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Language Course

German Courses
## German 1

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### Prerequisites

Basic knowledge of the German language and the Austrian culture; ability to use German in simple everyday situations

Interactive learning methods, team- and group activities

### 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

Basic knowledge of the German language and the Austrian culture; ability to use German in simple everyday situations

Interactive learning methods, team- and group activities

What students say about this course: “This course was excellent and not really technical. Learn German from zero. Go to the course if you want to learn the new language!”

### Recommended or required reading

Dictionary
### Prerequisites

started some German but did not reach A1 yet

### 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

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## Prerequisites

A2 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
General Courses
Cross Cultural Entrepreneurship

Note: Still to be determined if this course will take place in WS 2020/21.

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Prerequisites

Course contents

For an effective entrepreneurial and organizational management, the analysis of recent developments and trends within hypercompetitive global arena will be carried out in the classes through text and case studies. The expanding Startup Community among the geographies, and rapidly growing economies requires new management applications and entrepreneurial spirit. Entrepreneurship-, Startup- and Cross Cultural Management Strategies will be evaluated in the context of global changes and the development of future markets.

Topics: Entrepreneurial Spirit, Thinking and Behaviour, Economical and technical trends and developments within competitive markets, Cultural and entrepreneurial differences and their boundaries, Early Stage Marketing, Business Modelling and Business Planning for Startups, ...

Recommended or required reading
A revolution is currently taking place in the automotive sector before our very eyes. In addition to new drive systems, it is above all digitalization that is becoming increasingly important, both in the vehicle itself and in the surrounding road infrastructure. Innovative IT solutions allow vehicles to communicate both with each other and with their environment, thus opening up countless possibilities for making future mobility safer, more environmentally friendly and more efficient.

Technologies like these include intelligent assistance systems, self-driving cars and systems for networking road users with their environment, but also mobility-based services (e.g. UBER) will fundamentally change our understanding of mobility in the coming years.

The degree program Automotive Computing trains experts for precisely these, still very young, specialist areas. The rapid development of the industry already requires specialists who understand the interplay between information technology and mobility, who can apply this optimally and thus help to shape our future sustainably.
### Course Unit Code
ALD

### Type of Course Unit
Integrated Course

### ECTS- Credits
5

### Name of Lecturer
Marc Kurz

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

### Mode of Delivery
Face to Face

### Prerequisites
The students know the most important formal and practical foundations of computer science, such as the targeted selection and evaluation of data structures, design and specification of algorithms, standard algorithms and introduction to complexity analysis.

### Course contents
Focus on algorithms and data structures. Specification of algorithms; Complex dynamic data structures (trees, graphs), standard algorithms (search, sorting, dynamic search trees, hashing methods), iterative methods (conversion of sum expressions), recursive algorithms, elementary graph algorithms, calculation models and complexity measures. In the area of concrete applications, data formats for geodata (OGC SFS, GDF, ...) are treated as well as path data-graphs and routing algorithms.

### Recommended or required reading
Sedgewick R.: Algorithmen. Addison-Wesley, 1992
Wirth Niklaus.: Algorithmen und Datenstrukturen. Teubner Studienbücher Informatik, 1986
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.
## English 1

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### Prerequisites

### Course contents

### Recommended or required reading

*Note: Maximum 2 students can take this course! First come, first served!*

Winter Semester 2020/21
# English 3

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<td>KWM270</td>
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<td>Annamaria Mähr</td>
<td>Written exam, exercise sheets</td>
<td>Face to Face</td>
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</table>

**Prerequisites**

**Course contents**

What students say about this course: “This course was excellent, the professor is very cool and interesting. I liked it even more than English Communication.”

**Recommended or required reading**
Interaction Design

Note: Still to be determined if this course will take place in WS 2020/21.

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Prerequisites

Course contents

The usability and user experience of many interactive products (e.g. websites, apps, entertainment devices, smart homes, …) could be substantially improved if the creators of such technologies would think more about their users’ actual needs, goals, and skills. Therefore, the course KWM250 Interaction Design is concerned with the user-centered design of user interfaces for interactive products. Students learn how to apply a user-centered design process to design, prototype, and test new user interfaces together with test users. The course teaches important methods from usability engineering and interaction design such as user observation, requirements analysis, using personas and scenarios, sketching, wireframes, prototyping, usability testing, etc. To pass the course, students have to succeed in the theoretical and the practical part. The theoretical part consists of lectures about usability, user experience, human-computer interaction and user-centered design methods. In the practical part, teams of 2-4 students apply this knowledge in a semester team project during which they design, build, and evaluate a user interface prototype.

What students say about this course: “This course was excellent and quite technical. You will get the techniques for designing websites and games. “

Recommended or required reading
What do smartphones, modern cars and robots have in common? They are 'smart' thanks to in-built computer technology that delivers functions once considered the stuff of sci-fi movies. Such smart computers depend on the perfect combination of dedicated software and hardware. This key symbiosis is the chief focus of our degree programme in Hardware-Software-Design. This full-time degree programme offers a thorough grounding in informatics, IT and electronics. Students will develop competence in the design and creation of embedded systems, software application and chip design.

HSD

Introduction to Artificial Intelligence

**Course Unit Code**
EK15

**Name of Lecturer**
Dietmar Millinger

**Type of Course Unit**
Integrated Course

**ECTS- Credits**
2.5

**Assessment Methods and Criteria**

**Mode of Delivery**
Face to Face

**Prerequisites**
This class requires basic understanding in computer programming and mathematics. Basic knowledge in Python is preferrable but not mandatory.

**Course contents**
The goal of the class is to provide actionable knowledge about the basic principles and structures as well as functions of AI systems und subsystems. This class has a focus on machine learning. With this knowledge the student shall be able to select and integrate AI modules into larger software systems. Therefore the students learn about a number of common AI modules, their functions and their interfaces. A special focus lies in the lifecycle of machine learning projects from proof of concept to production situations and the use of frameworks in production projects. In the practical part 4 examples in python on jupyter are implemented and strategies for improvement of the results are developed.

**Recommended or required reading**

*Note: Elective Course - Only offered if enough students register.*

Winter Semester 2020/21
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.
# Media Studies

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**Name of Lecturer**
Jeremiah Diephuis

**Assessment Methods and Criteria**
Oral or written exam

The course covers the history and development of media technologies and traditions (radio, TV, film, computer games, Internet) and current issues in the media industry.

Media Studies aims to strengthen students’ oral and written communication skills, particularly within the field of digital media.

What students say about this course: “This course was interesting!”

**Recommended or required reading**
Projects cover any number of topics within the field of Media, both technical- and design-oriented. Generally the student will propose a topic to the faculty of which they would like to cover. These topics generally fall somewhere in the spectrum of Game, Web, Audio/Video and Animation design/development. Some examples of technologies that might be used, depending on the project, are Java, Unity, LibGdx, Adobe Creative Cloud, PHP, HTML, and JavaScript. Each project differs, so it depends which particular skills and technologies the student wishes to improve or pick up. A couple examples of projects from past students include:

- Creating a puzzle game in which the main character finds herself lost in fictional universes.
- Creating a simple rhythm-based music game
- Developing a strategy game (Group of 3 people—2 focusing on art/graphics, 1 on sounds, visual, and programming) http://hive-21.com/
- Building a website which allows users to share a sort of “diary” of development projects and receive feedback from the community
- Making a music video for a local band
- 2D/3D Animation
- Short films

Recommended or required reading
## Stop Motion Animation

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<td>MTD352</td>
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<td>Students need to apply with a portfolio (online or pdf, youtube/vimeo links). Images: jpg, png, tiff, ...). Movies: (mov, avi, mpg, ...).</td>
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### Assessment
- **Methods and Criteria**

### Mode of Delivery
- **Face to Face**

### Course contents
- Workflow, principles and language of related analogue animation techniques: Stop Motion, Clay Animation, Cut Out, Cartoon Animation, Rotoscoping.

### Recommended or required reading
Digital Imaging

Note: Still to be determined if this course will take place in WS 2020/21.

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<td>worked out assignments, short presentations, written exam</td>
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<th>Mode of Delivery</th>
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<th>Course contents</th>
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<tr>
<td>This course covers fundamental methods of digital image processing, including point operations, filters, color, geometrical operations and the detection of “interesting” image structures. Image processing is different to image editing (something you would do with Photoshop) and computer graphics, which aims at synthesizing images. The key objective here is to improve images or to extract relevant information from images in a possibly fully automatic way. The focus of this course is on algorithms, practical techniques, and some simple mathematical concepts. At the end, participants should have obtained a good judgement of the potentials and limitations of digital image processing by developing their own programs in Java with the (extremely simple) ImageJ framework.</td>
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<table>
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## Audio Processing

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<td>Christoph Schaufler</td>
<td>Exercises, Course-project</td>
<td>Face to Face</td>
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### Prerequisites

- **audio processing fundamentals**: operation of a modern digital audio workstation (Apple Logic, Steinberg Cubase, Avid ProTools, or the like) audio editing techniques, post processing (spectrum: equalisation/filters/etc., dynamic: gate/compression/etc., effects: frequency- and time-based effects/reverb/etc).

- **programming fundamentals**: knowledge of boolean / logic operations & basic programming skills, analytical thinking and methodical procedure when tackling problems.

### Course contents

Introduction to Sound Synthesis and MIDI control. Fundamentals of audio signal processing in theory and practice using node-based programming environments (e.g. Cycling74 MAX). Reproduction of substantial algorithms from the field of sound synthesis and audio effects.

### Recommended or required reading

- Andy Farrell, Designing Sound, 2010
- S. W. Smith, The Scientist and Engineer's Guide to DSP Programming
# Web Applications

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<td>Class-based activities</td>
<td>Face to Face</td>
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## Prerequisites

Foundations in Web App & DB Development (HTML/CSS, JavaScript, PHP, SQL)

## Course contents

Using server-side JavaScript- and PHP-based frameworks (e.g. node.js/Express, Symfony) and development workflows to build web applications and REST backends. Foundations of SQL based object-relational mapping (ORM) libraries (Doctrine ORM) and using document databases (MongoDB) for managing/publishing structured data.

## Recommended or required reading

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.
Project 4

Course Unit Code
PRO4

Type of Course Unit
Integrated Course

ECTS- Credits
5

Name of Lecturer
Coordinator: Stephan Selinger

Assessment
Oral Presentation

Mode of Delivery
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 during their studies. Projects are therefore a good chance to implement their own ideas as well as to carry out interesting R&D projects and cooperations with companies. When doing projects, students run through all steps of 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
# Mobile Games

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<td>Stephan Selinger</td>
<td>Oral or Written Examination</td>
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## Course contents

Sports-related mobile devices and systems are booming as never before. Not only established industry giants such as Garmin, Polar, or Suunto thrive in this market segment, companies like Samsung (e.g. Fit Gear, Gear 2) or Apple with the Apple Watch are gearing up. Runtastic - founded by mobile computing graduates - is another prime example that you can achieve anything in this area.

The lecture shows the basics, methods, algorithms and techniques needed to successfully participate in the development of such systems. Accompanying the theory parts (see the list below), we are going to develop an app, so that at the end of the course we will have a fully functional system.

## Recommended or required reading

Note: MOH5, MOG5 and MOS5 all take place at the same time, therefore please choose just one of these courses!
## Mobile Games

<table>
<thead>
<tr>
<th>Course Unit Code</th>
<th>Type of Course Unit</th>
<th>ECTS- Credits</th>
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</thead>
<tbody>
<tr>
<td>MOG5</td>
<td>Integrated Course</td>
<td>5</td>
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<table>
<thead>
<tr>
<th>Name of Lecturer</th>
<th>Assessment</th>
<th>Mode of Delivery</th>
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<tbody>
<tr>
<td>Christian Bartsch</td>
<td>Semester project</td>
<td>Face to Face</td>
</tr>
</tbody>
</table>

### Prerequisites

### Course contents

Technical topics about development of mobile games with a game engine. Students develop their own games as a semester project in groups of 2, the project submission and presentation determine the final grade.

### Recommended or required reading

*Note: MOH5, MOG5 and MOS5 all take place at the same time, therefore please choose just one of these courses!*
Software Development for Android

**Course Unit Code**
SEA

**Type of Course Unit**
Integrated Course

**ECTS-Credits**
5

**Name of Lecturer**
Philipp Matthias Jahoda

**Assessment Methods and Criteria**
exercises, micro project

**Mode of Delivery**
Face to Face

**Prerequisites**
Recommendations by former exchange students: I liked this course a lot, it was quite technical. We mainly used Android Studio. I would recommend students to know Java in order to do this course.

**Course contents**
Development of Android applications for smartphones based on the current API version.
- Activity 1
- Resources
- View/Layout/Interaction
- Sensors
- Intent
- Inter-Component Communication
- Fragments
- Multimedia 1
- MultiTasking
- Service 1
- AppWidgets
- Animation
- Context
- Manifest
- Notification
- Activity 2
- ActionBar 1
- Receiver
- Location 1

What students say about this course: "This course was excellent and very technical. We used Android Studio and Java. I would recommend to have experience with Java. In this course you will learn to build an android app from zero."

**Recommended or required reading**

*Note: SEA, SEI and ADA all take place at the same time, therefore please choose just one of these courses!*

Winter Semester 2020/21
Course Unit Code
ADA

Type of Course Unit
Integrated Course

ECTS- Credits
5

Name of Lecturer
Stephan Brunner, Mostafa Hassan, Markus Hintersteiner

Assessment Methods and Criteria
Oral or Written Examination

Mode of Delivery
Face to Face

Prerequisites

Course contents
In this module, students learn to develop applications for the Windows Phone platform using the programming language C# in the development environment Visual Studio. The basics of the programming language C# and the .NET framework are taught at the beginning, highlighting the most important differences and similarities to the programming language Java.

The main part of this module covers the development of XAML-based applications for the Windows Phone platform, including the general design of Windows Phone applications, side layout and navigation, the MVVM design pattern, file access, network applications, the Windows Phone application’s life cycle, the use of device resources such as camera and motion sensors, location-related and Maps, Universal Apps, and the release of apps in the Windows Phone Apps + Games Store.

Recommended or required reading

Note: SEA, SEI and ADA all take place at the same time, therefore please choose just one of these courses!
Distributed Information Systems

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<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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<tbody>
<tr>
<td>VIS</td>
<td>Integrated Course</td>
<td>5</td>
<td>Jens Krösche</td>
<td>Final Exam, Exercises</td>
<td>Face to Face</td>
</tr>
</tbody>
</table>

Prerequisites

good Java programming skills
decent C++ programming skills

Course contents

- theoretical foundations of “distributed systems”
- basic practical knowledge about client / server communication via TCP / UDP sockets (C++ / Java) and the use of threads, taking the corresponding synchronization mechanisms into account
- Java RMI
- Java-based SOAP / REST APIs
- fundamentals in the area of frameworks and component-oriented software development

Recommended or required reading

The exchange of information, just like the amount of data and its accessibility anywhere, anytime, is matched by the exponential growth in modern technology. Experts qualified to meet the challenges of cybercrime, hacking and data theft are in increasing demand. This full-time degree programme will equip you to meet this demand, with its focus on full spectrum security protocols associated with the operation of computer systems and networks as well as mainstream data transfer, storage and archiving. Compulsory elective modules will give students the opportunity to further specialise in network, data and systems security.
# English 1

<table>
<thead>
<tr>
<th>Course Unit Code</th>
<th>Type of Course Unit</th>
<th>ECTS- Credits</th>
<th>Prerequisites</th>
<th>Course contents</th>
<th>Recommended or required reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENG1</td>
<td>Integrated Course</td>
<td>2</td>
<td></td>
<td>The aim of this course is to revise grammar structures, expand vocabulary and foster presentation skills and fluency in the target language. Additionally special emphasis will be set on speaking skills, expressing of opinion and debating.</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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<tbody>
<tr>
<td>Irdonka Kretzschmar</td>
<td>Oral and Written Examination</td>
<td>Face to Face</td>
</tr>
</tbody>
</table>

Bachelor
Seminar 3

Course Unit Code
SEM3

Type of Course Unit
Integrated Course

ECTS- Credits
2

Name of Lecturer
Marcus Nohlberg

Assessment
Methods and Criteria

Mode of Delivery
Face to Face

Prerequisites

Course contents
The BSc lectures will cover the theme “Champions of Today’s Digital World” and will tackle three challenging areas of information security:

PII and Cloud - this lecture considers the issue of personally identifiable information (PII) residing in the Cloud and the risks to this information and what protection can be used to reduce and manage these risks.

IOT Security - the Internet of Things involves trillions small devices connecting and talking to each other in ‘smart ways’ to do ‘smart things’. But like all applications of the Internet security and privacy are top priority issues - this lecture covers some of these issues.

Social Networking Security Risks - there is widespread private and commercial use being made of social networking and such use brings with it the problems of security and privacy. Examples are social engineering, identity theft, data leakage through to potential damage to image and reputation.

Recommended or required reading

Note: Limited places (4) - An early registration is necessary.
Winter Semester 2020/21
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.
# Parallel and Distributed Software Systems

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<td>VPS5</td>
<td>Integrated Course</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>Stefan Wagner</td>
<td>Written exam, exercise sheet</td>
<td>Face to Face</td>
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</tbody>
</table>

## Prerequisites
For taking this course, you should know that you
- will have to participate in all lectures
- will have to do exercises at home
- will have to have a good knowledge of C# programming

## Course contents
This lecture concentrates on the development of multi-threaded applications using the Microsoft .NET framework. Apart from a theoretical introduction into parallel programming and an overview of different hardware architectures, different APIs, synchronization and patterns are discussed. In the exercises the theoretical knowledge is applied in several practical examples (e.g., parallel Mandelbrot set generator, parallel Water World simulation).

## Recommended or required reading
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.
## Computational Intelligence 2

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<td>Integrated Course</td>
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<td>Face to Face</td>
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<tr>
<th>Name of Lecturer</th>
<th>Assessment</th>
<th>Prerequisites</th>
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<tr>
<td>Stephan Winkler</td>
<td>Methods and Criteria</td>
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<tr>
<td>Karin Pröll</td>
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</table>

Note: This course can also be chosen from Bachelor students if they meet the prerequisites.

### Course contents
Supervised machine learning: artificial neural networks, deep learning, machine learning in image analysis, support vector machines, random forests, regression, classification, white box modeling by genetic programming, and a studies project at the end of the course.

### Recommended or required reading

Winter Semester 2020/21
The main language of instruction is German, although some modules may be offered in English.

**Computational Science**
- supervised/unsupervised learning, hypotheses feature selection conceptual learning, candidate elimination
- cross-validation, case-based reasoning, rule-based reasoning nearest neighbours, decision trees classifier systems, Artificial Neuronal Networks (classic & bayesian technique), Deep Learning, Support Vector Machines & Kernel Methods, Random forest regression/classification, Bayesian Networks and Clustering, Markov Chain Monte Carlo Sampling, exercises with WEKA, HeuristicLab and SPSS/Clementine.

**Computational Intelligence 1**
- Multivariate Statistics
- Numerical Methods
- Advanced Scripting
- Text Mining
- Biomedical Data Analysis
- Data Analysis Production
- Cloud Computing
- Computer Vision
- Data Protection and Privacy
- High Performance Computing
- Big Data

*Note: There is also a Big Data Course in the Software Engineering Master.*
Design-orientated know-how and practical skills in computer animation, audio/video & games

This full-time Master’s degree programme builds on a student’s creative, design and technical skills with our production and design-orientated programme that focuses on computer animation, audio/video, and games. You will expand further your ability to perform innovative and professional work across the media production industry. Our degree programme also seeks to build project management skills and develop a systematic approach to conceptualising and leading media projects by focusing on practice-oriented project work modules that combine state-of-the-art theory and practice. Students can furthermore choose from a broad range of in-depth modules for further specialisation.

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

<table>
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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>DA630</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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<tr>
<td>Jürgen Hagler</td>
<td></td>
<td>Face to Face</td>
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</table>

### Prerequisites
Basic knowledge in Digital Arts and Programming
Students need to apply with a portfolio (online or pdf, youtube/vimeo links).
Images: jpg, png, tiff, ...). Movies: (mov, avi, mpg, ...).

### Course contents
The goal of the course is to provide students with a theoretical and practical understanding of interactive and generative art. The course begins with a theoretical introduction based on over 40 years of media art history from the Ars Electronica Archive. This insight provides a chronological and thematic overview of generative and interactive art.

Towards the end of the course, we will then increasingly focus on concrete projects, tools and algorithms. This is with the intention that the students themselves realize an interactive and/or generative visualization with Processing as a project in the Deep Space of the Ars Electronica Center.

Evaluation
20% Concept and presentation of the project for Deep Space
50% Implementation of the Deep Space project
30% Project documentation

Group work of 2 to 4 students with clear comprehensibility of the individual performance.

### Recommended or required reading

*Note: The course is not suitable for students with a purely technical focus.*

Winter Semester 2020/21
Embedded Systems are an integral part of many modern-day devices, from smartphones to cars and robots. Without them, there would also be no smart homes and smart cities. Developing those complex, integrated computers requires a broad set of skills: expertise in the development of hardware and software, sensors, and systems networking. Our full-time, interdisciplinary Master’s degree programme in Embedded Systems Design covers all those aspects. Students choose two of the following three specialisation pathways: System-on-Chip Design, Embedded Computing (Embedded Systems, Cyber-Physical Systems), and Systems & Signals. They will also be able to develop teamworking, leadership and project management skills, and select from a wide range of elective modules for further specialisation.

## Distributed Realtime Systems

<table>
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<tr>
<th>Course Unit Code</th>
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<td>DRS3</td>
<td>Integrated Course</td>
<td>6</td>
<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>Dietmar Millinger</td>
<td>Written exam</td>
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</tbody>
</table>

### Prerequisites
- Embedded Computer Systems
- Programming language C
- Communication Systems

### Course contents
- Distributed Systems and Time
- Real-Time Communication and Execution Architectures
- Faults and Fault-Tolerance

The goal of the lecture is to acquire a model of distributed real/time systems which allows the student to understand project requirements for distributed real/time systems, design the architecture of hierarchical distributed real/time systems, select commercial of the shelf components for use in distributed real/time systems and understand key mechanisms for fault/tolerant distributed real/time systems.

### Recommended or required reading
Master’s degree courses

Energy Informatics

ENI

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.
# Physics

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<th>Course Unit Code</th>
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<th>ECTS- Credits</th>
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<tbody>
<tr>
<td>ENI401</td>
<td>Integrated Course</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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<tbody>
<tr>
<td>Andreas Aichhorn</td>
<td>Oral or Written Examination</td>
<td>Face to Face</td>
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</tbody>
</table>

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

## Course contents
- Fundamental definitions and units: DC and AC, current, voltage, resistor, impedance, energy and power.
- Measurement technology: Fundamentals of measurements (electrical Power, electrical energy, temperature, light); measurement chain (sensor to data acquisition).
- EMC: Physically principles of electromagnetically impacts; screening and coupling decreasing measures; source and sink considerations; filtering.
- Measurement errors and accuracy: Error types (systematic, digitalization, random, ...); accuracy; resolution.
- Data acquisition concepts
- Filtering of data
- Measurement amplifiers

## Recommended or required reading
**Course Unit Code**
ENI402

**Type of Course Unit**
Integrated Course

**ECTS- Credits**
5

**Name of Lecturer**
Werner Friedl

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

**Mode of Delivery**
Face to Face

**Course Unit Code**
ENI

**Type of Course Unit**
Integrated Course

**ECTS- Credits**
5

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

**Course contents**
Energy and Climate Policy within the EU
The 2020 climate and energy package; the 2030 framework for climate and energy policies; liberalisation of the electricity and gas markets; promotion of the use of energy from renewable sources; energy efficiency directive; the EU emissions trading system; regulation on wholesale energy market integrity and transparency (REMIT); agency for the cooperation of energy regulators; network codes.

Smart Meter
Smart meter rollout recommendation (EU); smart grid task forces (EU); homologation/verification of meters (Non EU/EU/National).
Energy pricing with respect to examples like:
Whole sale trading market, stock exchange; classical energy utilization; domestic systems; island systems.
Microgrid systems Energy trading
Market places, products, hedging, …
Financial assessment
Overview on marketing and market development

**Recommended or required reading**
Processes and Process Modelling

Course Unit Code
ENI403

Type of Course Unit
Integrated Course

ECTS- Credits
5

Name of Lecturer
Dagmar Auer
Franz Fischer

Assessment
Oral or Written Examination

Mode of Delivery
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
Market roles and processes in a liberalized energy market
Supply contract management and related processes, such as start of supply, move-in and move-out and end of supply; grid usage contracting and billing; meter-reading services; master data distribution; energy settlement; process and communication monitoring; grid operator, supplier.

Business processes
Rollout process
Processes modelling
Methodologies, tools.

Recommended or required reading
## Systems Engineering I: Fundamentals

**Note:** Still to be determined if this course will take place in WS 2020/21. If so, then online!

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<th>Course Unit Code</th>
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<tr>
<td>ENI404</td>
<td>Integrated Course</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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<tbody>
<tr>
<td>Stephan Selinger</td>
<td>Oral or Written Examination</td>
<td>Face to Face</td>
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</table>

**Prerequisites**

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

**Course contents**

Fundamentals of systems and software engineering; system development life cycle, life cycle management, agile and traditional processes and methods, unified process, scrum, XP, eclipse process framework project; requirements engineering, use cases; software architectures; modeling structure and behavior in UML and SysML, UML style guidelines, language architecture of UML (Metamodel, meta object facility (MOF)), XML metadata interchange format (XMI), UML profiles, object constraint language (OCL), eclipse modeling framework (EMF), graphical modeling framework, model-to-model transformation, model-to-text transformation, code generation, Xtext and Xtend; model driven architecture, domain specific languages and domain specific modeling; software configuration management (SCM), defect tracking.

**Recommended or required reading**

5. S. W. Ambler: The Elements of UML 2.0 Style. Cambridge University Press. 2005
7. A. Cockburn: Writing Effective Use Cases. Addison-Wesley. 2001
**Energy Consumers**

**Course Unit Code**
ENI406

**Type of Course Unit**
Integrated Course

**ECTS- Credits**
5

**Name of Lecturer**
Wolfgang Stumpf

**Assessment Methods and Criteria**
Participation, homework, written exam

**Mode of Delivery**
Face to Face

**Prerequisites**
Bachelor’s degree or comparable higher education; interest in building energy systems, building services, energy consumers and Internet of things

**Course contents**
- Knowing and understanding the technology of the main energy consumers in industry, outdoors and buildings: lighting, heating, ventilation, cooling, pumps, drives, compressed air and their applications in energy systems
- Focus on building energy: state of the art and definitions, systems, components, characteristic values and standards, calculation of energy demands, concepts for reduced heating, cooling, ventilation, air conditioning and lighting consumption
- Automation concepts and energy saving potentials due to automation
- Creating the future: smart buildings / smart cities / smart grids
- Economic aspects and environmental impacts of energy efficient technologies and load flexibility

**Recommended or required reading**
### Communication Technology

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<th>Course Unit Code</th>
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<tr>
<td>ENI501</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>Armin Veichtlbauer</td>
<td>Oral or Written Examination</td>
<td>Face to Face</td>
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</tbody>
</table>

### Prerequisites

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

### Course contents

- Communication basics (terms, objectives, relevance for Smart Grid)
- Communication models (OSI Reference Model, TCP/IP)
- Signal Processing (Fourier analysis, analogue/digital conversion, coding)
- Modulation (pulse shapes, AM/FM/PM, complex modulation, spread spectrum)
- Medium access control (topologies, multiple access, stochastic MAC, Example: Aloha Network)
- Logical link control (error handling strategies, Hamming coding, CRC, Stop&Wait ARQ, Sliding Window ARQ)
- Network layer functionality (packet switching, link-state routing, distance-vector routing, QoS)
- Internet technologies (IPv4, IPv6, NAT, subnetting, MPLS, Internet organization)

### Recommended or required reading

Cloud Computing/Big Data

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<th>Course Unit Code</th>
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<td>ENI</td>
<td>Oral or Written Examination</td>
<td>Face to Face</td>
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Prerequisites

Course contents

Basic principles of cloud computing (idea and motivation, opportunities and risks, application areas); architecture of cloud computing platforms (layer model for the classification of platforms, IaaS, PaaS, SaaS); architecture of cloud applications (tier architecture, AOP, stateful / stateless services, loose coupling, separation of concerns, asynchronous message processing); google app engine (architecture, memory models, task queues, integration of external services, security, programming model); microsoft windows azure (architecture, fault tolerance, programming model, memory services: blobs, tables, queues, SQL azure, windows azure service bus); amazon web services (architecture, EC2, SQS, SNS, S3, load balancing, VPC).

Recommended or required reading
Software Systems II: SCADA

Course Unit Code: ENI508
Type of Course Unit: Integrated Course
ECTS- Credits: 5

Name of Lecturer: Stephan Hutterer

Assessment Methods and Criteria: Face to Face

Mode of Delivery: Face to Face

Prerequisites

Course contents

- Power System Operation:
Supervisory control and data acquisition (SCADA); basics of power grid automation (typical functionality, real-time requirements, information flow); information architecture (CIM-reference model); protocols (IEC 61850, IEC 60870-5 standards, DNP3); deepened understanding of IEC 61850; existing software solutions and their features; power grid protection; IT security aspects in power grids.

- Power System Analysis:
Data analysis (weather forecast, load profiles and simultaneity of loads); basic simulation/computation/analysis approaches used in power grid operation (load flow, short circuit); optimization and control of the grid (optimal power flow, load frequency control).

- Practical Part:
Application of selected SCADA and simulation tool

Recommended or required reading
# Java Advanced

**Note:** Still to be determined if this course will take place in WS 2020/21. If so, then online!

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<th>Course Unit Code</th>
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<tr>
<td>ENI515</td>
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<th>Assessment Methods and Criteria</th>
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<tr>
<td>Johannes Sametinger</td>
<td></td>
<td>Face to Face</td>
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</tbody>
</table>

## Prerequisites

## Course contents

## Recommended or required reading

*Note: Elective Course - Only offered if enough students register.*
# Scientific Working

<table>
<thead>
<tr>
<th>Course Unit Code</th>
<th>Type of Course Unit</th>
<th>ECTS- Credits</th>
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</thead>
<tbody>
<tr>
<td>ENI601</td>
<td>Seminar</td>
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<tr>
<th>Name of Lecturer</th>
<th>Assessment</th>
<th>Mode of Delivery</th>
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<tbody>
<tr>
<td>Rainhard Findling</td>
<td>Methods and Criteria</td>
<td>Face to Face</td>
</tr>
<tr>
<td></td>
<td>Hand-ins, presentation</td>
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</tr>
</tbody>
</table>

## Prerequisites
Knowledge of using LaTeX to write documents, basic knowledge about usage of scientific reference management software like JabRef, previous completion of a thesis (e.g. Bachelor’s thesis) which included reading scientific publications.

## Course contents
Learning outcomes: after this course students will understand the scientific method, the peer reviewing process, and the organization of program committees and scientific conferences. The course furthermore facilitates improving scientific paper reading and writing skills, as well as improving scientific presentation skills.

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

HCC
# Intercultural Negotiation

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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>Face to Face</td>
</tr>
</tbody>
</table>

**Prerequisites**
B2-level of English

**Course contents**
Intercultural theory (Hofstede, Hall, Trompenaars, Hampden-Turner, Schwartz, House et al, Lewis); global awareness and intercultural negotiation techniques.

**Recommended or required reading**
Virtual Reality

<table>
<thead>
<tr>
<th>Course Unit Code</th>
<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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</thead>
<tbody>
<tr>
<td>Christoph Anthes</td>
<td>Project and oral exam</td>
<td>Face to Face</td>
</tr>
</tbody>
</table>

Prerequisites
Programming skills are recommended
profound C# programming skills

Course contents
Virtual Reality is a technology which tries to immerse the user by stimulating the senses. Interactive stereoscopic graphics are displayed while the user's head position is tracked in order to generate perspectively correct images.
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 basics and bindings to current VR hardware.
The topics of the course cover concepts like interaction and navigation, investigate the hardware and the underlying aspects of input and output devices like visual perception and stereoscopy. Special topics like visualisation, networked and collaborative virtual environments play an important role. Since a key aspect of the lecture is the development of VR applications, the focus is set on the applications and their development with the help of existing software packages.

Recommended or required reading

Note: Limited places - An early registration is necessary.
Note: This course can also be chosen from Bachelor students if they meet the prerequisites.

Winter Semester 2020/21
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.

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

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<tr>
<th>Course Unit Code</th>
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<th>Name of Lecturer</th>
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<tr>
<td>ENK3 S</td>
<td>Seminar</td>
<td>2</td>
<td>Martina Gaisch</td>
<td></td>
<td>Face to Face</td>
</tr>
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</table>

### Prerequisites

### Course contents

Simulations roleplay, group works, partner works, presentations and discussions to topics like:

- Working rights
- Knowledge Management
- Business Intelligence und Data Mining
- Learning in Data Engineering
- Data Warehousing- und OLAP-Techniken
- Organisation Planning
- Semantic Systems
- ... 

### Recommended or required reading
### Intercultural Communication

<table>
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<tr>
<th>Course Unit Code</th>
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<th>ECTS- Credits</th>
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<tbody>
<tr>
<td>Martina Gaisch</td>
<td></td>
<td>Face to Face</td>
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</table>

#### Prerequisites

#### Course contents

- Theories and key concepts of Intercultural Communication - Processes of intercultural adaptation according to the stage model of Milton Bennett and based on Geert Hofstede
- Examples and experiences from practical applications
- Exercises for the further development of key competences
- Based on a case study in the field of international communication, a potential conflict is worked up

What students say about this course: “This course was excellent and quite technical “

#### Recommended or required reading
Effective management strategies to deal with information security on a global scale
The ever-growing multiplication of diffuse data and IT systems pose serious security challenges which can only be addressed by a holistic approach to security management protocols. Likewise, applications in the area of social networks or cloud computing and 'always-on' technologies need to be increasingly taken into account when planning and implementing information and communications systems. This new, part-time Master's degree will provide students with the expertise to deploy the interdisciplinary approach that is a key element in formulating and implementing effective management strategies to deal with the imperatives of international information security on a global scale.

Note for applicants: The main language of tuition on this study programme is German, although some modules may be offered in English.
## English 1

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<tbody>
<tr>
<td>Martina Gaisch</td>
<td>Continuous Assessment</td>
<td>Face to Face</td>
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</table>

### Prerequisites

Participants need to have a sound level of English (at least B2) - both in written and oral discourse.

### Course contents

This course aims at preparing participants for the Cambridge BEC higher certificate. Students get competencies in receptive and productive language skills.

The course is structured in ways that draw on all linguistic skills required for the BEC higher examination. Reading, writing, listening and speaking competencies are conveyed by providing sufficient course material to the students.

Two face-to-face modules provide the learners with the opportunity to clarify open questions but also to engage with their cohorts and practise speaking exercises. The rest will be conveyed via BigBlueButton to ensure an interactive and assisted teaching and learning.

### Recommended or required reading

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*Note: This course can also be chosen from Bachelor students if they meet the prerequisites.*

*Note: This course already starts at the end of September.*

*Note: Limited places - An early registration is necessary.*
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.

Writing and Typesetting with Math

Note: Still to be determined if this course will take place in WS 2020/21.

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<th>Assessment Methods and Criteria</th>
<th>Mode of Delivery</th>
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<tbody>
<tr>
<td>Wilhelm Burger</td>
<td>Attendance (3 sessions) and minor homework</td>
<td>Face to Face</td>
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</table>

Prerequisites
A basic understanding of LaTeX is helpful but not required (a working setup will be provided).

Course contents
This workshop is about writing professional documents that include mathematical elements. You learn how to develop a basic mathematical notation, choose appropriate symbols and operators, define compound structures (e.g., vectors and matrices), functions, logical expressions etc. It is shown how to correctly place mathematical elements in the main text, use proper punctuation, reference equations, formulate algorithms etc. The course is mainly intended as a preparation for project and thesis work in engineering. The goal is to avoid common mistakes and to produce documents that are up to professional standards.

Recommended or required reading

Note: Elective Course - Only offered if enough students register

Winter Semester 2020/21
Human-Computer Interaction

**Course Unit Code**
IM400

**Name of Lecturer**
Michael Haller

**Type of Course Unit**
Integrated Course

**ECTS- Credits**
4.5

**Assessment Methods and Criteria**
Presentation

**Mode of Delivery**
Face to Face

**Prerequisites**
no programming skills required

**Course contents**
Students will learn the fundamental concepts of user-centered design thinking. Students will work in teams of two on an interaction design project that is supported by lectures, readings, and discussions. Topics will include User Centered Design, Human, Attention, Perception, Recognition, Prototyping (low-fidelity, high-fidelity), Human Performance Models (e.g., Hick’s Law, Fitts’ Law, Keystroke-Level Model), Design Evaluation, Heuristics, and Quantitative & Qualitative Evaluation.

**Recommended or required reading**
# Software Design Methods

<table>
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<th>Course Unit Code</th>
<th>Type of Course Unit</th>
<th>ECTS- Credits</th>
<th>Prerequisites</th>
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<tbody>
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<td>IM410</td>
<td>Integrated Course</td>
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</table>

**Name of Lecturer**
Hans Prüller

**Assessment Methods and Criteria**
Written Exam

**Mode of Delivery**
Face to Face

## Prerequisites

## Course contents
Modern Software Architectures and Methods of System Design, Modeling- and Design-Patterns, Development Environments, Test-cases, Use-cases, Performance vs. Elegance.

## Recommended or required reading

*Note: Limited places - An early registration is necessary.*

Winter Semester 2020/21
## Advanced Computer Graphics

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<th>Course Unit Code</th>
<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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</thead>
<tbody>
<tr>
<td>Michael Haller</td>
<td>Final Report and oral Exam</td>
<td>Face to Face</td>
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</tbody>
</table>

### Prerequisites
Profound mathematical, programming knowledge, basic knowledge of Computer Graphics

### Course contents
Students will learn the fundamental concepts of advanced computer graphics techniques. Topics will include introduction in GPU programming, advanced shading and texturing techniques (parallax bumpmapping), photo-realistic and non-photorealistic rendering (hatching, painterly renderer) techniques, shadow generation (shadow volumes, shadow mapping). Real-time rendering techniques, introduction in XNA.

### Recommended or required reading
## Hypermedia Frameworks

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<th>Course Unit Code</th>
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<tbody>
<tr>
<td>Rimbert Rudisch-Sommer</td>
<td>Exam</td>
<td>Face to Face</td>
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</table>

### Prerequisites

Foundations in Web Development (HTML/CSS), Java, and Databases (SQL)

### Course contents


### Recommended or required reading
# Game Architecture

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<th><strong>Course Unit Code</strong></th>
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<th><strong>Assessment Methods and Criteria</strong></th>
<th><strong>Mode of Delivery</strong></th>
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<tbody>
<tr>
<td>Roman Divotkey</td>
<td>Project work and exam</td>
<td>Face to Face</td>
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</tbody>
</table>

## Prerequisites

Profound programming knowledge, basic knowledge of game programming

## Course contents

Computer game genres, general software architecture of games and interactive applications, software design patterns, architectural patterns, related algorithms and data structures, representation of entities and states, real-time processing of events, game physics, game specific artificial intelligence, architecture an integration of middle ware components like physics, graphics, sound, logic and artificial intelligence, quality assurance in game development, performance considerations.

## Recommended or required reading
### Project 1

<table>
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<th>Type of Course Unit</th>
<th>ECTS- Credits</th>
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<th>Mode of Delivery</th>
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<tr>
<td>Coordinator: Roman Divotkey</td>
<td>Project, presentation</td>
<td>Face to Face</td>
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</table>

#### Prerequisites

#### Course contents
Guided project work on topics provided by faculty members or proposed by the student. Working in teams (of size 1-3) is encouraged to foster project management and team collaboration skills. Each project is coached by at least one faculty member.

#### Recommended or required reading
# Design for Physical Prototyping

<table>
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<th>Course Unit Code</th>
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<td>Kathrin Probst</td>
<td>Methods and Criteria</td>
<td>Face to Face</td>
</tr>
<tr>
<td>Patrick Parzer</td>
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<tr>
<td>Michael Haller</td>
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</table>

## Prerequisites

## Course contents

Physical Prototyping is the process of making a physical representation of an idea. Early in the process physical prototypes can be made of all kinds of materials. Physical prototypes allow designers and users to interact with the idea. By building an idea, designers are challenged to “build to think” and thus gain deeper insights. This course will go beyond early physical prototyping: it is a hands-on introduction to interactive electronics prototyping for students with a variety of backgrounds, including those with no prior experience in electronics. Familiarity with programming is helpful, but not required. Participants learn basic electronics, microcontroller programming, and physical prototyping using the Arduino platform, then use digital and analog sensors, LED lights and motors to build, program and customize a smart prototype. Moreover, students will get enough theoretical background for developing their own physical prototypes.

## Recommended or required reading
## Semantic Text Analysis

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<th>Course Unit Code</th>
<th>Type of Course Unit</th>
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<tbody>
<tr>
<td>Andreas Stöckl</td>
<td>Homeworks/small projects</td>
<td>Face to Face</td>
</tr>
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</table>

### Prerequisites

### Course contents

Essential components of many Web applications are methods for automatic text analysis. In this course, the (mathematical) foundations are taught to build such applications. Basic string processing methods as well as methods for cluster analysis, classification and categorization of texts are discussed. Important topics of the course are algorithms to identify objects in texts such as places, persons and other objects.

### Recommended or required reading
In-Game Technologies

Course Unit Code | IM645
Type of Course Unit | Integrated Course
ECTS- Credits | 4.5
Name of Lecturer | Roman Divotkey
Assessment Methods and Criteria
Mode of Delivery | Face to Face

Prerequisites

Course contents
Introduction to free-to-play (F2P) business model; concepts for game monetization, in-app purchases and the necessary adaptations to game design and mechanics as well as supporting technologies. Analytics, player metrics, AB testing, key performance indicators, rapid iterations. Supporting technologies: scripting, component-based development, data-driven development, user generated content, cellular automata, voxel engine, game data persistence, security considerations.

Recommended or required reading
Special Topic: Information Visualisation

Course Unit Code: IM646
Type of Course Unit: Integrated Course
ECTS Credits: 4.5
Name of Lecturer: Doris Zachhuber, Markus Wagner, Alexander Rind
Assessment Methods and Criteria: Project and presentation
Mode of Delivery: Face to Face

Prerequisites

Course contents
- Principles of information- and data visualisation
- Concepts for concise and expressive representation of complex information.
- Application of color, space, animation and interactivity in visualisation.

Recommended or required reading

Note: Elective Course - Only offered if enough students register.
Winter Semester 2020/21
Academic Writing

**Course Unit Code**  
IM692

**Type of Course Unit**  
Elective Course

**ECTS- Credits**  
3

**Name of Lecturer**  
Jeremiah Diephuis

**Assessment Methods and Criteria**  
Final paper

**Mode of Delivery**  
Face to Face

**Prerequisites**

**Course contents**
Writing efficiently and eloquently requires a great deal more than just using suitable vocabulary and the appropriate tenses. Style, register and flow can vary a great deal depending on the purpose and context of the text being written. This course addresses the challenges involved in crafting sentences that are comprehensible, precise and defensible. The main topics include the development of logical argumentative structures, describing and interpreting data, moderating claims and handling complex grammatical issues. This course is highly recommended for students who will be writing their theses in English or for researchers who would like to hone their proposal and paper writing skills. Regular writing assignments are required.

**Recommended or required reading**

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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!

Class Location-Based and Context-Aware Systems

Note: The main language of instruction is German, although some modules may be offered in English.

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<tr>
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<th>Type of Course Unit</th>
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<th>Name of Lecturer</th>
<th>Assessment Methods and Criteria</th>
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<tr>
<td>Jens Krösche</td>
<td>Final Exam</td>
<td>Face to Face</td>
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</tbody>
</table>

Prerequisites

Excellent Java programming skills

Course contents


Since the mid 1990 the idea of computers merging with the environment and supporting the user in his daily activities has been a well known idea in many research facilities. But through the massive distribution and the processing/sensing power of today's Smartphones the idea more and more becomes reality. Therefore the need arises to utilize techniques enabling applications to react to the aspects of the ever changing environment and the user's needs/goals/tasks. This module gives an overview of the corresponding aspects/techniques/patterns to write applications which can react to a dynamic environment.

Recommended or required reading

Note: Elective Course - Only offered if enough students register.

Winter Semester 2020/21
Mobile Services

Note: The main language of instruction is German, although some modules may be offered in English.

<table>
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<tr>
<th>Course Unit Code</th>
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<th>Assessment</th>
<th>Mode of Delivery</th>
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<tbody>
<tr>
<td>W. Wiedermann</td>
<td>Project work, final exam</td>
<td>Face to Face</td>
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<tr>
<td>G. Pospischil</td>
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Prerequisites
Mobile Computing Background

Course contents
Survey of Services and Service Architecture, Mobile Messaging (SMS, EMS, MMS, Unified Messaging), IMS (IP Multimedia Subsystem) incl. Group List Management, Presence, Location-Based Services, SIP, VoIP

Immersion in the construction and functions of public and private mobile networks. Knowledge of architecture, protocols, interfaces and services in order to be able to develop applications in a future-oriented way. Survey of planning aspects to assure the availability of services.

Recommended or required reading

Note: Elective Course - Only offered if enough students register.

Winter Semester 2020/21
Operating Systems for Mobile Applications

Course Unit Code
MC403

Type of Course Unit
Reading Course + Project

ECTS- Credits
5

Name of Lecturer
Self-learning course

Assessment
Project

Mode of Delivery
Face to Face

Prerequisites
advanced programing skills (preferable Java/C#/Swift)

Course contents
Especially the strong fluctuation and heterogeneity of smartphones, together with their widespread usage, make the development of mobile applications a laborious undertaking. Students gain insight in how to develop software for different mobile devices.

As this is a “self-learning course”, every student participating in this lecture needs to announce which TWO operating systems (Android/iOS/Windows Phone) he/she wants to work with per email to the lecture coordinator. As a result, access to the lecture notes is provided.

After confirmation every student has to define (a) suitable project topic(s) with the corresponding OS advisors. In preparation to this, every student has to write a one page summary that introduces the project idea (motivation, content, requirements, possible UI-design, ...) and send it to the corresponding advisors.

Recommended or required reading

Note: Elective Course - Only offered if enough students register.
Winter Semester 2020/21
# Software Architectures and Patterns

*Note: The main language of instruction is German, although some modules may be offered in English.*

<table>
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<tr>
<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>Marc Kurz</td>
<td>Final Exam</td>
<td>Face to Face</td>
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</table>

## Prerequisites

object oriented programming

## Course contents

Software Architecture Design Process, Process Models, Software Pattern, Architectural Pattern (Layers, Pipes and Filters, MVC, Blackboard, ...), Design Pattern (Builder, Factory, Command, Decorator, Strategy, ...), Idioms, Anti-Pattern

Due to the restrictive and highly dynamical environment, designing mobile applications is a feasible task. But, to develop flexible and maintainable software architecture prior knowledge of well tested software design techniques and patterns on the architectural side as well as on the component side is required. Therefore this module focuses on a survey and evaluation of common known software design techniques and software pattern.

## Recommended or required reading
# Augmented Reality

Note: The main language of instruction is German, although some modules may be offered in English.

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<tr>
<th>Course Unit Code</th>
<th>Type of Course Unit</th>
<th>ECTS- Credits</th>
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<tr>
<td>MC405</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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<tbody>
<tr>
<td>Christoph Anthes</td>
<td>Project and oral exam</td>
<td>Face to Face</td>
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</tbody>
</table>

## Prerequisites

profound C# programming skills

## 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
Mobile Games

*Note: The main language of instruction is German, although some modules may be offered in English.*

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<tr>
<th>Course Unit Code</th>
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<td>MC406</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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<tr>
<td>Florian Lettner</td>
<td>Final Exam</td>
<td>Face to Face</td>
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</table>

Prerequisites

Course contents

Computer game genres, Game Design for the Mobile Games Market, general software architecture of games and interactive applications, software design patterns, architectural patterns, related algorithms and data structures, representation of entities and states, real-time processing of events, game physics, game specific artificial intelligence, architecture and integration of middleware components like physics, graphics, sound, logic and artificial intelligence, quality assurance in game development, performance-oriented game programming, software project management, game development with Scrum, software testing. The theoretical fundamentals of game programming are put into practice on current mobile platforms.

Within the framework of this module, all of the important components of mobile infotainment will be examined.

Recommended or required reading

*Note: Elective Course - Only offered if enough students register.*

Winter Semester 2020/21
Advanced Project Engineering

Note: The main language of instruction is German, although some modules may be offered in English.

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<tr>
<td>Maurer Walter</td>
<td>Post-Module Case Study</td>
<td>Face to Face</td>
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Prerequisites
Have fulfilled the educational requirements of the University of applied sciences
Basic knowledge in project management
Being team member or manager of a project is a benefit.
No certification in project management needed
Be open minded for international aspects and different aspects of business culture

Course contents
Project Management Basics, International Project Management, Risk Management, Managing Cultural Diversity/(International), Teamwork, Organisational Culture and Management Structures, General Agile Project Management Methods, Agile Processes (eXtreme Programming (Pair Programming), Scrum, Crystal, Dynamic System Development Methods, Feature Driven Development, etc.), Test Driven Development, Frequent Code Reviews, etc.)

Due to the rapidly changing IT world and based on a real life scenario (in the best case the students master project) deeper knowledge about modern “agile” project engineering technologies and advanced project management skills will be acquired. Which help improve software development, speedup development cycles, foster maintainability, and on the same time provide flexibility for changing project requirements.

Recommended or required reading
* Philip Kotler – Marketing Management – Prentice Hall
* A Guide to the Project Management Body of Knowledge – PMI
* Jim Highsmith - Agile Project Management - Pearson Education
* Terry Schmidt Strategic Project Management Made Simple: Practical Tools for Leaders - John Wiley & Sons

Note: Elective Course - Only offered if enough students register.
Winter Semester 2020/21
# Systems Engineering 1: UML and MDA

*Note: The main language of instruction is German, although some modules may be offered in English.*

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<th>Name of Lecturer</th>
<th>Assessment Methods and Criteria</th>
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<td>Stephan Selinger</td>
<td>Final Exam</td>
<td>Face to Face</td>
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## Prerequisites

## Course contents


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
Automotive Computing

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<th>Course Unit Code</th>
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<tr>
<td>MC502</td>
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Name of Lecturer: Christopher Schwarzlmüller

Assessment Methods and Criteria: Project Assignment and Final Exam

Mode of Delivery: Face to Face

Prerequisites:
- Basic programming skills in C++ or C# and Java
- Basic know-how of Android/iOS application principles
- Interest in modern computer graphics systems

Course contents:
- Overview and architecture of vehicles and automotive computer systems: functional domains (power train, chassis, body, HMI, telematics), ECUs, head units, instrument cluster displays
- Developing trends in Automotive Systems and feature evolution
- AUTOSAR (AUTomotive Open System Architecture) and bus system interfaces LIN, CAN, TTCAN, Flexray, MOST, OBD, Kline
- Communication and Information Systems: Instrumentation, automotive sound systems, parking systems, trip recorders, navigation systems, telematics
- Advanced Driver Assistance Systems (ADAS): Adaptive Cruise Control (ACC), lane departure warning, blind spot detection, automatic parking
- Vehicular Communication Systems (Car to car, Car to Infrastructure…)
- Automotive Software Engineering: product lines, re-use, model-based development of automotive embedded systems
- Car infotainment systems design using state of the art solutions and tools for HMI design

Recommended or required reading:

Note: Elective Course - Only offered if enough students register.

Note: The main language of instruction is German, although some modules may be offered in English.
Cloud Computing

**Note:** The main language of instruction is German, although some modules may be offered in English.

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<tr>
<td>Michael Maurer</td>
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<td>Face to Face</td>
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**Prerequisites**

**Course contents**

Basic principles of cloud computing (idea and motivation, opportunities and risks, application areas), architecture of cloud computing platforms (layer model for the classification of platforms, IaaS, PaaS, SaaS), architecture of cloud applications (tier architecture, AOP, stateful / stateless Services, loose coupling, separation of concerns, asynchronous message processing), Microsoft Windows Azure (Architecture, Fault Tolerance, programming model, memory services: Blobs, tables, queues, SQL Azure, Windows Azure service bus), Amazon Web Services (architecture, EC2, SQS, SNS, S3, load balancing, VPC), Google Cloud Platform (GCE, App Engine, GCS, Cloud Datastore).

**Recommended or required reading**

**Note:** Elective Course - Only offered if enough students register.

Winter Semester 2020/21
Distributed Real-Time Systems

Note: The main language of instruction is German, although some modules may be offered in English.

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<tr>
<td>Stephan Selinger</td>
<td>Final Exam</td>
<td>Face to Face</td>
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Prerequisites

Course contents


Immersion in real-time design and programming with a special focus on real-time communication.

Recommended or required reading

# Mobile Health and Sports

*Note: The main language of instruction is German, although some modules may be offered in English.*

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<th>Assessment Methods and Criteria</th>
<th>Mode of Delivery</th>
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<tr>
<td>Mark A.M. Kramer</td>
<td>Participation, group work, presentation, final project</td>
<td>Face to Face</td>
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</table>

## Prerequisites

The desire to learn and experience how mobile technologies and services can support, augment and extend connected health-care scenarios and sports (Quantified Self) contexts. Also, it is essential to be confident in reading, writing and working (speaking) in English.

## Course contents


Exploration of the fundamental concepts, methods and practices of using modern mobile, information and communication technologies for connected health and sports scenarios; Identifying and using mobile applications and services designed for healthcare and sports; Conceptualizing, designing and developing a mobile solution.

Assessment methods: In class participation, 20%; Group work 30%; Group Presentation 10%  Final Project (prototyping of a mobile application.) 40%

## Recommended or required reading

*Note: Elective Course - Only offered if enough students register.*
Short-Range Wireless Communication

Note: The main language of instruction is German, although some modules may be offered in English.

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<td>Face to Face</td>
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Prerequisites

Course contents

Regulatory Framework Conditions, Spectral Areas, Standardization, Security, Bluetooth, WLAN (802.11), HomeRF, DECT, ZigBee, UWB, RFID, NFC

Recommended or required reading

Note: Elective Course - Only offered if enough students register.
Supply Chain Management

Note: The main language of instruction is German, although some modules may be offered in English.

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<td>Final Exam &amp; Exercises</td>
<td>Face to Face</td>
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Prerequisites

some programming skills in C or Java

Course contents

Mobile computing technologies as well as computer algorithm play a very important role in the logistics. The course starts with an overview of Supply Chain Management and its importance for today’s enterprises, showing the IT as “Enabler” of Supply Chain Processes. Following an introduction about Warehouse Management Systems (WMS) will be given, including the technologies used in modern warehouses: Mobile Computer Devices, Enterprise Application Integration (EAI) Tools, Automatic Identification (Barcode, RFID), Warehouse Automation (Robotics, Shuttle-Systems). Beside theoretical input and basic knowledge two programming examples will be executed by the students in teams during the course. Both will deal with practical topics from supply chain management and familiarize the students with the algorithms and constitute awareness of possible challenges.

Recommended or required reading

1. R. Melzer-Ridinger: Supply Chain Management, Fortis,

Note: Elective Course - Only offered if enough students register.

Winter Semester 2020/21
Systems Engineering 3: Metrics and Testing

Note: The main language of instruction is German, although some modules may be offered in English.

Course Unit Code
MC517

Name of Lecturer
Rudolf Ramler
Mario Winterer

Assessment Methods and Criteria
Final Exam

Mode of Delivery
Face to Face

Prerequisites
* Systems Engineering 1+2
* Software Architectures and Patterns
* Object-oriented Programming (Bachelor)
* Project Engineering (Bachelor)

ECTS- Credits
5

Type of Course Unit
Integrated Course

Course contents
Software metrics (e.g., code coverage, kloc, bugs/kloc, cyclomatic complexity, function points, cohesion and coupling,…), black box and white box testing, unit tests, integration tests, system test, regression tests, testing of non-functional properties, test plans, testing tools, automated testing, testing and the software development process, test-driven development, model-based testing, GUI-testing, UML Testing Profile, Continuous Integration and Delivery, certifications

This course is a step by step description of the software metrics. It includes introduction to foundations of measurement theory, models of software engineering measurement, software products metrics, software process metrics and measuring management.

Recommended or required reading
* S. Freeman: Growing Object-Oriented Software, Guided by Tests. Pearson Professional, 2009
* J. Humble, D. Farley: Continuous Delivery: Reliable Software Releases Through Build, Test, and Deployment Automation. Pearson Professional, 2010

Winter Semester 2020/21
Machine Learning

Note: The main language of instruction is German, although some modules may be offered in English.

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<td>MC520</td>
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<tr>
<td>Rainhard Findling</td>
<td>Hand-ins, presentation, final examination</td>
<td>Face to Face</td>
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Prerequisites
This course requires good programming skills in languages for statistical computing/data analysis, like R or Python.

Course contents
Learning outcomes: understanding and practical applicability of data analysis and machine learning methods in mobile environments. After this course, students will be able to perform/apply data recording, graphical/visual data analysis, data preprocessing and feature extraction, basic regression and classification, data partitioning and resampling techniques, as well as model tuning and selection. Students will further know details concerning practical applicability of specific models, like neural networks, support vector machines, regression and classification trees, and ensembles, including bagging, boosting, and random forests.

Recommended or required reading
* Grolemund, G. and Wickham H.: R for Data Science. O'Reilly, 2017
Scientific Working

Note: The main language of instruction is German, although some modules may be offered in English.

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<td>MC601</td>
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<tr>
<td>Rainhard Findling</td>
<td>Seminar paper and oral presentation</td>
<td>Face to Face</td>
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Prerequisites

Course contents

Understanding the scientific method, the peer reviewing process, and the organization of program committees and scientific conferences. Improving scientific paper reading and paper writing skills. Improving scientific presentation skills.

Course participants learn the techniques of writing a scientific work and implement these into their own work. Through support and feedback of the advisor, a successive advancement with continuous improvement in quality is assured.

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 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.
Data Warehousing and OLAP

Course Unit Code
DWO

Type of Course Unit
Elective Course

ECTS- Credits
4.5

Name of Lecturer
Henryk Maciejewski

Assessment
Methods and Criteria

Mode of Delivery
Face to Face

Prerequisites

Course contents
Analytical vs. direct data processing - different architectures for different requirements; Data Warehouse as a holistic depot of analytical data; real application examples of OLAP (Online Analytical Processing) data warehouse systems. Building a data warehouse: methodology of data warehouse implementation process, maintaining data integrity, accuracy and completeness, ETL (extract-transform-load), purpose and meaning of metadata. Database design for Date Warehouse: requirements concerning multidimensional queries to databases. Database technologies for OLAP.

Exercise part: Training in the use of a commercial OLAP development environment.

Recommended or required reading

Winter Semester 2020/21
Big Data Analytics and Interactive Visualization

Course Unit Code: 

Type of Course Unit: Integrated Course

ECTS- Credits: 5

Name of Lecturer:

Christoph Heinzl
Barbara Traxler

Assessment Methods and Criteria:

Mode of Delivery:

Face to Face

Prerequisites

Course contents

This course is an elective subject module and consists of three parts:

Part 1: Interactive Data Visualization
Part 2: Interactive Visualization Using D3
Part 3: Big Data Analytics

Each part comprises 14 units à 45 min.
To pass this course, all three parts have to be completed successfully.

Evaluation:

Part 1: State of the art report on a topic of your choice in the field of big data analytics and interactive visualization
Part 2: Programming exercise in D3
Part 3: Programming exercise in Big data analytics

Recommended or required reading
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<td>Integrated Course</td>
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<td>Stefan Wagner</td>
<td></td>
<td>Face to Face</td>
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### Prerequisites

### Course contents

continuous modeling and simulation by numeric integration, systems theory basics, growth and decay models, predator-prey models, epidemiology basics, control circuits, parameters optimization by heuristic algorithms, discrete modeling and simulation, discrete event specified systems, agent based modeling and simulation; software frameworks: MATLAB / Simulink, AnyLogic, HeuristicLab

### Recommended or required reading

*Note: In Wintersemester 2020/21 this course will be in English! In Wintersemester 2021/22 this course will be in German!*

*Note: Modelling and Simulation and Heuristic and Evolutionary Algorithms take place at the same time, therefore please choose just one of these courses!*
**Course Unit Code**
NHL1ILV

**Type of Course Unit**
Integrated Course

**ECTS- Credits**
5

**Name of Lecturer**
Michael Affenzeller

**Assessment Methods and Criteria**

**Mode of Delivery**
Face to Face

**Prerequisites**

**Course contents**

Taxonomy of optimization algorithms, demarcation between numerical and heuristic optimization, examples of combinatorial optimization problems and complexity theory, search space behavior and P and NP problems. Heuristic methods: Problem specific methods vs. metaheuristics, construction vs. improvement heuristics, neighbourhood and distance of solutions, local search, trajectory based methods, simulated annealing, taboo search. Population-based methods: Ant-Colony Optimization, Swarm Intelligence, Genetic Algorithms, Evolutionary Strategies, Genetic Programming and Scatter Search. In exercises use, parameter setting, analytical and empirical analysis of different optimization techniques using HeuristicLab, a generic development and test environment for heuristic optimization procedures.

**Recommended or required reading**

*Note: In Wintersemester 2020/21 this course will be in German! In Wintersemester 2021/22 this course will be in English!*

*Note: Modelling and Simulation and Heuristic and Evolutionary Algorithms take place at the same time, therefore please choose just one of these courses!*
### Numerical Methods

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**Prerequisites**

**Course contents**

**Recommended or required reading**
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**Prerequisites**

**Course contents**

**Recommended or required reading**
# Semantic Web Technologies

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<th>Assessment Methods and Criteria</th>
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<tr>
<td>Thomas Kern</td>
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<td>Viktoria Dorfer</td>
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**Prerequisites**

**Course contents**

**Recommended or required reading**
Prerequisites
Knowledge of object-oriented programming; interest in abstraction, problem decomposition, and how these aspects pertain to algorithmic problem solving.

Course contents
Paradigms are in the foreground, not the learning of new programming languages; the main focus is on the comparison of alternative problem-solving possibilities by the different paradigms (and languages). Imperative and object-oriented programming are assumed to be known; various forms of the object-oriented paradigm are discussed based on the peculiarities of languages such as Java, C# and Smalltalk. The focal points are the functional aspects of the logical programming paradigm:
Functional P. : the differences between purely functional programming (e. g. Scheme & ML without assignments, with functions as first-class values) and imperative programming languages are worked out;
Logical P. : using prologue it is shown how to get a different view of programming by separating program logic and executing control. Finally, relatively new paradigms such as the generative or the aspect-oriented are briefly presented and compared with the others.

Recommended or required reading
The course is inspired by the book “Seven languages in seven weeks” by Bruce Tate. Reading the book, however, is not required for the course.
# Software Project Engineering

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<tr>
<td>Christoph Anthes</td>
<td>Face to Face</td>
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**Prerequisites**

**Course contents**

**Recommended or required reading**
# Scientific Work

<table>
<thead>
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<th>Course Unit Code</th>
<th>Type of Course Unit</th>
<th>ECTS- Credits</th>
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<tr>
<th>Name of Lecturer</th>
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<td>Stephan Dreiseit</td>
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## Prerequisites

## Course contents

Structure and Functions of the Forms of Scientific Work: Protocol, Report, Thesis Paper, Diploma Thesis. Techniques of scientific work: scientific material; research (e.g. in libraries, catalogues, publishing houses and bibliographies; pyramid system, search strategies); indexing systems; techniques of material representation; foreign material, supporting documents; abbreviations; bibliography; conceptual planning; choice and reflection of topics, scheduling, material, presentation, literature management programs.

## Recommended or required reading
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**Prerequisites**

**Course contents**

**Recommended or required reading**
# Cutting Edge Specialisation

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<td>Bernhard Niedermayer Martin Ahrer</td>
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## Prerequisites

## Course contents

## Recommended or required reading
## Intelligent Agent Systems

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### Prerequisites

- None specified.

### Course contents

- None specified.

### Recommended or required reading

- None specified.
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### Master's Thesis

**Prerequisites**

**Course contents**

**Recommended or required reading**