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 | DAB4 U | Database Design | Practice-oriented session | 4 | Bachelor | 3 | 5 |
| AC.ba | DAB4 V | Database Design | Lecture | 4 | Bachelor | 2 | 6 |
| AC.ba | WDP4 U | Web Development | Practice-oriented session | 4 | Bachelor | 3 | 7 |
| AC.ba | WDP4 V | Web Development | Lecture | 4 | Bachelor | 2 | 8 |
| **School of Informatics, Communications and Media (Bachelor, Hagenberg Campus)** | | | | | | | |
| FHHGB | ADS1IL_INT | Algorithms and Data Structures (with Java) | Integrated course | 2 | Bachelor | 5 | 9 |
| FHHGB | AIC1IL_INT | AI in Creativity | Integrated course | 2 | Bachelor | 5 | 10 |
| FHHGB | CDF1IL_INT | Computer Design and Firmware Programming | Integrated course | 2 | Bachelor | 5 | 12 |
| FHHGB | DEU1IL_INT | German for Beginners | Integrated course | 2 | Bachelor | 2 | 13 |
| FHHGB | DEU2IL_INT | German for Beginners with Prior Knowledge | Integrated course | 2 | Bachelor | 2 | 14 |
| FHHGB | GDP1IL_INT | General Data Protection Regulation | Integrated course | 2 | Bachelor | 4 | 15 |
| FHHGB | HAI2IL_INT | Human Aspects of Information Security | Integrated course | 2 | Bachelor | 2 | 16 |
| FHHGB | MAD1IL_INTIL | Mobile App Development | Integrated course | 2 | Bachelor | 5 | 17 |
| FHHGB | PHY2IL_INT | Basics of Physiology | Integrated course | 2 | Bachelor | 3 | 18 |
| FHHGB | SCM1IL_INT | Source Code Management using Git | Integrated course | 2 | Bachelor | 0,5 | 19 |
| FHHGB | SEM1PR_INT2PT | Semester project | Project | 2 | Bachelor | 10 | 20 |
| FHHGB | VRM1IL_INT | Version & Release Management using Git | Integrated course | 2 | Bachelor | 0,5 | 21 |
| **Hardware-Software-Design (Bachelor, Hagenberg Campus)** | | | | | | | |
| HSD.ba | ENG2-17ILV | English 2 | Integrated course | 2 | Bachelor | 2 | 22 |

| Programme (department) | Course unit code | Course unit title | Course type | Semester (level) | Level | ECTS | Page |
|---|---|---|---|---|---|---|---|
| **Hardware-Software-Design (Bachelor, Hagenberg Campus)** | | | | | | | |
| HSD.ba | GID4ILV | Source Code Management using Git | Integrated course | 4 | Bachelor | 0,5 | 23 |
| HSD.ba | GIV4ILV | Version & Release Management using Git | Integrated course | 4 | Bachelor | 0,5 | 24 |
| **Communication and Knowledge Media (Bachelor, Hagenberg Campus)** | | | | | | | |
| KWM.ba | AUP6VO | Adaptivity and Personalization | Lecture | 6 | Bachelor | 3 | 25 |
| KWM.ba | SCR2UE | Client-Side Scripting | Practice-oriented session | 2 | Bachelor | 2,5 | 26 |
| KWM.ba | SCR2VO | Client-Side Scripting | Lecture | 2 | Bachelor | 1 | 27 |
| KWM.ba | STE2UE | Scientific and Technical English | Practice-oriented session | 2 | Bachelor | 1 | 28 |
| KWM.ba | WAC2IL | Web Accessibility | Integrated course | 2 | Bachelor | 1 | 29 |
| **Medical and Bioinformatics (Bachelor, Hagenberg Campus)** | | | | | | | |
| MBI.ba | 21_KEN2UE | English 2 | Practice-oriented session | 2 | Bachelor | 2 | 31 |
| MBI.ba | 21_TEN4UE | Technical English 2 | Practice-oriented session | 4 | Bachelor | 1 | 32 |
| **Media Technology and Design (Bachelor, Hagenberg Campus)** | | | | | | | |
| MTD.ba | 05_DVC4IL | Digital Imaging / Visual Computing | Integrated course | 4 | Bachelor | 5 | 33 |
| MTD.ba | 05_EMP4IL | Embodied Play | Integrated course | 4 | Bachelor | 5 | 34 |
| MTD.ba | 05_IGP4IL | Interaction and Game Programming | Integrated course | 4 | Bachelor | 5 | 35 |
| MTD.ba | 05_MIR4IL | Mixed Reality | Integrated course | 4 | Bachelor | 5 | 36 |
| MTD.ba | 05_ONM4IL | Online Multimedia | Integrated course | 4 | Bachelor | 5 | 37 |
| MTD.ba | 05_PRO0PT | Semester Project | Project | 4 | Bachelor | 10 | 38 |
| MTD.ba | 05_S3D4IL | Special Topic 3D | Integrated course | 4 | Bachelor | 5 | 39 |
| **Secure Information Systems (Bachelor, Hagenberg Campus)** | | | | | | | |
| SIB.ba | HIS4IL | Human Aspects of Information Security | Integrated course | 4 | Bachelor | 2 | 40 |

| Programme (department) | Course unit code | Course unit title | Course type | Semester (level) | Level | ECTS | Page |
|---|---|---|---|---|---|---|---|
| **Secure Information Systems (Bachelor, Hagenberg Campus)** | | | | | | | |
| SIB.ba | SEN2IL | Social Engineering | Integrated course | 2 | Bachelor | 2 | 41 |
| **Software Engineering (Bachelor - Part Time, Hagenberg Campus)** | | | | | | | |
| SE.ba | 09_VPS5VO | Distributed and Parallel Software Systems | Lecture | 5 | Bachelor | 1 | 42 |

## 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_2CO2U | Computational Intelligence II | Practice-oriented session | 2 | Master | 3 | 43 |
| DSE.ma | 0_2CO2V | Computational Intelligence II | Lecture | 2 | Master | 3 | 44 |
| DSE.ma | 0_MOS2U | Modelling and Simulation | Practice-oriented session | 2 | Master | 2 | 46 |
| DSE.ma | 0_MOS2V | Modelling and Simulation | Lecture | 2 | Master | 3 | 47 |
| **Interactive Media (Master, Hagenberg Campus)** | | | | | | | |
| IM.ma | HMF2IL | Hypermedia Frameworks | Integrated course | 2 | Master | 5 | 48 |
| IM.ma | IVI2IL | Information Visualization | Integrated course | 2 | Master | 5 | 49 |
| **Communication and Knowledge Media (Master, Hagenberg Campus)** | | | | | | | |
| KWM.ma | KWM510 | Intercultural Online Collaboration | Integrated course | 2 | Master | 5 | 50 |
| KWM.ma | KWM531 | Leadership | Integrated course | 2 | Master | 2,5 | 51 |
| KWM.ma | KWM540 | Digitalization: Technologies and Deployment Scenarios | Integrated course | 2/4 | Master | 2 | 53 |
| **Software Engineering (Master, Hagenberg Campus)** | | | | | | | |
| SE.ma | 15_DML2ILV | Data Mining and Machine Learning | Integrated course | 2 | Master | 5 | 55 |
| SE.ma | 22_GEP2VO | Generative Programming | Lecture | 2 | Master | 3 | 56 |
| **Human-Centered Computing (Master - Part Time, Hagenberg Campus)** | | | | | | | |
| HCC.ma | 17_DVA2I | Data Preprocessing and Analytics | Integrated course | 2 | Master | 3 | 57 |
| **Information Engineering and -Management (Master - Part Time, Hagenberg Campus)** | | | | | | | |
| IEM.ma | 24_KIN2 I | Artificial Intelligence and Machine Learning | Integrated course | 2 | Master | 3,5 | 58 |
| **Information Security Management (Master - Part Time, Hagenberg Campus)** | | | | | | | |
| ISM.ma | CCC2ILV | Cross Cultural Business Communication | Integrated course | 2 | Master | 3 | 59 |

**Lecture/Seminar profile:**

## Database Design (DAB4 U)

| | |
|---|---|
| **Degree course** | AC.ba |
| **Course title** | Database Design |
| **Course code** | DAB4 U |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | Andreas Müller |
| **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** | 5 |

**Learning objectives:**
n.a.

**Content:**
In this course we will discuss fundamental concepts of databases (relationl and non-relational). Topics include Entity Relationship Diagrams, Relational Models & SQL, Stored Procedures, Triggers, Indexes, Concurrency, NoSQL, APIs & ORM and Security.

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

**Lecture/Seminar profile:**

## Database Design (DAB4 V)

| | |
|---|---|
| **Degree course** | AC.ba |
| **Course title** | Database Design |
| **Course code** | DAB4 V |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | Andreas Müller |
| **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** | 5 |

**Learning objectives:**
n.a.

**Content:**
In this course we will discuss fundamental concepts of databases (relationl and non-relational). Topics include Entity Relationship Diagrams, Relational Models & SQL, Stored Procedures, Triggers, Indexes, Concurrency, NoSQL, APIs & ORM and Security.

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

**Lecture/Seminar profile:**

## Web Development (WDP4 U)

| | |
|---|---|
| **Degree course** | AC.ba |
| **Course title** | Web Development |
| **Course code** | WDP4 U |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | Andreas Müller |
| **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:**
n.a.

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

**Lecture/Seminar profile:**

## Web Development (WDP4 V)

| | |
|---|---|
| **Degree course** | AC.ba |
| **Course title** | Web Development |
| **Course code** | WDP4 V |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | Andreas Müller |
| **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:**
n.a.

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

**Lecture/Seminar profile:**

## Algorithms and Data Structures (with Java) (ADS1IL_INT)

| | |
|---|---|
| **Degree course** | FHHGB |
| **Course title** | Algorithms and Data Structures (with Java) |
| **Course code** | ADS1IL_INT |
| **Level** | Bachelor |
| **Term** | SS24 |
| **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:**
Knowledge of standard algorithms and the most important data structures, with their complexity in time (algorithms) and space (data structures)
Use and adaptation of such algorithms and data structures for solving appropriate problems

**Content:**
Algorithms for
• searching (sequential search, binary search, hashing),
• sorting (simple sorting algorithms like insertion and selection sort as well as efficient sorting algorithms like merge, heap and quick sort) and
• pattern matching
Additionally: recursive algorithms and recursion versus iteration
Data structures like
• arrays,
• linked lists,
• binary (search) trees, heaps,
• stacks, queues and priority queues
Complexity of algorithms

**Prerequisites:**
• Basics of programming with any programming language
• Basic understanding of object-oriented programming

**Lecture/Seminar profile:**

## AI in Creativity (AIC1IL_INT)

| | |
|---|---|
| **Degree course** | FHHGB |
| **Course title** | AI in Creativity |
| **Course code** | AIC1IL_INT |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | |
| **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** | SS24 |
| **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** | SS24 |
| **Lecturer** | Bettina Buchberger |
| **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** | SS24 |
| **Lecturer** | Bettina Buchberger |
| **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:**

## General Data Protection Regulation (GDP1IL_INT)

| | |
|---|---|
| **Degree course** | FHHGB |
| **Course title** | General Data Protection Regulation |
| **Course code** | GDP1IL_INT |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | |
| **Contact hours per week** | 4 |
| **ECTS credits** | 4 |
| **Course type** | Integrated course |
| **Examinations** | oral or written examination |
| **Language of instruction** | English |
| **Places for international students** | 10 |

**Learning objectives:**
Students know the basic principles of the General Data Protection Regulation. They are able to deal with data protection problems on the basis of the law and find comprehensibly and justifiable solutions.

**Content:**
Principles of the General Data Protection Regulation of the European Union and the Data Protection Law in Austria.

**Prerequisites:**
None

**Lecture/Seminar profile:**

## Human Aspects of Information Security (HAI2IL_INT)

| | |
|---|---|
| **Degree course** | FHHGB |
| **Course title** | Human Aspects of Information Security |
| **Course code** | HAI2IL_INT |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | |
| **Contact hours per week** | 1 |
| **ECTS credits** | 2 |
| **Course type** | Integrated course |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 10 |

**Learning objectives:**
Students are able to understand the behavior of people in the context of information security; they understand and are able to apply the basics of risk perception and assessment.

**Content:**
Principles of human behavior in the context of information security. Subjective assessment of risks and threats; effectiveness of policies and regulations; open and covert avoidance behavior, basic concepts and examples of security awareness training.

**Prerequisites:**
None

**Lecture/Seminar profile:**

## Mobile App Development (MAD1IL_INTIL)

| | |
|---|---|
| **Degree course** | FHHGB |
| **Course title** | Mobile App Development |
| **Course code** | MAD1IL_INTIL |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | |
| **Contact hours per week** | 1 |
| **ECTS credits** | 5 |
| **Course type** | Integrated course |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 10 |

**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:**

## Basics of Physiology (PHY2IL_INT)

| | |
|---|---|
| **Degree course** | FHHGB |
| **Course title** | Basics of Physiology |
| **Course code** | PHY2IL_INT |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | |
| **Contact hours per week** | 2 |
| **ECTS credits** | 3 |
| **Course type** | Integrated course |
| **Examinations** | oral or written examination |
| **Language of instruction** | English |
| **Places for international students** | 10 |

**Learning objectives:**
Get an understanding of enzymes, enzyme functionality, creatinine, urine test strips

**Content:**
• Measurement of tidal volume
• Panoptic staining of blood smear
• Conducting a blood group test
• Determination of the erythrocyte count
• Determination of haematocrit
• Determination of methaemoglobin in the blood
• Measurement of osmotic erythrocyte resistance
• Protein Concentration Determination
• Blood cell settling rate
• Comparison of blood pressure monitors

**Prerequisites:**
Basic knowledge in biology and chemistry

**Lecture/Seminar profile:**

## Source Code Management using Git (SCM1IL_INT)

| | |
|---|---|
| **Degree course** | FHHGB |
| **Course title** | Source Code Management using Git |
| **Course code** | SCM1IL_INT |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | |
| **Contact hours per week** | 0,5 |
| **ECTS credits** | 0,5 |
| **Course type** | Integrated course |
| **Examinations** | oral or written examination |
| **Language of instruction** | English |
| **Places for international students** | 10 |

**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:**
Basic knowlege in programming

**Lecture/Seminar profile:**

## Semester project (SEM1PR_INT2PT)

| | |
|---|---|
| **Degree course** | FHHGB |
| **Course title** | Semester project |
| **Course code** | SEM1PR_INT2PT |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | |
| **Contact hours per week** | 1 |
| **ECTS credits** | 10 |
| **Course type** | Project |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 10 |

**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:**

## Version & Release Management using Git (VRM1IL_INT)

| | |
|---|---|
| **Degree course** | FHHGB |
| **Course title** | Version & Release Management using Git |
| **Course code** | VRM1IL_INT |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | |
| **Contact hours per week** | 0,5 |
| **ECTS credits** | 0,5 |
| **Course type** | Integrated course |
| **Examinations** | oral or written examination |
| **Language of instruction** | English |
| **Places for international students** | 10 |

**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:**
Basic knowlege in programming, Source Code Management using Git

**Lecture/Seminar profile:**

## English 2 (ENG2-17ILV)

| | |
|---|---|
| **Degree course** | HSD.ba |
| **Course title** | English 2 |
| **Course code** | ENG2-17ILV |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | Julia Maria Lengauer |
| **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:**
n.a.

**Prerequisites:**
n.a.

**Lecture/Seminar profile:**

## Source Code Management using Git (GID4ILV)

| | |
|---|---|
| **Degree course** | HSD.ba |
| **Course title** | Source Code Management using Git |
| **Course code** | GID4ILV |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | Dominik Krenner |
| **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 (GIV4ILV)

| | |
|---|---|
| **Degree course** | HSD.ba |
| **Course title** | Version & Release Management using Git |
| **Course code** | GIV4ILV |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | Dominik Krenner |
| **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:**

## Adaptivity and Personalization (AUP6VO)

| | |
|---|---|
| **Degree course** | KWM.ba |
| **Course title** | Adaptivity and Personalization |
| **Course code** | AUP6VO |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | Mirjam Augstein |
| **Contact hours per week** | 2 |
| **ECTS credits** | 3 |
| **Course type** | Lecture |
| **Examinations** | written examination |
| **Language of instruction** | German/English |
| **Places for international students** | 10 |

**Learning objectives:**
After completing the course, students should be able to design adaptive systems and know and apply methods for the acquisition, analysis and interpretation of data that serve as a basis for adaptivity. Furthermore, students should be able to evaluate adaptive systems in terms of usability and added value compared to non-adaptive variants.

**Content:**
Adaptivity is a way of making systems personalized to users - in many ways. For example, adaptivity can affect the graphical user interface of a system, which then automatically adapts to the user, but also the type and amount of content presented. The latter means a way out of the so-called "information dilemma" which has become a growing problem since the early days of the Internet. The rapidly increasing amount of available information as well as the increasing diversity of users pose new challenges to the designers and developers of the systems. A single representation is often no longer sufficient. This course deals with the basics of personalization and adaptive systems. Different aspects of adaptive systems are covered, starting with the goals of adaptivity, user modeling techniques, security aspects, and evaluation of adaptive systems. The goal of the course is to provide a holistic overview of the topic. Technical aspects as well as the user perspective will be considered.

Assessment: The course will be assessed by a written exam at the end of the semester. Students need to achieve at least 50% of the obtainable points in order to complete the course positively.

**Prerequisites:**
Students participating in the course need to have basic (web) programming skills and should be familiar with the basics of human-centered design.

**Lecture/Seminar profile:**

## Client-Side Scripting (SCR2UE)

| | |
|---|---|
| **Degree course** | KWM.ba |
| **Course title** | Client-Side Scripting |
| **Course code** | SCR2UE |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | Johannes Schönböck |
| **Contact hours per week** | 2 |
| **ECTS credits** | 2,5 |
| **Course type** | Practice-oriented session |
| **Examinations** | continuous assessment |
| **Language of instruction** | German/English |
| **Places for international students** | 4 |

**Learning objectives:**
Graduates have basic knowledge in the conception, design and implementation of hypermedia applications, taking into account usability, standards compliance and progressive enhancement. The implementation is based on modern languages and tools. The focus of the course is on client-side web development with JavaScript. Students will gain a detailed insight into the basic concepts and technologies of the web, with current design trends and frameworks (jQuery) being scrutinized and explored using practical examples. The course consists of a lecture and a practical exercise - lecture and exercise can only be attended together.

**Content:**
Introduction into Client Side Scripting
• JavaScript basics
• Document Object Model (DOM)
• Object-oriented programming in JavaScript
In the exercise, the contents of the lecture are applied to concrete examples.

**Prerequisites:**
basic knowledge of programming

**Lecture/Seminar profile:**

## Client-Side Scripting (SCR2VO)

| | |
|---|---|
| **Degree course** | KWM.ba |
| **Course title** | Client-Side Scripting |
| **Course code** | SCR2VO |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | Johannes Schönböck |
| **Contact hours per week** | 1 |
| **ECTS credits** | 1 |
| **Course type** | Lecture |
| **Examinations** | written examination |
| **Language of instruction** | German/English |
| **Places for international students** | 2 |

**Learning objectives:**
Graduates have basic knowledge in the conception, design and implementation of hypermedia applications, taking into account usability, standards compliance and progressive enhancement. The implementation is based on modern languages and tools. The focus of the course is on client-side web development with JavaScript. Students will gain a detailed insight into the basic concepts and technologies of the web, with current design trends and frameworks (jQuery) being scrutinized and explored using practical examples. The course consists of a lecture and a practical exercise - lecture and exercise can only be attended together.

**Content:**
Introduction into Client Side Scripting
• JavaScript basics
• Document Object Model (DOM)
• Object-oriented programming in JavaScript

**Prerequisites:**
basic knowledge of programming

**Lecture/Seminar profile:**

## Scientific and Technical English (STE2UE)

| | |
|---|---|
| **Degree course** | KWM.ba |
| **Course title** | Scientific and Technical English |
| **Course code** | STE2UE |
| **Level** | Bachelor |
| **Term** | SS24 |
| **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** | 4 |

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

**Content:**
Prepare, review and read materials for class. Carry out verbal and written assignments. Complete oral and written classroom assignments. Engage in group-, pair- and roleplay activities. Participate in discussions & give feedback when called upon. Grammar reviews. Leading a discussion. Final grammar examination.

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

**Lecture/Seminar profile:**

## Web Accessibility (WAC2IL)

| | |
|---|---|
| **Degree course** | KWM.ba |
| **Course title** | Web Accessibility |
| **Course code** | WAC2IL |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | Reinhard Koutny, Peter Heumader |
| **Contact hours per week** | 1 |
| **ECTS credits** | 1 |
| **Course type** | Integrated course |
| **Examinations** | continuous assessment |
| **Language of instruction** | German/English |
| **Places for international students** | 4 |

**Learning objectives:**
Accessibility of web and software systems is of crucial importance for the inclusion and participation of people with disabilities and older people (approx. 20% of the total population) in the information and knowledge society. The way web and software interfaces are designed, determines whether independent and self-directed interaction and access for people with disabilities is possible. In the information society, disability is no longer just an attribute of the individual but a quality criterion for the design of the information and communication technology (ICT)-based living environment.
This requirement for the design, implementation and use of technical systems is reflected in political directives, laws and increasingly also in social and economic requirements. In addition, accessibility of web and software systems is an essential contribution to increasing usability and user experience for all people, regardless of age and/or any disabilities.

Graduates of this lecture:
- gain broad awareness of the problems and needs of people with disabilities and older people when interacting with standard hardware and websites or software systems,
- have basic knowledge about assistive technology that standard hardware and software already provide today and about specialized assistive technology (AT) that these people (can) use at the human-computer interface (HCI),
- recognize the potential of accessible user interfaces to mitigate the effects of disabilities and to improve inclusion, care, and support of people with disabilities,
- develop awareness and understanding of the need for accessibility as a basic condition for realizing this potential in inclusion and participation in all areas of life,
- gain in-depth knowledge of technical standards for accessible web and software development
- learn to use different methods, techniques and tools in the implementation of the standards,
- acquire knowledge of how these standards are implemented with different development

environments on different platforms,
- learn methods and use tools for evaluating accessibility,
- are able to independently carry out exemplary practical examples in design and programming,
- develop competencies to realize accessibility at the current state of the art, but also in the future,
- understand accessibility as an integral part of web/software engineering

**Content:**

1. Introduction:
○ Objectives and overview of the lecture
○ What is accessibility and why is accessibility important.
○ Overview of guidelines
○ Assistive technologies and their types of interaction with user interfaces of web/software systems
○ Self-experience: browsing and using ICT without screen, mouse, and keyboard; target audience.
2. Accessibility guidelines, their xemplary implementation and application examples
○ Principle 1: Perceivability: equivalent alternatives, adaptation of content, …
3. accessibility guidelines, their exemplary implementation and application examples
○ Principle 2: Operability: keyboard interface, navigation, time, ...
4. accessibility guidelines, their exemplary implementation and application examples
○ Principle 3: Understandability: readability, user guidance, error prevention, ...
○ Principle 4: Robustness: Compatibility with AT and other user agents, ...
○ WCAG 2.1
5. Accessible dynamic web and software systems: Accessible Rich Internet Applications (WAI-ARIA)
○ HTML 5 Accessibility
○ What is WAI-ARIA?
○ ARIA elements and methods
○ ARIA Examples

**Prerequisites:**

basic knowledge of programming

**Lecture/Seminar profile:**

## English 2 (21_KEN2UE)

| | |
|---|---|
| **Degree course** | MBI.ba |
| **Course title** | English 2 |
| **Course code** | 21_KEN2UE |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | Alastair Long |
| **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 in order to improve each student's written and oral communication skills. Some of the areas of topicality include conflict situations, rhetorical expression, computer ethics, as well as issues in bioinformatics.

**Prerequisites:**
n.a.

**Lecture/Seminar profile:**

## Technical English 2 (21_TEN4UE)

| | |
|---|---|
| **Degree course** | MBI.ba |
| **Course title** | Technical English 2 |
| **Course code** | 21_TEN4UE |
| **Level** | Bachelor |
| **Term** | SS24 |
| **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:**
The skills acquired in the module English for Communication will be combined with those from the module Technical English to improve each student's written and oral communication skills.
Each student will choose a topic from the realm of bioinformatics, create a PowerPoint presentation for it, and deliver it; this will be followed by a group discussion of the content as well as feedback for the speaker. In addition, each student will critique one presentation in writing, and the instructor will do all of them via audio or video analysis. The areas of topicality include a short review of presentation techniques, rhetorical expression, pitfalls during a presentation, and critique writing.

**Prerequisites:**
n.a.

**Lecture/Seminar profile:**

## Digital Imaging / Visual Computing (05_DVC4IL)

| | |
|---|---|
| **Degree course** | MTD.ba |
| **Course title** | Digital Imaging / Visual Computing |
| **Course code** | 05_DVC4IL |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | David Christian Schedl |
| **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:**
Students learn basic processes and techniques from digital image processing and computer vision. In addition to the theoretical understanding, students also acquire practical skills in implementing and applying algorithms and software that are used, for example, in deep learning, robotics, medicine, biology, astronomy, and media production.

Requirements
General interest in image processing and a basic math understanding.

**Prerequisites:**
Basic Knowledge in HTML, CSS, JavaScript

**Lecture/Seminar profile:**

## Embodied Play (05_EMP4IL)

| | |
|---|---|
| **Degree course** | MTD.ba |
| **Course title** | Embodied Play |
| **Course code** | 05_EMP4IL |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | Michael Lankes |
| **Contact hours per week** | 3 |
| **ECTS credits** | 5 |
| **Course type** | Integrated course |
| **Examinations** | continuous assessment |
| **Language of instruction** | German/English |
| **Places for international students** | 6 |

**Learning objectives:**
n.a.

**Content:**
Introduction, basic concepts and forms of embodied play (natural forms of interaction in games: eye interaction, facial expressions, gestures, positioning and representation of the players). Technical basics and functionality of required hardware (eye tracker, laser ranger etc.). Conception and prototypical implementation of a playful prototype in groups. Evaluation of the results in the form of playtests and heuristic evaluations.

**Prerequisites:**
Basic Knowledge in HTML, CSS, JavaScript

**Lecture/Seminar profile:**

## Interaction and Game Programming (05_IGP4IL)

| | |
|---|---|
| **Degree course** | MTD.ba |
| **Course title** | Interaction and Game Programming |
| **Course code** | 05_IGP4IL |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | Philipp Wintersberger |
| **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:**
In this course, we will discuss and apply the following three principles:

Exertion: Inclusion of body movement (i.e., gestures, activities, sequences) into games, play, and simulation. How can we create experiences that make our users exhausting themselves with joy?
Integration: Waiving the boundaries between users and technology. How can we create experiences that make people believe being an entity with technological artifacts?
AI and machine learning in games: How can we make our game actors self-learn and optimize behavior? For this part, there is no fundamental knowledge of AI and math needed.
Grading: In group projects, we will develop experiences that foster on at least one of the above mentioned areas.
Requirements
General interest into gameful experiences or simulation beyond classical games. Basic knowledge of Unity and/or Unreal assumed.

**Prerequisites:**
Basic Knowledge in HTML, CSS, JavaScript

**Lecture/Seminar profile:**

## Mixed Reality (05_MIR4IL)

| | |
|---|---|
| **Degree course** | MTD.ba |
| **Course title** | Mixed Reality |
| **Course code** | 05_MIR4IL |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | Jeremiah Diephuis, Dominik Hackl, Georgi Yordanov Kostov |
| **Contact hours per week** | 3 |
| **ECTS credits** | 5 |
| **Course type** | Integrated course |
| **Examinations** | continuous assessment |
| **Language of instruction** | German/English |
| **Places for international students** | 6 |

**Learning objectives:**
n.a.

**Content:**
Introduction to technologies and production processes for mixed reality applications. Fusion of the acquired knowledge from the courses "Game Programming" and "3D Design" with special attention to possibilities of performance optimization. Insight into the use of MR technologies for motion capture and other purposes. Design and prototype development of an interactive MR application (game, installation, etc.).

**Prerequisites:**
Basic Knowledge in HTML, CSS, JavaScript

**Lecture/Seminar profile:**

## Online Multimedia (05_ONM4IL)

| | |
|---|---|
| **Degree course** | MTD.ba |
| **Course title** | Online Multimedia |
| **Course code** | 05_ONM4IL |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | Rimbert Rudisch-Sommer |
| **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:**
In-depth contents in Hypermedia Programming, such as:

TypeScript
React
State Management (eg Redux)
Functional and Reactive Programming Concepts (eg RxJS)
Media-APIs (eg WebRTC, Streaming)
Laravel

**Prerequisites:**
Basic Knowledge in HTML, CSS, JavaScript

**Lecture/Seminar profile:**

## Semester Project (05_PRO0PT)

| | |
|---|---|
| **Degree course** | MTD.ba |
| **Course title** | Semester Project |
| **Course code** | 05_PRO0PT |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | |
| **Contact hours per week** | 2 |
| **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. This course only takes place with a minimum of participants.

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

**Prerequisites:**
n.a.

**Lecture/Seminar profile:**

## Special Topic 3D (05_S3D4IL)

| | |
|---|---|
| **Degree course** | MTD.ba |
| **Course title** | Special Topic 3D |
| **Course code** | 05_S3D4IL |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | Marius David Oelsch |
| **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:**
Rigging is the foundation of all kind of manually animated sequences, from pretty simple rigs to quite complex full creature rigs. This course discusses different types of rigging for animation in Blender. Other than a bit of theory up front the course will mostly be in practical examples and exercises.

**Prerequisites:**
Basic Knowledge in HTML, CSS, JavaScript

**Lecture/Seminar profile:**

## Human Aspects of Information Security (HIS4IL)

| | |
|---|---|
| **Degree course** | SIB.ba |
| **Course title** | Human Aspects of Information Security |
| **Course code** | HIS4IL |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | Marcus Nohlberg |
| **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:**
The students will learn:
Foundations of:
• Information Security Awareness
• How to create Security Awareness materials
• How to create Security Awareness campaigns
• How to present security materials
• Basics of research within the human

**Content:**
Basics of human behaviour in the context of information security, subjective assessment of risks and threats, effectiveness of policies and regulations, overt and covert avoidance behaviour, basic concepts and examples of security awareness training.

**Prerequisites:**
n.a.

**Lecture/Seminar profile:**

## Social Engineering (SEN2IL)

| | |
|---|---|
| **Degree course** | SIB.ba |
| **Course title** | Social Engineering |
| **Course code** | SEN2IL |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | Marcus Nohlberg |
| **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:**
The students will learn:
Foundations of:
• Social Engineering
• The Human Element of Security
• Socio-psychological aspects related to Information Security
• Gow to structure work on preventing Social Engineering
• The fundamentals of research within the human element

**Content:**
Psychological basics of manipulation and influence, mechanisms and basic patterns of social engineering attacks and scams, possibilities of recognising and avoiding such attacks.

**Prerequisites:**
n.a.

**Lecture/Seminar profile:**

## Distributed and Parallel Software Systems (09_VPS5VO)

| | |
|---|---|
| **Degree course** | SE.ba |
| **Course title** | Distributed and Parallel Software Systems |
| **Course code** | 09_VPS5VO |
| **Level** | Bachelor |
| **Term** | SS24 |
| **Lecturer** | Bogdan Burlacu |
| **Contact hours per week** | 1 |
| **ECTS credits** | 1 |
| **Course type** | Lecture |
| **Examinations** | written examination |
| **Language of instruction** | German/English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
Einführung in die Entwicklung paralleler und verteilter Programme (Motivation, Anwendungsgebiete, Moore's Gesetz, TOP500 Liste), Theoretische Grundlagen (Speed Up, Effizienz, Amdahls Gesetz, Gustafsons Gesetz, Konsequenzen), Überblick über parallele Hardwarearchitekturen (Flynns Taxonomy, Pipelining, Shared Memory Systeme, Distributed Memory Systeme), Herausforderungen beim Erstellen nebenläufiger Programme (Deadlocks, Livelocks, Race Conditions, Overhead, Synchronisation), Entwicklung nebenläufiger bzw. paralleler Applikationen für .NET, OpenMP

**Prerequisites:**
WEB2

**Lecture/Seminar profile:**

## Computational Intelligence II (0_2CO2U)

| | |
|---|---|
| **Degree course** | DSE.ma |
| **Course title** | Computational Intelligence II |
| **Course code** | 0_2CO2U |
| **Level** | Master |
| **Term** | SS24 |
| **Lecturer** | Ulrich Bodenhofer, Stephan Winkler, Sebastian Dorl |
| **Contact hours per week** | 1 |
| **ECTS credits** | 3 |
| **Course type** | Practice-oriented session |
| **Examinations** | continuous assessment |
| **Language of instruction** | German/English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
n.a.

**Prerequisites:**
Entsprechend der Zugangsvoraussetzungen des Studienganges

**Lecture/Seminar profile:**

## Computational Intelligence II (0_2CO2V)

| | |
|---|---|
| **Degree course** | DSE.ma |
| **Course title** | Computational Intelligence II |
| **Course code** | 0_2CO2V |
| **Level** | Master |
| **Term** | SS24 |
| **Lecturer** | Ulrich Bodenhofer, Stephan Winkler, Sebastian Dorl |
| **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:**
Theoretical part:
• Differentiation between numerical and heuristic optimization
• Taxonomy of heuristic optimization methods
• Examples of combinatorial optimization problems and complexity theory
• Solution space behavior and P and NP problems
• Heuristic methods (overview): Problem-specific methods vs. metaheuristics
• Construction vs. improvement heuristics
• Proximity and distance of solutions
• Local search
• Genetic Algorithms (GA)
• Evolution strategies
• Genetic Programming (GP)
• Symbolic regression and symbolic classification
• Basics of support vector machines: linear SVM, soft-margin SVM, non-linear SVMs and the kernel trick
• SVMs for classification of biological sequences
• Multi-class SVM and support vector regression
• History and basics of neural networks
• The backpropagation algorithm
• Tips and tricks for the practical use of neural networks
• Deep learning fundamentals: vanishing gradients, pre-training, alternative activation functions,

drop-out
• Convolutional neural networks: basics, transfer learning with the help of pre-trained networks, object recognition
• Recurrent neural networks and Long Short-Term Memory (LSTM) and their application in sequence and language processing
• Basic idea of Generative Adversarial Networks (GANs), Neural Style Transfer
• Deep fakes

Practical part:
• Development and use of evolutionary algorithms to solve different problems
• Implementation of evolutionary algorithms to solve different problems
• Use of data processing pipelines: data cleaning, feature definition & extraction, model selection, tuning, results analysis
• Use of regression and classification algorithms to solve different data mining tasks
• Use of different methods to find a solution and combination of methods (data preprocessing, clustering, classification / regression)
• Use of existing frameworks (HeuristicLab, MATLAB, Python packages) and implementation of own preprocessing methods
• Involvement of students in research projects of the research groups Heuristic and Evolutionary Algorithms (HEAL) and Bioinformatics (BIN)
• Use of linear and non-linear support vector machines for classification and regression
• Hyperparameter selection for SVMs using grid Search
• Use of classic neural networks for the classification of vectorial data
• Hyperparameter selection for neural networks using random search
• Use of convolutional neural networks for image classification
• Use of pre-trained convolutional neural networks for image classification
• Use of a simple GAN architecture to generate image data

**Prerequisites:**

Entsprechend der Zugangsvoraussetzungen des Studienganges

**Lecture/Seminar profile:**

## Modelling and Simulation (0_MOS2U)

| | |
|---|---|
| **Degree course** | DSE.ma |
| **Course title** | Modelling and Simulation |
| **Course code** | 0_MOS2U |
| **Level** | Master |
| **Term** | SS24 |
| **Lecturer** | Stephan Winkler, Elisabeth Maria Mayrhuber |
| **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:**
In the practical part of this course the contents presented in the lectures are implemented using software frameworks MATLAB/Simulink and AnyLogic.

**Prerequisites:**
Entsprechend den Zugangsvoraussetzungen des Studienganges

**Lecture/Seminar profile:**

## Modelling and Simulation (0_MOS2V)

| | |
|---|---|
| **Degree course** | DSE.ma |
| **Course title** | Modelling and Simulation |
| **Course code** | 0_MOS2V |
| **Level** | Master |
| **Term** | SS24 |
| **Lecturer** | Stephan Winkler, Elisabeth Maria Mayrhuber |
| **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:**
The following topics are addressed in the lectures: Basics of modeling, linear and nonlinear systems, continuous and discrete modeling and simulation, modeling of biological systems and processes; deterministic simulations and stochastic simulations; Monte Carlo methods; population dynamics; predator prey models; models for the progress of epidemical diseases; compartment models: pharmakokinetiks, one-compartment-models, two-compartment-models, kinetiks of insulin; analysis of biosystems: haemodynamics, cardiovascular systems simulations; controlled systems; gas exchange models in lungs; classification of models and computer simulations.

**Prerequisites:**
Entsprechend den Zugangsvoraussetzungen des Studienganges

**Lecture/Seminar profile:**

## Hypermedia Frameworks (HMF2IL)

| | |
|---|---|
| **Degree course** | IM.ma |
| **Course title** | Hypermedia Frameworks |
| **Course code** | HMF2IL |
| **Level** | Master |
| **Term** | SS24 |
| **Lecturer** | Rimbert Rudisch-Sommer |
| **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:**
Students have gained an understanding of the principles of modern hypermedia application architectures with a focus on server-side application layers with different platforms. The students are able to select the most suitable tools for the respective application purpose from the multitude of existing and emerging tools and to use them correctly.

**Content:**
Architectures of Hypermedia Applications, Server-Side Frameworks (e.g. Spring Framework, Ruby on Rails, Play Framework), Rapid Application Development, Reactive Programming, Web Services, REST, Persistence Libraries.

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

**Lecture/Seminar profile:**

## Information Visualization (IVI2IL)

| | |
|---|---|
| **Degree course** | IM.ma |
| **Course title** | Information Visualization |
| **Course code** | IVI2IL |
| **Level** | Master |
| **Term** | SS24 |
| **Lecturer** | Mandy Keck, Holger Stitz |
| **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:**
n.a.

**Content:**
The course consists of a theoretical and a practical part. While the theoretical part serves as a basic introduction to information visualization, a practical project offers the opportunity to apply and deepen this knowledge.
Theory: Definition of information visualization, role of visualization in data analysis, reference model of visualization, data types and structures, visual perception and visual variables, visualization and interaction techniques, narrative visualizations (storytelling), presentation of common visualization libraries.

**Prerequisites:**
Basic Knowledge in HTML, CSS, JavaScript

**Lecture/Seminar profile:**

## Intercultural Online Collaboration (KWM510)

| | |
|---|---|
| **Degree course** | KWM.ma |
| **Course title** | Intercultural Online Collaboration |
| **Course code** | KWM510 |
| **Level** | Master |
| **Term** | SS24 |
| **Lecturer** | Martina Gaisch |
| **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:**
Graduates know the necessary basics of multicultural and virtual teamwork and are familiar with theories and core concepts of intercultural competence. They are able to apply the acquired knowledge in the use and design of technology-supported environments. They use common tools and are aware of the socio-cultural processes that take place within distributed teams in organizations. They use media in a context-sensitive and needs-oriented manner and excel at professional communication in an intercultural environment. On the basis of the intercultural competencies acquired, graduates are able to work in such settings in a manner appropriate to the situation. They are able to develop community concepts and to establish and manage (online) communities.

**Content:**
This module elaborates on intercultural theories that are predominant on a macro-level and discusses possible implications and cross-border interactions between individuals of different societal backgrounds. It is further discussed how globalization and internationalization endeavors encourage intercultural cooperation and what prerequisites are required for virtual teamwork across nations. Several hands-on examples are provided and critical intercultural incidents can be experienced, discussed and reflected upon throughout cross-border cooperation.

**Prerequisites:**
-

**Lecture/Seminar profile:**

## Leadership (KWM531)

| | |
|---|---|
| **Degree course** | KWM.ma |
| **Course title** | Leadership |
| **Course code** | KWM531 |
| **Level** | Master |
| **Term** | SS24 |
| **Lecturer** | Carrie Kovacs |
| **Contact hours per week** | 1,5 |
| **ECTS credits** | 2,5 |
| **Course type** | Integrated course |
| **Examinations** | continuous assessment |
| **Language of instruction** | German/English |
| **Places for international students** | 2 |

**Learning objectives:**
The course aims to provide an overview of major leadership theories, including basic assumptions, empirical evidence and practical applications of these theories. Students will practice applying theories to real-life examples (e.g., personal experiences, case studies…) in order to gain a deeper understanding of the leadership process and to reflect on the interaction between theory, empirical research, and practice.

**Content:**
The course will present the following topics broadly, with students covering individual topics in more depth:
• Defining & Describing Leadership
• Trait Approach / Skills Approach
• Behavioral Approach
• Situational Approach / Path-Goal Theory
• Leader-Member Exchange (LMX)
• Gender & Leadership
• Leadership Ethics
• Servant Leadership / Followership

Assignments/Grading:
• Class participation, including preparing discussion questions and taking part in discussions (40%)
• Helping plan & lead a class on one topic (30%)
• Summarizing & presenting an empirical leadership study (30%)

**Prerequisites:**

According to the prerequisites for degree program access.

**Lecture/Seminar profile:**

## Digitalization: Technologies and Deployment Scenarios (KWM540)

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|---|---|
| **Degree course** | KWM.ma |
| **Course title** | Digitalization: Technologies and Deployment Scenarios |
| **Course code** | KWM540 |
| **Level** | Master |
| **Term** | SS24 |
| **Lecturer** | Stefan Unterhuber |
| **Contact hours per week** | 1 |
| **ECTS credits** | 2 |
| **Course type** | Integrated course |
| **Examinations** | continuous assessment |
| **Language of instruction** | German/English |
| **Places for international students** | 2 |

**Learning objectives:**
Upon successful completion of the course ...
... the students have gained a general overview of the essence of Digital Transformation (DT) and its current and predicted impact on their own lives and work,
... the students have an overview of technological developments relevant in the context of DT and their impact on everyday life and the world of work,

... the students have developed a differentiated view of the implementation of digitization ideas, which includes the different success factors in the concrete environment (e.g. disruption vs. evolution),
... the students know both the different drivers behind DT and the respective hurdles,
- ...the students know best practices for digitization projects in different industries and markets,

... know a number of methods to practically deal with the requirements of complex and dynamic digitization projects.

**Content:**
PART 1: THE HYPE - Introduction to Digital Transformation, the motivation behind it, the most important application fields and the essential, underlying technologies (Cloud, Edge, Quantum, Big Data, IoT, AR/VR, DLT, AI/ML...).

Work phase 1: THE GOOD, THE BAD AND THE UGLY - students collect at least 1 example each of what they consider successful as well as unsuccessful Digital Transformation from practice and justify their selection (written report of group work); support of this phase by media recommendations (books, videos).

PART 2: REALITY CHECK - joint discussion of selected results and derivation of a structured approach for DT projects, differentiation by markets and application scenarios, derivation of a generic framework and phase model independent of technologies.

Work phase 2: ENGAGE - students select at least one case from the collected negative examples and create a detailed improvement proposal for it by designing a suitable process model and describing its application (written report of the group work); this phase is again supported by media recommendations; not least at this point, students are also encouraged to establish the reference to the LVA Ethics and Digitization as well as the LVA Data Protection and Media Law.

PART 3: SUCCESS FACTORS - identification of success factors and best practices for the successful initiation and implementation of Digital Transformation projects, cross-linking with content from the elective modules LVA on Innovation Management, Change Management and Design Thinking.

Work phase 3: BRAVE NEW WORLD - students design their own idea / rough concept for a successful Digital Transformation for the environment of their own experience and justify their choice of technologies and approach (written report of the group work)

PART 4: SUSTAIN - joint discussion of selected results, derivation of measures for the sustainability of DT projects in a double sense: how do Digital Transformations remain sustainably effective and what does a contribution of DT projects to sustainable business look like?

**Prerequisites:**

According to the prerequisites for degree program access.
This course only takes place with a minimum number of participants.

**Lecture/Seminar profile:**

## Data Mining and Machine Learning (15_DML2ILV)

| | |
|---|---|
| **Degree course** | SE.ma |
| **Course title** | Data Mining and Machine Learning |
| **Course code** | 15_DML2ILV |
| **Level** | Master |
| **Term** | SS24 |
| **Lecturer** | |
| **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:**
Overview of characteristic data mining problems, categorization of problems, complexity of hypothesis spaces, overfitting, underfitting, use of training validation and test data, cross-validation Find-S and Candidate Elimination algorithms, Decision Trees, Case-based Learning, Rule-Based learning, ensemble techniques.
Genetic Programming, symbolic regression, symbolic classification.
Exercise part: Use of the different machine learining algorithms on the basis of data sets from practice as well as benchmark data sets; training in the use of the Data Mining functionalities of HeuristicLab.

**Prerequisites:**
Entsprechend den Zugangsvoraussetzungen des Studiengangs

**Lecture/Seminar profile:**

## Generative Programming (22_GEP2VO)

| | |
|---|---|
| **Degree course** | SE.ma |
| **Course title** | Generative Programming |
| **Course code** | 22_GEP2VO |
| **Level** | Master |
| **Term** | SS24 |
| **Lecturer** | |
| **Contact hours per week** | 2 |
| **ECTS credits** | 3 |
| **Course type** | Lecture |
| **Examinations** | written examination |
| **Language of instruction** | German/English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
Motivation and idea of generative programming (" ... manufacturing software in an automated way ..."); overview of methods and techniques of generative programming; detailed discussion of particularly important and/or current approaches such as templates, generic programming, dynamic languages, static metaprogramming (e.g., in C++) and dynamic metaprogramming based on metainformation (e.g., in C# or Java with reflection). Aspect-oriented programming (AOP) with tools that allow static and dynamic weaving of aspects; domain engineering; domain specific languages and architectures; feature modeling; software product lines (in conjunction with AOP); generators and frameworks for generators.

**Prerequisites:**
Vor allem aus Modul FCW

**Lecture/Seminar profile:**

## Data Preprocessing and Analytics (17_DVA2I)

| | |
|---|---|
| **Degree course** | HCC.ma |
| **Course title** | Data Preprocessing and Analytics |
| **Course code** | 17_DVA2I |
| **Level** | Master |
| **Term** | SS24 |
| **Lecturer** | Bogdan Burlacu |
| **Contact hours per week** | 2 |
| **ECTS credits** | 3 |
| **Course type** | Integrated course |
| **Examinations** | oral or written examination |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
- develop a conceptual understanding of the basic tools in data science
- learn how to summarize data, how to prepare data
- learn about the data science pipeline within the bigger context of Machine Learning
- learn about algorithms used in data science (e.g., clustering, dimensionality reduction)
- learn about statistical analysis (significance, confidence intervals)

**Content:**
- Introduction to data
- Descriptive data summarization
- Cluster analysis
- Dimensionality reduction
- Feature selection and feature extraction
- Statistical inference

**Prerequisites:**
Prior knowledge:
- basic math and statistics concepts
- linear algebra
- basic understanding of algorithms

**Lecture/Seminar profile:**

## Artificial Intelligence and Machine Learning (24_KIN2 I)

| | |
|---|---|
| **Degree course** | IEM.ma |
| **Course title** | Artificial Intelligence and Machine Learning |
| **Course code** | 24_KIN2 I |
| **Level** | Master |
| **Term** | SS24 |
| **Lecturer** | Bogdan Burlacu |
| **Contact hours per week** | 2 |
| **ECTS credits** | 3,5 |
| **Course type** | Integrated course |
| **Examinations** | continuous assessment |
| **Language of instruction** | English |
| **Places for international students** | 2 |

**Learning objectives:**
n.a.

**Content:**
Basic concepts of machine learning
Unsupervised vs. supervised learning
Case-based learning vs. rule-based learning
Supervised learning: classification and regression
Decision tree learning: ID3 algorithm pruning
Overfitting and Bias-Variance Tradeoff
Model selection
Bagging and Boosting: Random Forest, Gradient Boosting

**Prerequisites:**
n.a.

**Lecture/Seminar profile:**

## Cross Cultural Business Communication (CCC2ILV)

| | |
|---|---|
| **Degree course** | ISM.ma |
| **Course title** | Cross Cultural Business Communication |
| **Course code** | CCC2ILV |
| **Level** | Master |
| **Term** | SS24 |
| **Lecturer** | Martina Gaisch |
| **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:**
Theories and core concepts of intercultural communication processes, intercultural negotiation with accompanying reflection,
Examples and experiences from practical application areas, exercises for the further development of generic key competences. Intercultural negotiation and dialogue skills are practised and analysed on the basis of several case studies.

**Prerequisites:**
n.a.