. Shneiderman, C. Plaisant: Designing the User Interface – Strategies for Effective Human-Computer Interaction, 5th Edition, Pearson Higher Education, 2010.
4. A. Cooper, R. Reimann, D. Cronin: About Face 3 – The Essentials of Interaction Design, Wiley Publishing Inc, 2007.
5. Y. Rogers, J. Preece, H. Sharp: Interaction Design – Beyond Human-Computer Interaction, 2nd Edition, John Wiley & Sons Ltd, 2009.
6. J. Krumm: Ubiquitous Computing Fundamentals, Chapman and Hall/CRC, 2009.

<b>Course Unit Code</b> MC516	<b>Type of Course Unit</b> Integrated Course	<b>ECTS- Credits</b> 5
<b>Name of Lecturer</b> Stephan Selinger	<b>Assessment Methods and Criteria</b> Oral or Written Examination	<b>Mode of Delivery</b> 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, faulttolerant 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

1. J. W. S. Liu: Real-Time Systems. Prentice Hall, 2000.
2. J. Cooling: Software Engineering for Real-Time Systems. Addison-Wesley, 2003.
3. B. P. Douglass. Real-Time UML Third Edition. Advances in The UML for Real-Time Systems, Addison-Wesley 2004.
4. Object Management Group (OMG): UML Profile for Schedulability Performance, and Time, Version 1.1, January 2005.
5. Object Management Group (OMG): UML Profile for Modeling and Analysis of Real-time and Embedded Systems (MARTE), Version 1.0, 2009.
6. I. Koren, C. M. Krishna: Fault-Tolerant Systems. Morgan Kaufmann, 09
7. Q. Li, C. Yao. Real-Time Concepts for Embedded Systems. CMP Books, 2003.

# Mobile Business and Marketing

Course Unit Code	Type of Course Unit	ECTS- Credits
MC605	Integrated Course	5
Name of Lecturer	Assessment Methods and Criteria	Mode of Delivery
Daniel Cronin Tom Peruzzi Philipp Baldauf	Oral or Written Examination	Face to Face

## Prerequisites

## Course contents

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

1. P. Sugai, M. Koeder, L. Ciferri: The Six Immutable Laws of Mobile Business, 1st Edition, Wiley-Interscience, 2010.
2. E. Tiwari, S. Buse: The Mobile Commerce Prospects: A Strategic Analysis of Opportunities in the Banking Sector, Hamburg University Press, 2007.
3. M. Austin: Mobile Business: Creating a Successful Mobile Strategy for Your Business, Kogan Page, 2011.
4. M. Reuver, H. Bouwman, T. Haaker: Mobile business models: organizational and financial design issues that matter, Electronic Markets, vol. 19, no. 1, 2009.
5. H. H. Bauer, T. Dirks, M. Bryant: Erfolgsfaktoren des Mobile Marketing, 1st Edition, Springer, 2008.
6. H. Bouwman, H. Vos, T. Haaker: Mobile Service Innovation and Business Models, 1st Edition, Springer, 2010.
7. M. Head, E. Y. Li: Mobile and Ubiquitous Commerce: Advanced E-business Methods, 1st Edition, Information Science Reference, 2009.
8. U. Koivukoski, V. Räisänen: Managing Mobile Services: Technologies and Business Practices, 1st Edition, Wiley, 2005.
9. A. Kornak, J. Teutloff, M. Welin-Berger: Enterprise Guide to gaining Business Value from Mobile Technologies, Wiley, 2004.

# Mobile Business and Marketing (cont)

<b>Course Unit Code</b>	<b>Type of Course Unit</b>	<b>ECTS- Credits</b>
MC605	Integrated Course	5
<b>Name of Lecturer</b>	<b>Assessment Methods and Criteria</b>	<b>Mode of Delivery</b>
Daniel Cronin	Oral or Written Examination	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:
  - o Mobile operating systems
  - o Search
  - o Payment
  - o 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

<b>Course Unit Code</b>	<b>Type of Course Unit</b>	<b>ECTS- Credits</b>
MC605	Integrated Course	5
<b>Name of Lecturer</b>	<b>Assessment Methods and Criteria</b>	<b>Mode of Delivery</b>
Daniel Cronin	Oral or Written Examination	Face to Face

## Prerequisites

## Course contents

One focus of the module is the teaching of comprehensive knowledge of the basic technologies JavaScript, CSS and HTML and the corresponding development environments. Another cornerstone is the communication of the possible applications of corresponding web apps in the area of the modern IT infrastructure (IoT, progressive web apps, ...) both in terms of content and structure, taking into account the advantages and disadvantages. It is also important to take account of current trends in new technologies, frameworks (such as Sass, Bootstrap, React, Ember, AngularJS) and application domains.

## Recommended or required reading

1. Wolf J.: HTML5 und CSS3: Das umfassende Handbuch, Rheinwerk Computing, 2016
2. Gull C., Münz S.: HTML5 Handbuch, 10. aktualisierte Auflage, Franzis Verlag GmbH, 2014
3. Laborenz K.: CSS: Das umfassende Handbuch: Inkl. Responsive Webdesign, Animationen, Sass, 3. Auflage, Rheinwerk Computing, 2014
4. Laborenz K., Ertl A.: Responsive Webdesign: Anpassungsfähige Websites programmieren und gestalten, 2. Auflage, Galileo Computing, 2014
5. Ater T.: Building Progressive Web Apps: Bringing the power of native to the browser, O'Reilly UK Ltd., 2017
6. Ackermann P.: Professionell entwickeln mit JavaScript: Design, Patterns und Praxistipps für Enterprise-fähigen Code, Rheinwerk Computing, 2015
7. Varghese S.: Web Development with Go: Building Scalable Web Apps and RESTful Services, Apress, 2015



# Software Engineering

## SE

<https://www.fh-ooe.at/en/hagenberg-campus/studiengaenge/master/software-engineering/>

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 highperformance 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.

**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**

This course will be held for Software Engineering, Mobile Computing and Interactive Media collectively. See Interactive Media Artificial Intelligence for further details.

**Recommended or required reading**

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

**Course Unit Code**

**Type of Course Unit**

**ECTS- Credits**

Integrated Course

**Name of Lecturer**

**Assessment  
Methods and Criteria**

**Mode of Delivery**

Gregory Curtis

## Prerequisites

## Course contents

## Recommended or required reading

# Data Mining and Machine Learning

Master  
SE

**Course Unit Code**

**Type of Course Unit**

**ECTS- Credits**

Integrated Course

**Name of Lecturer**

**Assessment  
Methods and Criteria**

**Mode of Delivery**

Affenzeller

**Prerequisites**

Date Warehousing

**Course contents**

**Recommended or required reading**

This course can only be chosen by Master students.