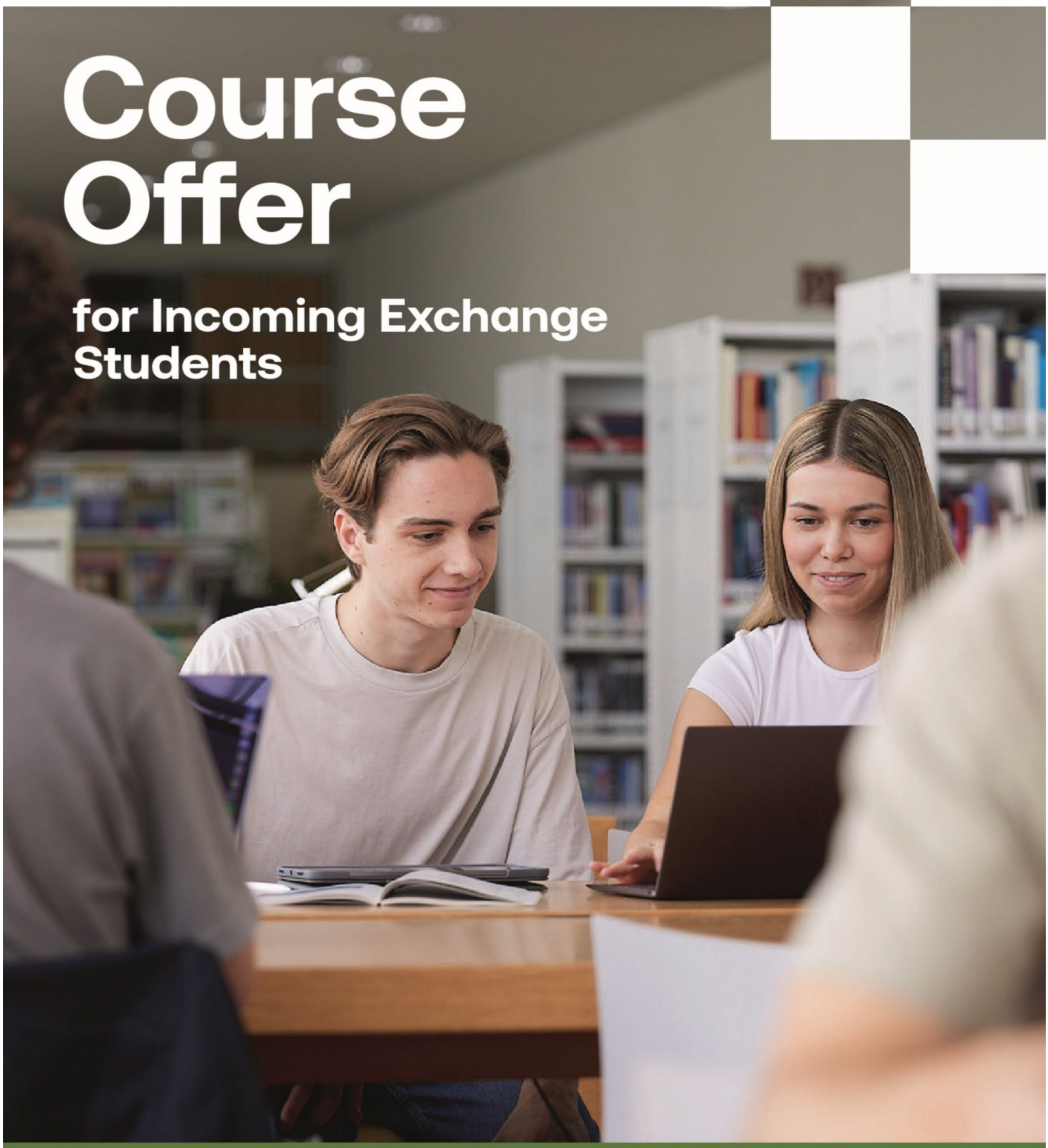
UNIVERSITY OF APPLIED SCIENCES UPPER AUSTRIA

# Course Offer

## for Incoming Exchange Students



**School of Informatics, Communications and Media**

fh-ooe.at/en/hagenberg-campus

# Bachelor's Degree Programme

| Programme (department) | Course unit code | Course unit title | Course type | Semester (level) | Level | ECTS | Page |
|---|---|---|---|---|---|---|---|
| **Automotive Computing (Bachelor, Hagenberg Campus)** | | | | | | | |
| AC.ba | ALD3 U | Algorithms and Data Structures | Practice-oriented session | 3 | Bachelor | 3 | 5 |
| AC.ba | ALD3 V | Algorithms and Data Structures | Lecture | 3 | Bachelor | 2 | 6 |
| AC.ba | VIS3 U | Distributed Information Systems | Practice-oriented session | 3 | Bachelor | 3 | 7 |
| AC.ba | VIS3 V | Distributed Information Systems | Lecture | 3 | Bachelor | 2 | 8 |
| **School of Informatics, Communications and Media (Bachelor, Hagenberg Campus)** | | | | | | | |
| FHHGB | AIC1IL_INT | AI in Creativity | Integrated course | 1 | Bachelor | 5 | 9 |
| FHHGB | CDF1IL_INT | Computer Design and Firmware Programming | Integrated course | 1 | Bachelor | 5 | 11 |
| FHHGB | DEU1IL_INT | German for Beginners | Integrated course | 1 | Bachelor | 2 | 12 |
| FHHGB | DEU2IL_INT | German for Beginners with Prior Knowledge | Integrated course | 1 | Bachelor | 2 | 13 |
| FHHGB | MAD1IL_INTIL | Mobile App Development | Integrated course | 1 | Bachelor | 5 | 14 |
| FHHGB | SEM1PR_INT2PT | Semester project | Project | 1 | Bachelor | 10 | 15 |
| **Hardware-Software-Design (Bachelor, Hagenberg Campus)** | | | | | | | |
| HSD.ba | EKI5-17ILV | Introduction to Artificial Intelligence | Integrated course | 5 | Bachelor | 2,5 | 16 |
| HSD.ba | ENG1-17ILV | English 1 | Integrated course | 1 | Bachelor | 2 | 17 |
| HSD.ba | ENG3-17ILV | English 3 | Integrated course | 3 | Bachelor | 1,5 | 18 |
| HSD.ba | GID3ILV | Source Code Management using Git | Integrated course | 3 | Bachelor | 0,5 | 19 |
| HSD.ba | GIV3ILV | Version & Release Management using Git | Integrated course | 3 | Bachelor | 0,5 | 20 |
| **Communication and Knowledge Media (Bachelor, Hagenberg Campus)** | | | | | | | |
| KWM.ba | COM1UE | Communication in the New Media Age | Practice-oriented session | 1 | Bachelor | 1 | 21 |

| Programme (department) | Course unit code | Course unit title | Course type | Semester (level) | Level | ECTS | Page |
|---|---|---|---|---|---|---|---|
| **Communication and Knowledge Media (Bachelor, Hagenberg Campus)** | | | | | | | |
| KWM.ba | IDP3VO | Interaction Design and Prototyping | Lecture | 3 | Bachelor | 2 | 22 |
| KWM.ba | PRE3UE | Presentation Skills for Knowledge Transfer | Practice-oriented session | 3 | Bachelor | 1 | 23 |
| **Medical and Bioinformatics (Bachelor, Hagenberg Campus)** | | | | | | | |
| MBI.ba | 09_GBC1UE | Biological and Chemical Basics | Laboratory session | 1 | Bachelor | 1 | 24 |
| MBI.ba | 21_ALG5ILV | Bioinformatics Algorithms | Integrated course | 5 | Bachelor | 2,5 | 25 |
| MBI.ba | 21_KEN1UE | English 1 | Practice-oriented session | 1 | Bachelor | 2 | 26 |
| MBI.ba | 21_MAL5UE | Machine Learning and Data Mining | Practice-oriented session | 5 | Bachelor | 1,5 | 27 |
| MBI.ba | 21_MAL5VO | Machine Learning and Data Mining | Lecture | 5 | Bachelor | 1 | 28 |
| MBI.ba | 21_TEN3UE | Technical English 1 | Practice-oriented session | 3 | Bachelor | 1 | 29 |
| MBI.ba | 21_TEN5UE | Technical English 3 | Practice-oriented session | 5 | Bachelor | 1 | 30 |
| **Mobile Computing (Bachelor, Hagenberg Campus)** | | | | | | | |
| MC.ba | 5_VIS3 U | Distributed Information Systems | Practice-oriented session | 3 | Bachelor | 3 | 31 |
| MC.ba | 5_VIS3 V | Distributed Information Systems | Lecture | 3 | Bachelor | 2 | 32 |
| **Media Technology and Design (Bachelor, Hagenberg Campus)** | | | | | | | |
| MTD.ba | 05_GWP5IL | Games with a Purpose | Integrated course | 5 | Bachelor | 5 | 33 |
| MTD.ba | 05_ISY5IL | Intelligent Systems | Integrated course | 5 | Bachelor | 5 | 34 |

## Master's Degree Programme

| Programme (department) | Course unit code | Course unit title | Course type | Semester (level) | Level | ECTS | Page |
|---|---|---|---|---|---|---|---|
| **Data Science and Engineering (Master, Hagenberg Campus)** | | | | | | | |
| DSE.ma | 0_1CO1U | Computational Intelligence I | Practice-oriented session | 1 | Master | 2 | 35 |
| DSE.ma | 0_1CO1V | Computational Intelligence I | Lecture | 1 | Master | 3 | 36 |
| DSE.ma | 0_NUM1U | Numerical Methods | Practice-oriented session | 1 | Master | 2 | 37 |
| DSE.ma | 0_NUM1V | Numerical Methods | Lecture | 1 | Master | 3 | 38 |
| **Interactive Media (Master, Hagenberg Campus)** | | | | | | | |
| IM.ma | GDE1IL | Game Development | Integrated course | 1 | Master | 5 | 39 |
| IM.ma | HUX1IL | Hypermedia UX Engineering | Integrated course | 1 | Master | 5 | 40 |
| IM.ma | IME3IL | Intelligent Media | Integrated course | 3 | Master | 5 | 41 |
| IM.ma | RTG1IL | Real Time Graphics | Integrated course | 1 | Master | 5 | 42 |
| IM.ma | SCO3IL | Spatial Computing | Integrated course | 3 | Master | 5 | 43 |
| IM.ma | STO1IL | Special Topic: Design for Physical Prototyping | Integrated course | 1 | Master | 5 | 44 |
| **Software Engineering (Master, Hagenberg Campus)** | | | | | | | |
| SE.ma | 15_DWO1ILV | Data Warehousing, OLAP and Business Intelligence | Integrated course | 1 | Master | 5 | 45 |
| SE.ma | 15_HEA1ILV | Heuristic and Evolutionary Algorithms | Integrated course | 1 | Master | 5 | 46 |
| SE.ma | 15_MSM1ILV | Modelling and Simulation | Integrated course | 1 | Master | 5 | 47 |
| SE.ma | 15_WIA3SE | Scientific Work | Seminar | 3 | Master | 1 | 48 |
| SE.ma | 22_BDV3ILV | Big Data Analytics and Interactive Visualization | Integrated course | 3 | Master | 5 | 49 |
| SE.ma | 22_NDL3ILV | Neural Networks and Deep Learning | Integrated course | 3 | Master | 5 | 50 |

| Programme (department) | Course unit code | Course unit title | Course type | Semester (level) | Level | ECTS | Page |
|---|---|---|---|---|---|---|---|
| **Human-Centered Computing (Master - Part Time, Hagenberg Campus)** | | | | | | | |
| HCC.ma | 17_INT3I | Intercultural Negotiation | Integrated course | 3 | Master | 1,5 | 51 |
| **Information Engineering and -Management (Master - Part Time, Hagenberg Campus)** | | | | | | | |
| IEM.ma | 20_BEC3 T | Business English Communication Skills | Individual Training | 3 | Master | 1 | 52 |
| IEM.ma | 20_ICC3 I | Intercultural Communication | Integrated course | 3 | Master | 2 | 53 |
| **Information Security Management (Master - Part Time, Hagenberg Campus)** | | | | | | | |
| ISM.ma | CCC1IL | Cross Cultural Business Communication | Integrated course | 1 | Master | 1 | 54 |
| ISM.ma | LAN1ILV | Language 1 | Integrated course | 1 | Master | 1 | 55 |
| ISM.ma | SAW3ILV | Security Awareness | Integrated course | 3 | Master | 3 | 56 |

**Lecture/Seminar profile:**

## Algorithms and Data Structures (ALD3 U)

| | |
|---|---|
| **Degree course** | AC.ba |
| **Course title** | Algorithms and Data Structures |
| **Course code** | ALD3 U |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | Marc Kurz, Stephan Selinger |
| **Contact hours per week** | 2,4 |
| **ECTS credits** | 3 |
| **Course type** | Practice-oriented session |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
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.

**Prerequisites:**
For exchange students: you have to take both, the lecture and practice orientated session, in order to receive ECTS for it (5 ECTS in total )

**Lecture/Seminar profile:**

## Algorithms and Data Structures (ALD3 V)

| | |
|---|---|
| **Degree course** | AC.ba |
| **Course title** | Algorithms and Data Structures |
| **Course code** | ALD3 V |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | Marc Kurz, Stephan Selinger |
| **Contact hours per week** | 1,6 |
| **ECTS credits** | 2 |
| **Course type** | Lecture |
| **Examinations** | oral or written examination |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
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.

**Prerequisites:**
For exchange students: you have to take both, the lecture and practice orientated session, in order to receive ECTS for it (5 ECTS in total )

**Lecture/Seminar profile:**

## Distributed Information Systems (VIS3 U)

| | |
|---|---|
| **Degree course** | AC.ba |
| **Course title** | Distributed Information Systems |
| **Course code** | VIS3 U |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | Jens Krösche |
| **Contact hours per week** | 2,4 |
| **ECTS credits** | 3 |
| **Course type** | Practice-oriented session |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
Basic practical exercises:
* Client / server communication via TCP / UDP sockets (C++ / Java) using multithreading and taking into account the corresponding synchronization mechanisms
* Remote Method Invocation via Java RMI
* Web Services based on Java-supported REST APIs
* Data Transformation XML / JSON based on Java's JAXB

**Content:**
The lecture covers the basic theoretical and practical topics regarding client / server communication in today's omnipresent distributed software systems.

**Prerequisites:**
According to the prerequisites for degree program access

**Lecture/Seminar profile:**

## Distributed Information Systems (VIS3 V)

| | |
|---|---|
| **Degree course** | AC.ba |
| **Course title** | Distributed Information Systems |
| **Course code** | VIS3 V |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | Jens Krösche |
| **Contact hours per week** | 1,6 |
| **ECTS credits** | 2 |
| **Course type** | Lecture |
| **Examinations** | oral or written examination |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
Basic practical exercises:
* Client / server communication via TCP / UDP sockets (C++ / Java) using multithreading and taking into account the corresponding synchronization mechanisms
* Remote Method Invocation via Java RMI
* Web Services based on Java-supported REST APIs
* Data Transformation XML / JSON based on Java's JAXB

**Content:**
The lecture covers the basic theoretical and practical topics regarding client / server communication in today's omnipresent distributed software systems.

**Prerequisites:**
According to the prerequisites for degree program access

**Lecture/Seminar profile:**

## AI in Creativity (AIC1IL_INT)

| | |
|---|---|
| **Degree course** | FHHGB |
| **Course title** | AI in Creativity |
| **Course code** | AIC1IL_INT |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | Alexander Schurr |
| **Contact hours per week** | 3 |
| **ECTS credits** | 5 |
| **Course type** | Integrated course |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
• Understand the fundamentals of creativity and its different dimensions, including artistic, scientific, and technological.
• Learn the basics of AI and its different applications in the field of creativity, including generative art, music composition, and storytelling.
• Explore the ethical and social implications of using AI to create art and other forms of creative output and develop a critical perspective on the role of technology in creativity.
• Analyse case studies and real-world examples of AI-generated art and creative works, and evaluate their aesthetic, technical, and emotional qualities.
• Develop practical skills in using AI tools and techniques to generate creative output, including using neural networks, machine learning algorithms, and other computational tools.

**Content:**
Introduction to Creativity and AI
• The concept of creativity and its various dimensions
• What is AI? Types of AI and its applications in different domains
• The intersection of creativity and AI: past, present, and future
AI in Creative Fields
• Generative art: algorithms and techniques for creating art with AI
• Music composition: using AI for generating music and exploring new genres
• Storytelling: AI tools for generating narratives, plotlines, and characters
Ethical and Social Implications
• Bias in AI and its impact on creative work
• Ownership and copyright of AI-generated content
• The role of AI in changing the creative process and the meaning of "art"
Collaboration and Co-creation

• Human-AI interaction in the creative process
• Integrating AI-generated output with human creativity
• Case studies of successful collaborations and co-creation projects
Hands-on Practice
• Experimentation with AI tools and techniques for creative output
• Project-based learning: creating an AI-generated art, music, or storytelling project
• Feedback and critique sessions
Future of Creativity and AI
• The impact of AI on the creative industries and professions
• Potential new forms of creative expression with AI
• Ethical and social considerations for the future of AI in creativity

**Prerequisites:**
None

**Lecture/Seminar profile:**

## Computer Design and Firmware Programming (CDF1IL_INT)

| | |
|---|---|
| **Degree course** | FHHGB |
| **Course title** | Computer Design and Firmware Programming |
| **Course code** | CDF1IL_INT |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | |
| **Contact hours per week** | 3 |
| **ECTS credits** | 5 |
| **Course type** | Integrated course |
| **Examinations** | written examination |
| **Language of instruction** | English |
| **Places for international students** | 10 |

**Learning objectives:**
Knowing the structure and basic functioning of a simple CPU (Central Processing Unit)
Understanding the relationship between hardware structure, time sequences and programmability in machine and assembly language
Hardware-near programming and handling of a modern ARM microcontroller platform
Ability to program peripherals of microcontrollers

**Content:**
Introduction to computer architecture: RISC/CISC, control unit (FSM, micro-programmed) and datapath
CPU-Microarchitecture: structure and timing models, working through the design of a simple CPU Introduction to the ARM assembly programming language: instruction classes, command architecture, addressing modes, hands-on lab on ARM assembly basics Programming of ARM-Microcontrollers in C and assembly language, macro programming,
inline assembly, use of libraries, compiler directives

**Prerequisites:**
Foundations of Digital Design (combinational and sequential circuits, Finite State Machines), Basic skills in programming

**Lecture/Seminar profile:**

## German for Beginners (DEU1IL_INT)

| | |
|---|---|
| **Degree course** | FHHGB |
| **Course title** | German for Beginners |
| **Course code** | DEU1IL_INT |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | |
| **Contact hours per week** | 1,6 |
| **ECTS credits** | 2 |
| **Course type** | Integrated course |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 10 |

**Learning objectives:**
n.a.

**Content:**
n.a.

**Prerequisites:**
none

**Lecture/Seminar profile:**

## German for Beginners with Prior Knowledge (DEU2IL_INT)

| | |
|---|---|
| **Degree course** | FHHGB |
| **Course title** | German for Beginners with Prior Knowledge |
| **Course code** | DEU2IL_INT |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | |
| **Contact hours per week** | 1,6 |
| **ECTS credits** | 2 |
| **Course type** | Integrated course |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 10 |

**Learning objectives:**
n.a.

**Content:**
n.a.

**Prerequisites:**
Basic knowledge in german

**Lecture/Seminar profile:**

## Mobile App Development (MAD1IL_INTIL)

| | |
|---|---|
| **Degree course** | FHHGB |
| **Course title** | Mobile App Development |
| **Course code** | MAD1IL_INTIL |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | |
| **Contact hours per week** | 4 |
| **ECTS credits** | 5 |
| **Course type** | Integrated course |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
Activity, Resources, View/Layout/Interaction, Context, Sensors, Manifest, Intent, Notification, Inter-Component Communication, Lists, Fragments, AppBar, UI-Navigation and Preferences

**Prerequisites:**
Decent knowledge in OO programming in Java or alike is necessary.

**Lecture/Seminar profile:**

## Semester project (SEM1PR_INT2PT)

| | |
|---|---|
| **Degree course** | FHHGB |
| **Course title** | Semester project |
| **Course code** | SEM1PR_INT2PT |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | |
| **Contact hours per week** | 1 |
| **ECTS credits** | 10 |
| **Course type** | Project |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
Working in a team on a specific topic, where you fulfill most of the prerequisites of the project.

**Content:**
Define Milestones and a final goal of the project. Write a project report at the end including your definded milestones. Report problems and argue why you have chosen which technology and how you solved upcoming problems

The Prerequisites depend on the project you have chosen. For a web project for example HTML, CSS,
javascript, PHP and MySQL

**Prerequisites:**
The Prerequisites depend on the project you have chosen. For a web project for example HTML, CSS,
javascript, PHP and MySQL.

**Lecture/Seminar profile:**

## Introduction to Artificial Intelligence (EKI5-17ILV)

| | |
|---|---|
| **Degree course** | HSD.ba |
| **Course title** | Introduction to Artificial Intelligence |
| **Course code** | EKI5-17ILV |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | Dietmar Millinger |
| **Contact hours per week** | 2 |
| **ECTS credits** | 2,5 |
| **Course type** | Integrated course |
| **Examinations** | written examination |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
Definition and Context of AI
Machine Learning
Life cycle of Machine Learning Projects
The goal of the class is to provide actionable knowledge about the basic principles and structures as well as
functions of applied AI systems. 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
life cycle of machine learning projects from proof of concept to production situations and the use of frameworks in production projects. In the practical part, 6 exercises are implemented in python on jupyter
notebooks and strategies for improvement of the results are developed.

**Prerequisites:**
n.a.

**Lecture/Seminar profile:**

## English 1 (ENG1-17ILV)

| | |
|---|---|
| **Degree course** | HSD.ba |
| **Course title** | English 1 |
| **Course code** | ENG1-17ILV |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | |
| **Contact hours per week** | 2 |
| **ECTS credits** | 2 |
| **Course type** | Integrated course |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
Grammar is refreshed and deepened, subject-specific or everyday vocabulary is expanded, and important phrases and idioms are conveyed to improve written and oral expression.
Topics include, among others, application documents, job interviews, as well as current technical topics.

**Prerequisites:**
n.a.

**Lecture/Seminar profile:**

## English 3 (ENG3-17ILV)

| | |
|---|---|
| **Degree course** | HSD.ba |
| **Course title** | English 3 |
| **Course code** | ENG3-17ILV |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | |
| **Contact hours per week** | 2 |
| **ECTS credits** | 1,5 |
| **Course type** | Integrated course |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
Further and more elaborate sharpening of subject-specific or everyday vocabulary; important phrases and idioms are taught to achieve an improvement in both written and oral expression.

**Prerequisites:**
n.a.

**Lecture/Seminar profile:**

## Source Code Management using Git (GID3ILV)

| | |
|---|---|
| **Degree course** | HSD.ba |
| **Course title** | Source Code Management using Git |
| **Course code** | GID3ILV |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | |
| **Contact hours per week** | 0,5 |
| **ECTS credits** | 0,5 |
| **Course type** | Integrated course |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 1 |

**Learning objectives:**
• Get an understanding of version control systems
• Get a basic understanding of the Git command line
• Learn what a Git repository is and how to use it
• Learn what a Git commit graph is and how to interpret it
• Learn and apply the basic Git workflows
• Understand the benefits of using a version control system in a team

**Content:**
• Introduction: Why use a version control system? What is needed to get started with Git?
• How Git works:
Repository, Working Directory, Staging Area/Index, Commit, Remote, Refs (Branch/Tag/HEAD), Commit-Graph
• Important Commands: init/clone, checkout, add/reset/commit, push/pull, branch/tag
• Merging & Merge-Conflicts (Merge-Commit): Step by step

**Prerequisites:**
n.a.

**Lecture/Seminar profile:**

## Version & Release Management using Git (GIV3ILV)

| | |
|---|---|
| **Degree course** | HSD.ba |
| **Course title** | Version & Release Management using Git |
| **Course code** | GIV3ILV |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | |
| **Contact hours per week** | 0,5 |
| **ECTS credits** | 0,5 |
| **Course type** | Integrated course |
| **Examinations** | continuous assessment |
| **Language of instruction** | German/English |
| **Places for international students** | 2 |

**Learning objectives:**
• Get a deeper understanding of how Git handles and represents commits and branches
• Get a deeper understanding of Git merge strategies and their benefits/drawbacks
• Understand how branches can be used to maintain multiple versions of an application
• Learn and apply how feature branches can be used to work on a shared code base in a team
• Understand common CI/CD concepts and how they relate to Git
• Learn and apply which commands should and should not be used for automation

**Content:**
• Analyzing Commits: Is a commit part of a specific branch? Is a branch fully merged into another branch? Compare branches
• Merging: Rebase, Cherry-Picking
• Branching Models (Single main branch, Version branches, Feature branches
• Using the stash
• Referencing other repositories: Submodules, Subtrees, Forks
• Automation: CI/CD, Repository Hooks, Plumbing vs. Porcelain commands

**Prerequisites:**
n.a.

**Lecture/Seminar profile:**

## Communication in the New Media Age (COM1UE)

| | |
|---|---|
| **Degree course** | KWM.ba |
| **Course title** | Communication in the New Media Age |
| **Course code** | COM1UE |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | Annamaria Mähr |
| **Contact hours per week** | 1 |
| **ECTS credits** | 1 |
| **Course type** | Practice-oriented session |
| **Examinations** | written examination |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
Broadening and revision of English communication skills.

**Content:**
The content of the course is a targeted deepening, broadening and refreshing of English language skills in the areas of grammar, subject-specific and general vocabulary, context-appropriate written and oral expression through role plays, group work, work in pairs, research, debates, as well as video and audio work etc. The subject areas should be related to specialized topics of the course or to topics of the social competence lecture held in the respective semester (e.g. context-adequate conversation in various everyday and professional situations).

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

**Lecture/Seminar profile:**

## Interaction Design and Prototyping (IDP3VO)

| | |
|---|---|
| **Degree course** | KWM.ba |
| **Course title** | Interaction Design and Prototyping |
| **Course code** | IDP3VO |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | Thomas Neumayr |
| **Contact hours per week** | 1 |
| **ECTS credits** | 2 |
| **Course type** | Lecture |
| **Examinations** | written examination |
| **Language of instruction** | English |
| **Places for international students** | 10 |

**Learning objectives:**
After the course, students know the basics of the human-centered design process, have learned helpful methods and techniques for interaction design, and are skilled in the basics of sketching and prototyping in the context of Human-Computer Interaction.

**Content:**
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 Interaction Design lecture is concerned with presenting tools and techniques that allow students to understand how human-centered design of user interfaces for interactive products works. Topics include usability, user experience, human-computer interaction, and human-centered design methods. Different methods for the design, prototyping, and testing of new user interfaces together with test users are discussed. The course teaches important methods from usability engineering and interaction design such as user observation, requirements analysis, sketching, wireframes, prototyping, etc. To pass the course, students 1) have to pass a final written exam at the end of the term (semester), and additionally 2) get assigned scientific literature to familiarize with recent topics, summarize the main contents, and orally present the essentials to the lecturer.

**Prerequisites:**
No previous knowledge required.

**Lecture/Seminar profile:**

## Presentation Skills for Knowledge Transfer (PRE3UE)

| | |
|---|---|
| **Degree course** | KWM.ba |
| **Course title** | Presentation Skills for Knowledge Transfer |
| **Course code** | PRE3UE |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | Annamaria Mähr |
| **Contact hours per week** | 1 |
| **ECTS credits** | 1 |
| **Course type** | Practice-oriented session |
| **Examinations** | oral examination |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
Enhancement of communication skills – with a focus on the mandatory professional internship.

**Content:**
The focus of the course is primarily to enhance oral communication skills, in the areas of presentation, describing statistics and other data, job applications, interview situations, negotiations (especially with regard to the mandatory professional internship) using discussions, role plays, team work based on a multitude of real-life scenarios.

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

**Lecture/Seminar profile:**

## Biological and Chemical Basics (09_GBC1UE)

| | |
|---|---|
| **Degree course** | MBI.ba |
| **Course title** | Biological and Chemical Basics |
| **Course code** | 09_GBC1UE |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | Louise Marie Buur |
| **Contact hours per week** | 1 |
| **ECTS credits** | 1 |
| **Course type** | Laboratory session |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
An insight into the typical way of working in a molecular biology laboratory should be given.

**Prerequisites:**
n.a.

**Lecture/Seminar profile:**

## Bioinformatics Algorithms (21_ALG5ILV)

| | |
|---|---|
| **Degree course** | MBI.ba |
| **Course title** | Bioinformatics Algorithms |
| **Course code** | 21_ALG5ILV |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | Julia Vetter |
| **Contact hours per week** | 2 |
| **ECTS credits** | 2,5 |
| **Course type** | Integrated course |
| **Examinations** | written examination |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
Part 1: Methods for biological sequence alignment: global and local pair-wise alignment, multiple alignment, scoring matrices, phylogenetic trees, heuristic methods for sequence alignment (BLAST, FASTA), profile based methods, characterization of protein families, suffix trees. Part 2: Methods for gene expression analysis: Clustering methods, cluster annotation, gene ontologies, other sources of external knowledge.

**Prerequisites:**
n.a.

**Lecture/Seminar profile:**

## English 1 (21_KEN1UE)

| | |
|---|---|
| **Degree course** | MBI.ba |
| **Course title** | English 1 |
| **Course code** | 21_KEN1UE |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | Sandra Zwirchmayr |
| **Contact hours per week** | 2 |
| **ECTS credits** | 2 |
| **Course type** | Practice-oriented session |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 4 |

**Learning objectives:**
n.a.

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

**Prerequisites:**
n.a.

**Lecture/Seminar profile:**

## Machine Learning and Data Mining (21_MAL5UE)

| | |
|---|---|
| **Degree course** | MBI.ba |
| **Course title** | Machine Learning and Data Mining |
| **Course code** | 21_MAL5UE |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | Ulrich Bodenhofer |
| **Contact hours per week** | 1 |
| **ECTS credits** | 1,5 |
| **Course type** | Practice-oriented session |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
Exercises accompanying the lecture, practical application of the knowledge learned in the lecture.

**Prerequisites:**
n.a.

**Lecture/Seminar profile:**

## Machine Learning and Data Mining (21_MAL5VO)

| | |
|---|---|
| **Degree course** | MBI.ba |
| **Course title** | Machine Learning and Data Mining |
| **Course code** | 21_MAL5VO |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | Ulrich Bodenhofer |
| **Contact hours per week** | 1 |
| **ECTS credits** | 1 |
| **Course type** | Lecture |
| **Examinations** | written examination |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
Introduction: knowledge discovery and data dining in biomedical applications, supervised data mining – feature selection, classification (classification problem, estimation, evaluation, methods: binary logistic regression, decision trees. k-NN, support vector machines), Unsupervised Data Mining – Clustering, (partitioning methods, k-means,  EM - hierarchical methods, single link - density based methods)

**Prerequisites:**
n.a.

**Lecture/Seminar profile:**

## Technical English 1 (21_TEN3UE)

| | |
|---|---|
| **Degree course** | MBI.ba |
| **Course title** | Technical English 1 |
| **Course code** | 21_TEN3UE |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | Alastair Long |
| **Contact hours per week** | 1 |
| **ECTS credits** | 1 |
| **Course type** | Practice-oriented session |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 4 |

**Learning objectives:**
n.a.

**Content:**
Primarily—but not exclusively—by means of group work, pair work, presentations, research, debates, as well as video and audio work the skills acquired in the module English for Communication will be honed and the process will be continued to expand each student's technical and general vocabulary skills as well as idiomatic usage in order to improve their written and oral communication skills. Areas of topicality, among others, are expressing cause and effect, predictions, and insights (past, present, future) into important companies from areas such as pharmaceuticals, agriculture, environment, and biotechnology.

**Prerequisites:**
n.a.

**Lecture/Seminar profile:**

## Technical English 3 (21_TEN5UE)

| | |
|---|---|
| **Degree course** | MBI.ba |
| **Course title** | Technical English 3 |
| **Course code** | 21_TEN5UE |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | Sandra Zwirchmayr |
| **Contact hours per week** | 1 |
| **ECTS credits** | 1 |
| **Course type** | Practice-oriented session |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
Primarily—but not exclusively—by means of group work, pair work, presentations, research, case studies, debates, as well as video and audio work the skills acquired in the module English for Communication as well as those from the third and fourth semesters will be honed and the process will be continued to expand each student's technical and general vocabulary skills as well as idiomatic usage in order to improve their written and oral communication skills.
In addition, areas dealing with stress situations within a company (employee conflicts, generational differences, tough decisions, heterogeneous company cultures, diverse employee interests, etc.) will be dealt with in order to study behavioral patterns and further interpersonal skills.

**Prerequisites:**
n.a.

**Lecture/Seminar profile:**

## Distributed Information Systems (5_VIS3 U)

| | |
|---|---|
| **Degree course** | MC.ba |
| **Course title** | Distributed Information Systems |
| **Course code** | 5_VIS3 U |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | Jens Krösche |
| **Contact hours per week** | 2,4 |
| **ECTS credits** | 3 |
| **Course type** | Practice-oriented session |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 4 |

**Learning objectives:**
Basic practical exercises:
* Client / server communication via TCP / UDP sockets (C++ / Java) using multithreading and taking into account the corresponding synchronization mechanisms
* Remote Method Invocation via Java RMI
* Web Services based on Java-supported REST APIs
* Data Transformation XML / JSON based on Java's JAXB

**Content:**
The lecture covers the basic theoretical and practical topics regarding client / server communication in today's omnipresent distributed software systems.

**Prerequisites:**
According to the prerequisites for degree program access

**Lecture/Seminar profile:**

## Distributed Information Systems (5_VIS3 V)

| | |
|---|---|
| **Degree course** | MC.ba |
| **Course title** | Distributed Information Systems |
| **Course code** | 5_VIS3 V |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | Jens Krösche |
| **Contact hours per week** | 1,6 |
| **ECTS credits** | 2 |
| **Course type** | Lecture |
| **Examinations** | written examination |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
Basic practical exercises:
* Client / server communication via TCP / UDP sockets (C++ / Java) using multithreading and taking into account the corresponding synchronization mechanisms
* Remote Method Invocation via Java RMI
* Web Services based on Java-supported REST APIs
* Data Transformation XML / JSON based on Java's JAXB

**Content:**
The lecture covers the basic theoretical and practical topics regarding client / server communication in today's omnipresent distributed software systems.

**Prerequisites:**
According to the prerequisites for degree program access

**Lecture/Seminar profile:**

## Games with a Purpose (05_GWP5IL)

| | |
|---|---|
| **Degree course** | MTD.ba |
| **Course title** | Games with a Purpose |
| **Course code** | 05_GWP5IL |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | Georgi Yordanov Kostov, Jeremiah Diephuis |
| **Contact hours per week** | 3 |
| **ECTS credits** | 5 |
| **Course type** | Integrated course |
| **Examinations** | continuous assessment |
| **Language of instruction** | German/English |
| **Places for international students** | 4 |

**Learning objectives:**
n.a.

**Content:**
Introduction to the topic of impact games (serious games) and definition of their areas of application, in addition to gamification models and use cases. The course will focus both on theoretical and practical aspects in the field of game design for educational, motivational and persuasive purposes. Regular game design challenges and the development and evaluation of a prototype in small groups will serve as the primary method of assessment.

**Prerequisites:**
Fundamentals in design, web, media technology, interaction and games.

**Lecture/Seminar profile:**

## Intelligent Systems (05_ISY5IL)

| | |
|---|---|
| **Degree course** | MTD.ba |
| **Course title** | Intelligent Systems |
| **Course code** | 05_ISY5IL |
| **Level** | Bachelor |
| **Term** | WS24/25 |
| **Lecturer** | Ulrich Bodenhofer |
| **Contact hours per week** | 3 |
| **ECTS credits** | 5 |
| **Course type** | Integrated course |
| **Examinations** | continuous assessment |
| **Language of instruction** | German/English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
Even though the title “Intelligent Systems” sounds much broader, this course focuses on machine learning – which is considered the most important subfield in the current artificial intelligence (AI) hype. The course consists (1) of a theoretical, lecture-like part in which the most important concepts and methods of machine learning are introduced and (2) practical exercises that are implemented in Python notebooks using well-known software packages, such as, pandas, scikit-learn, and Tensorflow/Keras. The course is structured as follows:

Unit 1: Overview of Artificial Intelligence
Unit 2: Basics of Machine Learning
Unit 3: Data Preprocessing and Visualization
Unit 4: Supervised Machine Learning
Unit 5: Basics of Neural Networks and Deep Learning
Unit 6: Convolutional Neural Networks
Unit 7: Further Topics in Deep Learning

**Prerequisites:**
Fundamentals in design, web, media technology, interaction and games.

**Lecture/Seminar profile:**

## Computational Intelligence I (0_1CO1U)

| | |
|---|---|
| **Degree course** | DSE.ma |
| **Course title** | Computational Intelligence I |
| **Course code** | 0_1CO1U |
| **Level** | Master |
| **Term** | WS24/25 |
| **Lecturer** | Gabriel Kronberger |
| **Contact hours per week** | 1 |
| **ECTS credits** | 2 |
| **Course type** | Practice-oriented session |
| **Examinations** | continuous assessment |
| **Language of instruction** | German/English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
exercises with python, weka, heuristic lab

**Prerequisites:**
Entsprechend der Zugangsvoraussetzungen des Studienganges

**Lecture/Seminar profile:**

## Computational Intelligence I (0_1CO1V)

| | |
|---|---|
| **Degree course** | DSE.ma |
| **Course title** | Computational Intelligence I |
| **Course code** | 0_1CO1V |
| **Level** | Master |
| **Term** | WS24/25 |
| **Lecturer** | Gabriel Kronberger |
| **Contact hours per week** | 2 |
| **ECTS credits** | 3 |
| **Course type** | Lecture |
| **Examinations** | oral or written examination |
| **Language of instruction** | German/English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
Machine Learning & Data Science
Hypothesis space, concept learning, feature selection
Bias-variance tradeoff, cross-validation
Linear regression
K-Nearest Neighbor regression / classification
Logistic Regression, Linear & Quadratic Discriminant Analysis
Ensemble learning, bagging, boosting,
Decision Trees, Random Forest, Gradient Boosted Trees
Support Vector Machines
Artificial Neural Networks, Backpropagation

**Prerequisites:**
Entsprechend der Zugangsvoraussetzungen des Studienganges

**Lecture/Seminar profile:**

## Numerical Methods (0_NUM1U)

| | |
|---|---|
| **Degree course** | DSE.ma |
| **Course title** | Numerical Methods |
| **Course code** | 0_NUM1U |
| **Level** | Master |
| **Term** | WS24/25 |
| **Lecturer** | Stephan Dreiseitl |
| **Contact hours per week** | 1 |
| **ECTS credits** | 2 |
| **Course type** | Practice-oriented session |
| **Examinations** | continuous assessment |
| **Language of instruction** | German/English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
Concurrent exercises, practical applications of the theoretical lecture contents.

**Prerequisites:**
according to the prerequisites for degree program access

**Lecture/Seminar profile:**

## Numerical Methods (0_NUM1V)

| | |
|---|---|
| **Degree course** | DSE.ma |
| **Course title** | Numerical Methods |
| **Course code** | 0_NUM1V |
| **Level** | Master |
| **Term** | WS24/25 |
| **Lecturer** | Stephan Dreiseitl |
| **Contact hours per week** | 2 |
| **ECTS credits** | 3 |
| **Course type** | Lecture |
| **Examinations** | oral or written examination |
| **Language of instruction** | German/English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
Introduction: floating point arithmetic, examples from numerical differentiation and integration. Numerical linear algebra: least squares solutions to linear systems, eigenvalues, eigensystems, diagonalisation, fundamentals of monte carlo methods.
Optimisation: Constrained and unconstrained continuous optimisation (gradient descent, quasi-Newton methods). Integer optimisation, branch & bound, branch & cut simplex/complex method, systems of equations: algebraic equations (Newton's method). Differential systems (Runge Kutta etc.), dynamic optimisation: graph searching, Q-learning, approximation algorithms, splines, Fourier transformation.

**Prerequisites:**
according to the prerequisites for degree program access

**Lecture/Seminar profile:**

## Game Development (GDE1IL)

| | |
|---|---|
| **Degree course** | IM.ma |
| **Course title** | Game Development |
| **Course code** | GDE1IL |
| **Level** | Master |
| **Term** | WS24/25 |
| **Lecturer** | Johannes Lugstein |
| **Contact hours per week** | 2,4 |
| **ECTS credits** | 5 |
| **Course type** | Integrated course |
| **Examinations** | oral or written examination |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
Graduates know the complex workflow required for the concrete realization of computer games. Students have expertise with a professional 3D game engine and know agile development processes.

**Content:**
Introduction to game development with a 3D game engine; asset produc-tion, pipeline & integration; fundamentals of sound, networking and phys-ics in modern games; integration of middleware APIs; scripting; data-driven game development; project management in the software domain, agile development methods, software prototyping & testing. In the course, game projects and tech-demos are defined together, each with an innova-tive feature. These are iteratively developed and tested in teams using agile methods. Special consideration is given to 3D multiplayer and net-work games.

**Prerequisites:**
Basic Knowledge in HTML, CSS, JavaScript and object oriented programming (eg Java) in general.

**Lecture/Seminar profile:**

## Hypermedia UX Engineering (HUX1IL)

| | |
|---|---|
| **Degree course** | IM.ma |
| **Course title** | Hypermedia UX Engineering |
| **Course code** | HUX1IL |
| **Level** | Master |
| **Term** | WS24/25 |
| **Lecturer** | Patrick James Niebrzydowski |
| **Contact hours per week** | 2,4 |
| **ECTS credits** | 5 |
| **Course type** | Integrated course |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
Graduates will be familiar with current architectures and frameworks for client-side web programming, as well as the workflow and tools for automating typical workflow in web development. They are able to design multimedia web applications themselves and implement them according to the latest standards and with current tools.

**Content:**
Modern JavaScript and other client-side languages (e.g. Type-script), workflow tools (e.g. Babel, Webpack), frameworks (e.g. React, Angular, Vue), components, state management (e.g. Redux, Vuex), web APIs (e.g. REST, GraphQL), UI frameworks.

**Prerequisites:**
Basic Knowledge in HTML, CSS, JavaScript and object oriented programming (eg Java) in general.

**Lecture/Seminar profile:**

## Intelligent Media (IME3IL)

| | |
|---|---|
| **Degree course** | IM.ma |
| **Course title** | Intelligent Media |
| **Course code** | IME3IL |
| **Level** | Master |
| **Term** | WS24/25 |
| **Lecturer** | Andreas Stöckl |
| **Contact hours per week** | 2,4 |
| **ECTS credits** | 5 |
| **Course type** | Integrated course |
| **Examinations** | oral or written examination |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
Graduates have knowledge of applications of artificial intelligence methods for processing and analyzing text data. They can implement different methods for typical practical problems and evaluate the results. Further-more, visualization methods can be applied for presentation and analysis. Graduates understand the broad spectrum of problems, tasks and solu-tion approaches in NLP (Natural Language Processing).

**Content:**
Fields of application of NLP, Basics of an NLP processing pipeline, Methods for text representation, Text classification, Topic Analysis, Information extraction, Chatbots, Applications in social media and e-commerce

**Prerequisites:**
Basic Knowledge in HTML, CSS, JavaScript and object oriented programming (eg Java) in general.

**Lecture/Seminar profile:**

## Real Time Graphics (RTG1IL)

| | |
|---|---|
| **Degree course** | IM.ma |
| **Course title** | Real Time Graphics |
| **Course code** | RTG1IL |
| **Level** | Master |
| **Term** | WS24/25 |
| **Lecturer** | David Christian Schedl, Leopold Johann Böss |
| **Contact hours per week** | 2,4 |
| **ECTS credits** | 5 |
| **Course type** | Integrated course |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
Students will have a detailed knowledge of advanced techniques in real-time computer graphics and will be able to implement them in selected applications. Students understand theoretical and mathematical aspects of algorithms used in computer games, computer-animated movies and visual film effects.

**Content:**
Computer graphics fundamentals; algorithms and software; rasterization; transformation pipeline; animation; lighting and illumination; materials; postprocessing and image-based techniques; non-photorealistic render-ing; texturing and texture-based techniques; shadows; ray tracing.

**Prerequisites:**
Basic Knowledge in HTML, CSS, JavaScript and object oriented programming (eg Java) in general.

**Lecture/Seminar profile:**

## Spatial Computing (SCO3IL)

| | |
|---|---|
| **Degree course** | IM.ma |
| **Course title** | Spatial Computing |
| **Course code** | SCO3IL |
| **Level** | Master |
| **Term** | WS24/25 |
| **Lecturer** | |
| **Contact hours per week** | 2,4 |
| **ECTS credits** | 5 |
| **Course type** | Integrated course |
| **Examinations** | oral or written examination |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
Graduates are familiar with different approaches for spatially connecting virtual and real content. In addition to theoretical and practical content, students also explore UX-related challenges in immersive areas such as virtual reality, augmented reality, embodied interaction, tangible user interfaces, etc.

**Content:**
Fundamentals of immersive systems (AR/VR/XR) in a spatial context; integration of internal and external sensors and optical systems for track-ing and location-based information; exploration of UI/UX challenges in the XR domain; approaches for multi-user, multi-modal "cross-virtuality" applications

**Prerequisites:**
Basic Knowledge in HTML, CSS, JavaScript and object oriented programming (eg Java) in general.

**Lecture/Seminar profile:**

## Special Topic: Design for Physical Prototyping (STO1IL)

| | |
|---|---|
| **Degree course** | IM.ma |
| **Course title** | Special Topic: Design for Physical Prototyping |
| **Course code** | STO1IL |
| **Level** | Master |
| **Term** | WS24/25 |
| **Lecturer** | Sara Mlakar, Samuel Dieter Zühlke, Thomas Preindl |
| **Contact hours per week** | 2,4 |
| **ECTS credits** | 5 |
| **Course type** | Integrated course |
| **Examinations** | oral or written examination |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
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.

**Prerequisites:**
Basic Knowledge in HTML, CSS, JavaScript and object oriented programming (eg Java) in general.

**Lecture/Seminar profile:**

## Data Warehousing, OLAP and Business Intelligence (15_DWO1ILV)

| | |
|---|---|
| **Degree course** | SE.ma |
| **Course title** | Data Warehousing, OLAP and Business Intelligence |
| **Course code** | 15_DWO1ILV |
| **Level** | Master |
| **Term** | WS24/25 |
| **Lecturer** | Henryk Maciejewski |
| **Contact hours per week** | 3 |
| **ECTS credits** | 5 |
| **Course type** | Integrated course |
| **Examinations** | oral or written examination |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
Basics: Analytical vs. direct data processing – different architectures for different requirements; Data Warehouse as a holistic repository of analytical data; Real application examples of OLAP (Online Analytical Processing) Data warehouse systems.
Building a data warehouse: methodology of the data warehouse implementation process, preservation of data integrity, accuracy and completeness, ETL processes (extract-transform-load), task and meaning of metadata. Database design for Date Warehouse: database requirements for multidimensional queries; Database technologies for OLAP.
Purpose and typical areas of application of data mining in science and industry; data preprocessing and modelling; Feature identification; Critical factors for successful data mining; Data mining process; Methodologies for data mining.
Problem formulation for data mining: prediction problems; clustering; association rules; Text mining and web mining; Structure and pattern identification in time series data. Algorithms: Algorithms for feature selection; Linear methods for regression and classification;
Exercise part: Training in the use of a commercial OLAP development environment.

**Prerequisites:**
according to the prerequisites for degree program access

**Lecture/Seminar profile:**

## Heuristic and Evolutionary Algorithms (15_HEA1ILV)

| | |
|---|---|
| **Degree course** | SE.ma |
| **Course title** | Heuristic and Evolutionary Algorithms |
| **Course code** | 15_HEA1ILV |
| **Level** | Master |
| **Term** | WS24/25 |
| **Lecturer** | Michael Affenzeller, Stefan Wagner |
| **Contact hours per week** | 3 |
| **ECTS credits** | 5 |
| **Course type** | Integrated course |
| **Examinations** | oral or written examination |
| **Language of instruction** | German/English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
Taxonomy of optimization algorithms, distinction between numerical and heuristic optimization, examples of combinatorial optimization problems and complexity theory, solution space behavior and P and NP problems. Heuristic methods: Problem-specific methods vs. metaheuristics, construction vs. improvement heuristics, neighborhood and distance of solutions, local search, non-population-based methods, Simulated Annealing, Tabu Search. Population-based methods: Ant-Colony Optimization, Swarm Intelligence, Genetic Algorithms, Evolutionary Strategies, Genetic Programming.
In exercises the parameterization of algorithms will be trained, analytical as well as empirical analysis of different optimization techniques using HeuristicLab, a generic open source framework for heuristic optimization methods.

**Prerequisites:**
according to the prerequisites for degree program access

**Lecture/Seminar profile:**

## Modelling and Simulation (15_MSM1ILV)

| | |
|---|---|
| **Degree course** | SE.ma |
| **Course title** | Modelling and Simulation |
| **Course code** | 15_MSM1ILV |
| **Level** | Master |
| **Term** | WS24/25 |
| **Lecturer** | Stephan Winkler, Elisabeth Maria Mayrhuber |
| **Contact hours per week** | 3 |
| **ECTS credits** | 5 |
| **Course type** | Integrated course |
| **Examinations** | oral or written examination |
| **Language of instruction** | German/English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
Principles of the modeling of dynamical system, taxonomy of dynamic models; continuous modeling & simulation vs. discrete modeling & simulation; stochastic vs. deterministic simulation; linear vs. nonlinear modeling. Basics of optimization techniques, especially for optimizing model parameters as well as identifying system parameters based on measurement data. Growth models, oscillators, and population models. Discrete event specified systems.
In the practical part of the lectures we discuss application examples, especially technical / physical systems, basics of economics, epidemiology and the spreading of contagious diseases, and predator prey systems. MATLAB / Simulink and AnyLogic are used as frameworks for modeling and simulating systems.

**Prerequisites:**
according to the prerequisites for degree program access

**Lecture/Seminar profile:**

## Scientific Work (15_WIA3SE)

| | |
|---|---|
| **Degree course** | SE.ma |
| **Course title** | Scientific Work |
| **Course code** | 15_WIA3SE |
| **Level** | Master |
| **Term** | WS24/25 |
| **Lecturer** | Ulrich Bodenhofer |
| **Contact hours per week** | 1 |
| **ECTS credits** | 1 |
| **Course type** | Seminar |
| **Examinations** | continuous assessment |
| **Language of instruction** | German/English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
Structure and purposes of different forms of scientific working: protocol, report, thesis paper, master's thesis. Techniques of scientific working: scientific material; literature search (libraries, catalogues, publishers, bibliographies, snowball system, search strategies); literature management systems; techniques of presenting scientific material; foreign material; evidence; abbreviations; bibliographies; conceptual planning; choice of topics and reflection, time management, material, presentation, literature management programs.

**Prerequisites:**
Entsprechend den Zugangsvoraussetzungen des Studiengangs

**Lecture/Seminar profile:**

## Big Data Analytics and Interactive Visualization (22_BDV3ILV)

| | |
|---|---|
| **Degree course** | SE.ma |
| **Course title** | Big Data Analytics and Interactive Visualization |
| **Course code** | 22_BDV3ILV |
| **Level** | Master |
| **Term** | WS24/25 |
| **Lecturer** | Barbara Traxler, Mandy Keck, Holger Stitz |
| **Contact hours per week** | 2,5 |
| **ECTS credits** | 5 |
| **Course type** | Integrated course |
| **Examinations** | oral or written examination |
| **Language of instruction** | German/English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
• Characteristics and challenges of big data
• Big data analytics stacks and architectures
• Frameworks and algorithms for batch and stream processing
• Hands-on examples using e.g. Hadoop, Map Reduce, Hive, Spark, Kafka
• Concepts of interactive visualization and visual analytics
• Visualization of multi-dimensional data
• Hands-on visual analytics projects using D3

**Prerequisites:**
according to the prerequisites for degree program access

**Lecture/Seminar profile:**

## Neural Networks and Deep Learning (22_NDL3ILV)

| | |
|---|---|
| **Degree course** | SE.ma |
| **Course title** | Neural Networks and Deep Learning |
| **Course code** | 22_NDL3ILV |
| **Level** | Master |
| **Term** | WS24/25 |
| **Lecturer** | Ulrich Bodenhofer |
| **Contact hours per week** | 3 |
| **ECTS credits** | 5 |
| **Course type** | Integrated course |
| **Examinations** | oral or written examination |
| **Language of instruction** | German/English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
Architectures of learning systems, layers, and components; inductive design of intelligent systems; the neuron and synapses; formal model of neurons; activation and output functions; neural networks; synaptic modification and learning; learning rules; learning as error minimization; feed-forward networks; error functions; backpropagation and variants; convolutions and convolutional networks; representation learning; error functions, layers, and activation functions in deep learning; recurrent neural networks and the vanishing gradient problem; LSTM and GRU cells; generative adversarial networks.

**Prerequisites:**
Entsprechend den Zugangsvoraussetzungen des Studiengangs

**Lecture/Seminar profile:**

## Intercultural Negotiation (17_INT3I)

| | |
|---|---|
| **Degree course** | HCC.ma |
| **Course title** | Intercultural Negotiation |
| **Course code** | 17_INT3I |
| **Level** | Master |
| **Term** | WS24/25 |
| **Lecturer** | Martina Gaisch |
| **Contact hours per week** | 1 |
| **ECTS credits** | 1,5 |
| **Course type** | Integrated course |
| **Examinations** | oral or written examination |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
Knowledge of concepts in intercultural communication.

**Content:**
Theories and core concepts of intercultural communication are conveyed. In doing so, intercultural negotiation techniques are tried out and reflected upon. Examples from practical application areas and exercises to further develop generic key competences are experienced. Further, intercultural negotiation and dialogue skills are practiced and analyzed based on hands-on case studies.

**Prerequisites:**
No previous knowledge required for Master Students. Bachelor's degree students with good knowledge in English.

**Lecture/Seminar profile:**

## Business English Communication Skills (20_BEC3 T)

| | |
|---|---|
| **Degree course** | IEM.ma |
| **Course title** | Business English Communication Skills |
| **Course code** | 20_BEC3 T |
| **Level** | Master |
| **Term** | WS24/25 |
| **Lecturer** | Jordanka Kretzschmar |
| **Contact hours per week** | 1 |
| **ECTS credits** | 1 |
| **Course type** | Individual Training |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
Students are familiarized with appropriate terminology from the field of Business English. They learn to use the English language professionally in a professional context and to discuss current and study-relevant topics.
In the process, both the subject-specific vocabulary and grammatical skills are deepened and further developed with the aim of successfully using the foreign language in everyday life, study and work.

**Prerequisites:**
n.a.

**Lecture/Seminar profile:**

## Intercultural Communication (20_ICC3 I)

| | |
|---|---|
| **Degree course** | IEM.ma |
| **Course title** | Intercultural Communication |
| **Course code** | 20_ICC3 I |
| **Level** | Master |
| **Term** | WS24/25 |
| **Lecturer** | Martina Gaisch |
| **Contact hours per week** | 1 |
| **ECTS credits** | 2 |
| **Course type** | Integrated course |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
Theories and core concepts of intercultural communication Processes of intercultural adaptation according to Milton Bennett's stage model and cultural dimensions based on Hall, Hampden-Turner, Hofstede and Lewis Examples and experiences from practical application areas Exercises to develop key competences
Role plays, case studies and critical incidents in intercultural work settings

**Prerequisites:**
n.a.

**Lecture/Seminar profile:**

## Cross Cultural Business Communication (CCC1IL)

| | |
|---|---|
| **Degree course** | ISM.ma |
| **Course title** | Cross Cultural Business Communication |
| **Course code** | CCC1IL |
| **Level** | Master |
| **Term** | WS24/25 |
| **Lecturer** | Martina Gaisch |
| **Contact hours per week** | 1 |
| **ECTS credits** | 1 |
| **Course type** | Integrated course |
| **Examinations** | written examination |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
This course seeks to enhance students' global awareness by challenging their implicit biases and pre-conceived worldviews.
It is sought to broaden their mindsets in terms intercultural and diversity-related concepts.
By engaging in constant reflective practice, they need to look beyond the seemingly obvious and learn to understand the interconnectivity of our VUCA-world.

**Prerequisites:**
n.a.

**Lecture/Seminar profile:**

## Language 1 (LAN1ILV)

| | |
|---|---|
| **Degree course** | ISM.ma |
| **Course title** | Language 1 |
| **Course code** | LAN1ILV |
| **Level** | Master |
| **Term** | WS24/25 |
| **Lecturer** | Jordanka Kretzschmar |
| **Contact hours per week** | 1 |
| **ECTS credits** | 1 |
| **Course type** | Integrated course |
| **Examinations** | written examination |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
This course focuses on business communication in a work-related context which should enable students to interact and collaborate effectively using multiple forms of communication across different channels and enhance the language proficiency of each participant.

**Prerequisites:**
n.a.

**Lecture/Seminar profile:**

## Security Awareness (SAW3ILV)

| | |
|---|---|
| **Degree course** | ISM.ma |
| **Course title** | Security Awareness |
| **Course code** | SAW3ILV |
| **Level** | Master |
| **Term** | WS24/25 |
| **Lecturer** | Marcus Nohlberg |
| **Contact hours per week** | 1,5 |
| **ECTS credits** | 3 |
| **Course type** | Integrated course |
| **Examinations** | written examination |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
Learning theory, advertising psychology, internal corporate communication, the concept of culture in various dimensions and its influence on human behaviour, project and change management

**Prerequisites:**
n.a.