



UNIVERSITY
OF APPLIED SCIENCES
UPPER AUSTRIA

Course Offer

for Incoming Exchange
Students

Summer Semester 2026

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	6
AC.ba	DAB4 V	Database Design	Lecture	4	Bachelor	2	7
AC.ba	WDP4 U	Web Development	Practice-oriented session	4	Bachelor	3	8
AC.ba	WDP4 V	Web Development	Lecture	4	Bachelor	2	9
Artificial Intelligence Solutions (Bachelor, Hagenberg Campus)							
AIS.ba	CVI4IL	Computer Vision	Integrated course	4	Bachelor	5	10
AIS.ba	DDW2UE	Databases and Data Warehouses	Practice-oriented session	2	Bachelor	3	11
AIS.ba	DDW2VO	Databases and Data Warehouses	Lecture	2	Bachelor	2	12
AIS.ba	DIV2IL	Data and Information Visualization	Integrated course	2	Bachelor	2,5	13
AIS.ba	DQP2IL	Data Quality and Data Preprocessing	Integrated course	2	Bachelor	2,5	14
AIS.ba	EAI4IL	Embedded AI	Integrated course	4	Bachelor	5	15
AIS.ba	GAI4UE	Generative AI	Practice-oriented session	4	Bachelor	3	16
AIS.ba	GAI4VO	Generative AI	Lecture	4	Bachelor	2	17
AIS.ba	MLS2UE	Supervised Machine Learning	Practice-oriented session	2	Bachelor	3	18
AIS.ba	MLS2VO	Supervised Machine Learning	Lecture	2	Bachelor	2	19
AIS.ba	PST2UE	Basics of Probability and Statistics	Practice-oriented session	2	Bachelor	3	20
AIS.ba	PST2VO	Basics of Probability and Statistics	Lecture	2	Bachelor	2	21
AIS.ba	SYM2UE	Logic and Symbolic AI	Practice-oriented session	2	Bachelor	3	22

Programme (department)	Course unit code	Course unit title	Course type	Semester (level)	Level	ECTS	Page
Artificial Intelligence Solutions (Bachelor, Hagenberg Campus)							
AIS.ba	SYM2VO	Logic and Symbolic AI	Lecture	2	Bachelor	2	23
Design of Digital Products (Bachelor, Hagenberg Campus)							
DDP.ba	23_MRE2VO	Market Research	Lecture	2	Bachelor	2	24
DDP.ba	26_BEM4IL	Business English & Green Marketing	Integrated course	4	Bachelor	3	25
School of Informatics, Communications and Media (Bachelor, Hagenberg Campus)							
FHHGB	AIC1IL_INT	AI in Creativity	Integrated course	2	Bachelor	5	26
FHHGB	DEU1IL_INT	German for Beginners	Integrated course	2	Bachelor	2	28
FHHGB	DEU2IL_INT	German for Beginners with Prior Knowledge	Integrated course	2	Bachelor	2	29
FHHGB	SEM1PR_INT2PT	Semester project	Project	2	Bachelor	10	30
Hardware-Software-Design (Bachelor, Hagenberg Campus)							
HSD.ba	ENG2-17ILV	English II	Integrated course	2	Bachelor	2	31
Communication and Knowledge Media (Bachelor, Hagenberg Campus)							
KWM.ba	AUP6VO	Adaptivity and Personalization	Lecture	6	Bachelor	3	32
KWM.ba	SCR2IL	Client-Side Scripting	Integrated course	2	Bachelor	3,5	34
KWM.ba	STE2UE	Scientific and Technical English	Practice-oriented session	2	Bachelor	1	35
KWM.ba	WAC2IL	Web Accessibility	Integrated course	2	Bachelor	1	36
Medical and Bioinformatics (Bachelor, Hagenberg Campus)							
MBI.ba	09_PHS2UE	Man: Physiology	Practice-oriented session	2	Bachelor	1,86	38
MBI.ba	21_KEN2UE	English 2	Practice-oriented session	2	Bachelor	2	39
MBI.ba	21_TEN4UE	Technical English 2	Practice-oriented session	4	Bachelor	1	40
Media Technology and Design (Bachelor, Hagenberg Campus)							
MTD.ba	05_DVC4IL	Digital Imaging / Visual Computing	Integrated course	4	Bachelor	5	41

Programme (department)	Course unit code	Course unit title	Course type	Semester (level)	Level	ECTS	Page
Media Technology and Design (Bachelor, Hagenberg Campus)							
MTD.ba	05_IGP4IL	Interaction and Game Programming	Integrated course	4	Bachelor	5	42
MTD.ba	05_MIR4IL	Mixed Reality	Integrated course	4	Bachelor	5	43
MTD.ba	05_S3D4IL	Special Topic 3D	Integrated course	4	Bachelor	5	44
Secure Information Systems (Bachelor, Hagenberg Campus)							
SIB.ba	HIS4IL	Human Aspects of Information Security	Integrated course	4	Bachelor	2	45
SIB.ba	SEN2IL	Social Engineering	Integrated course	2	Bachelor	2	46
Software Engineering (Bachelor - Part Time, Hagenberg Campus)							
SE.ba	09_VPS5VO	Distributed and Parallel Software Systems	Lecture	6	Bachelor	1	47
SE.ba	14_VPS5UE	Distributed and Parallel Software Systems	Practice- oriented session	6	Bachelor	1,5	48

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	2	49
DSE.ma	0_2CO2V	Computational Intelligence II	Lecture	2	Master	2	50
DSE.ma	0_MOS2U	Modelling and Simulation	Practice-oriented session	2	Master	2	52
DSE.ma	0_MOS2V	Modelling and Simulation	Lecture	2	Master	3	53
Interactive Media (Master, Hagenberg Campus)							
IM.ma	BIG4IL	Big Data	Integrated course	4	Master	5	54
IM.ma	HMF2IL	Hypermedia Frameworks	Integrated course	2	Master	5	55
IM.ma	IVI2IL	Information Visualization	Integrated course	2	Master	5	56
IM.ma	RTE2IL	Real Time Engineering	Integrated course	2	Master	5	57
IM.ma	SDM2IL	Software Design Methods	Integrated course	2	Master	5	58
IM.ma	UIN3IL	User Interfaces	Integrated course	4	Master	5	59
IM.ma	VCO2IL	Visual Computing	Integrated course	2	Master	5	60
Communication and Knowledge Media (Master, Hagenberg Campus)							
KWM.ma	DIC2IL	Diversity Management and Intercultural Collaboration	Integrated course	2	Master	5	61
Software Engineering (Master, Hagenberg Campus)							
SE.ma	25_AIN2IL	Artificial Intelligence	Integrated course	2	Master	5	62
SE.ma	25_DML2IL	Data Mining and Machine Learning	Integrated course	2	Master	5	63
SE.ma	25_FLC2UE	Formal Languages and Compilers	Practice-oriented session	2	Master	2	64
SE.ma	25_FLC2VO	Formal Languages and Compilers	Lecture	2	Master	3	65

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_DVA2I	Data Preprocessing and Analytics	Integrated course	2	Master	3	66
Information Security Management (Master - Part Time, Hagenberg Campus)							
ISM.ma	CCC2ILV	Cross Cultural Business Communication	Integrated course	2	Master	3	67

Lecture/Seminar profile:**Database Design (DAB4 U)**

Degree course	AC.ba
Course title	Database Design
Course code	DAB4 U
Level	Bachelor
Term	SS26
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:

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	SS26
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:

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	SS26
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:

In this course we will discuss fundamental concepts and technologies from the field of Web Development. Topics include HTML, CSS, JavaScript, Client-side Frameworks and Backends.

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	SS26
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:

In this course we will discuss fundamental concepts and technologies from the field of Web Development. Topics include HTML, CSS, JavaScript, Client-side Frameworks and Backends.

Prerequisites:

According to the prerequisites for degree program access

Lecture/Seminar profile:**Computer Vision (CVI4IL)**

Degree course	AIS.ba
Course title	Computer Vision
Course code	CVI4IL
Level	Bachelor
Term	SS26
Lecturer	
Contact hours per week	4
ECTS credits	5
Course type	Integrated course
Examinations	continuous assessment
Language of instruction	English
Places for international students	4

Learning objectives:

n.a.

Content:

Fundamentals of digital image processing and computer vision: human perception, images and their representations, color models, image statistics, linear filters and their applications. Theoretical and practical aspects when working with digital images. Techniques and datasets for image classification, segmentation, object and keypoint detection. Training, transfer-learning and usage of pre-trained models such as neural networks, convolutional neural networks (CNNs) and transformers. Data preparation and image augmentation techniques. Current trends in computer vision. Extensive practical exercises to deepen the understanding of the topics covered.

Prerequisites:

IAI1, ALG1, PRO1, DAM2, DAP2, MAT1, MAT2, MAL2, MAL3, NDL3

Lecture/Seminar profile:**Databases and Data Warehouses (DDW2UE)**

Degree course	AIS.ba
Course title	Databases and Data Warehouses
Course code	DDW2UE
Level	Bachelor
Term	SS26
Lecturer	
Contact hours per week	2
ECTS credits	3
Course type	Practice-oriented session
Examinations	continuous assessment
Language of instruction	English
Places for international students	4

Learning objectives:

n.a.

Content:

Introduction to databases and advantages of using database systems, basic concepts (data model, scheme, instances) and components of database systems, architectures of database systems and data independence, basics of modeling (model concept, techniques and methods), database models; entity-relationship model, relational model and relational query models (relational algebra, query and tuple calculus), phases of database design (conceptual, logical, physical design), relational database design (functional dependencies, normal forms, transformation properties), basics of database definition and database queries with SQL. Analytical vs. transactional data processing – different architectures for different requirements, data warehouse (DWH) as a unified source of record for analytical data, application examples for data warehouse systems and DWH architectures. Conceptual modeling: dimensional fact model according to Golfarelli. Implementation of dimensional data models on RDBMS: star schema & snowflake schema. Data integration: data vault schema. Extract-Transform-Load process (ETL). Technological concepts for data warehousing: bitmap index, column store, compression, in-memory.

Prerequisites:

FCS1, ALG1, PRO1

Basics of computer science, algorithms & data structures, and programming

Lecture/Seminar profile:**Databases and Data Warehouses (DDW2VO)**

Degree course	AIS.ba
Course title	Databases and Data Warehouses
Course code	DDW2VO
Level	Bachelor
Term	SS26
Lecturer	Gabriel Kronberger
Contact hours per week	2
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:

Introduction to databases and advantages of using database systems, basic concepts (data model, scheme, instances) and components of database systems, architectures of database systems and data independence, basics of modeling (model concept, techniques and methods), database models; entity-relationship model, relational model and relational query models (relational algebra, query and tuple calculus), phases of database design (conceptual, logical, physical design), relational database design (functional dependencies, normal forms, transformation properties), basics of database definition and database queries with SQL. Analytical vs. transactional data processing – different architectures for different requirements, data warehouse (DWH) as a unified source of record for analytical data, application examples for data warehouse systems and DWH architectures. Conceptual modeling: dimensional fact model according to Golfarelli. Implementation of dimensional data models on RDBMS: star schema & snowflake schema. Data integration: data vault schema. Extract-Transform-Load process (ETL). Technological concepts for data warehousing: bitmap index, column store, compression, in-memory.

Prerequisites:

FCS1, ALG1, PRO1

Basics of computer science, algorithms & data structures, and programming

Lecture/Seminar profile:**Data and Information Visualization (DIV2IL)**

Degree course	AIS.ba
Course title	Data and Information Visualization
Course code	DIV2IL
Level	Bachelor
Term	SS26
Lecturer	
Contact hours per week	2
ECTS credits	2,5
Course type	Integrated course
Examinations	continuous assessment
Language of instruction	English
Places for international students	4

Learning objectives:

Graduates are aware of the importance of visualization for understanding and interpreting data, they can classify data sources and types, and know appropriate types of visualization. They can design visualizations so that they correspond to human visual perception. Graduates can further apply the most important models and steps for the process of information visualization to their own tasks. They are able to create relevant visualizations for a selected data set using visualization tools in order to identify characteristic patterns, outliers or trends.

Content:

The course introduces the essential contents of interactive information visualization. It is explained, 1.) where the added value of information visualization lies, 2.) to what extent visualizations can exploit human perception to make patterns, trends, and outliers in abstract data visible, 3.) how visualizations help memory and cognition, 4.) which cognitive and perceptual limits information visualization has, and 5.) which central role interaction plays in information visualization. This theoretical content is applied in practice and deepened in the practical part of the course by interactively visualizing a wide variety of data sets with Python visualization libraries (e.g., Seaborn, Altair) and the visualization tools (e.g. Tableau and Microsoft Power BI) in order to identify interesting patterns or trends in them. The technological implementation and the user-friendly design of the visualizations are evaluated.

Prerequisites:

IAI1, FCS1, ALG1, PRO1, MAT1

Basics of computer science, algorithms & data structures, Python programming, and linear algebra

Lecture/Seminar profile:**Data Quality and Data Preprocessing (DQP2IL)**

Degree course	AIS.ba
Course title	Data Quality and Data Preprocessing
Course code	DQP2IL
Level	Bachelor
Term	SS26
Lecturer	
Contact hours per week	2
ECTS credits	2,5
Course type	Integrated course
Examinations	continuous assessment
Language of instruction	English
Places for international students	4

Learning objectives:

Graduates know the essential methods for preprocessing data for advanced machine learning, in particular, scaling and transformation, as well as treatment and imputation of missing values. They can implement these in Python using the 'pandas' package to solve practical tasks.

Content:

Introduction to data: basic introduction and concepts; taxonomy of data; data representation; summarization and exploratory analysis; distance and similarity; example: central limit theorem. Data preprocessing: the data engineering pipeline; wrangling, cleaning, preprocessing; data quality; descriptive data summarization: basic statistics, skewness, dispersion, outliers; the box plot; missing values: sources (missing at random, missing not at random, not missing at random), mitigation strategies, missing values imputation; noise and noise removal; binning and scaling; basics of principal component analysis and linear discriminant analysis. All concepts and methods will be practiced in the exercise part of the course based on Python and the 'pandas' library.

Prerequisites:

IAI1, FCS1, ALG1, PRO1, MAT1

Basics of computer science, algorithms & data structures, Python programming, and linear algebra

Lecture/Seminar profile:**Embedded AI (EAI4IL)**

Degree course	AIS.ba
Course title	Embedded AI
Course code	EAI4IL
Level	Bachelor
Term	SS26
Lecturer	
Contact hours per week	4
ECTS credits	5
Course type	Integrated course
Examinations	continuous assessment
Language of instruction	English
Places for international students	4

Learning objectives:

n.a.

Content:

n.a.

Prerequisites:

IAI1, FCS1, PRO1, DAM2, DAP2, PRO2, SWA3

Blocked partially: RQE5VO will be held in blocks at the beginning of the 5th semester

Lecture/Seminar profile:**Generative AI (GAI4UE)**

Degree course	AIS.ba
Course title	Generative AI
Course code	GAI4UE
Level	Bachelor
Term	SS26
Lecturer	
Contact hours per week	2
ECTS credits	3
Course type	Practice-oriented session
Examinations	continuous assessment
Language of instruction	English
Places for international students	4

Learning objectives:

n.a.

Content:

Principles of generative modeling in detail and how to perform generative modeling with deep learning. Autoencoders, variational autoencoders.
Generative Adversarial Networks: architectures, training, technical issues.
Transformers: architectures and training, sequence-to-sequence learning, applications to natural language processing, vision transformers. Stable diffusion networks, Contrastive Language-Image Pre-training.
Extensive practical exercises deepen the subjects through practical examples.

Prerequisites:

IAI1, ALG1, PRO1, DAT2, MAT1, MAT2, MAL2, MAL3, NDL3

Lecture/Seminar profile:**Generative AI (GAI4VO)**

Degree course	AIS.ba
Course title	Generative AI
Course code	GAI4VO
Level	Bachelor
Term	SS26
Lecturer	
Contact hours per week	2
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:

Principles of generative modeling in detail and how to perform generative modeling with deep learning. Autoencoders, variational autoencoders.
Generative Adversarial Networks: architectures, training, technical issues.
Transformers: architectures and training, sequence-to-sequence learning, applications to natural language processing, vision transformers. Stable diffusion networks, Contrastive Language-Image Pre-training.
Extensive practical exercises deepen the subjects through practical examples.

Prerequisites:

IAI1, ALG1, PRO1, DAT2, MAT1, MAT2, MAL2, MAL3, NDL3

Lecture/Seminar profile:**Supervised Machine Learning (MLS2UE)**

Degree course	AIS.ba
Course title	Supervised Machine Learning
Course code	MLS2UE
Level	Bachelor
Term	SS26
Lecturer	
Contact hours per week	2
ECTS credits	3
Course type	Practice-oriented session
Examinations	continuous assessment
Language of instruction	English
Places for international students	4

Learning objectives:

n.a.

Content:

Introduction to supervised machine learning, classification, and regression; joint distribution of inputs and outputs, generalization error; estimation of generalization error using training and test sets; cross validation; confusion tables and evaluation measures derived from them; evaluation measures for unbalanced classification tasks; receiver-operator characteristics curve; evaluation measures for regression; underfitting and overfitting; hyperparameter optimization; supervised machine learning methods: k-nearest neighbor, linear regression, support vector machines, decision trees, tree ensembles: bagging (random forests) and boosting. Extensive practical exercises deepen the subjects of the lecture through practical examples.

Prerequisites:

IAI1, ALG1, PRO1, MAT1

Basics of AI, algorithms & data structures, Python programming, linear algebra, and calculus

Lecture/Seminar profile:**Supervised Machine Learning (MLS2VO)**

Degree course	AIS.ba
Course title	Supervised Machine Learning
Course code	MLS2VO
Level	Bachelor
Term	SS26
Lecturer	Ulrich Bodenhofer
Contact hours per week	2
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:

Introduction to supervised machine learning, classification, and regression; joint distribution of inputs and outputs, generalization error; estimation of generalization error using training and test sets; cross validation; confusion tables and evaluation measures derived from them; evaluation measures for unbalanced classification tasks; receiver-operator characteristics curve; evaluation measures for regression; underfitting and overfitting; hyperparameter optimization; supervised machine learning methods: k-nearest neighbor, linear regression, support vector machines, decision trees, tree ensembles: bagging (random forests) and boosting. Extensive practical exercises deepen the subjects of the lecture through practical examples.

Prerequisites:

IAI1, ALG1, PRO1, MAT1

Basics of AI, algorithms & data structures, Python programming, linear algebra, and calculus

Lecture/Seminar profile:**Basics of Probability and Statistics (PST2UE)**

Degree course	AIS.ba
Course title	Basics of Probability and Statistics
Course code	PST2UE
Level	Bachelor
Term	SS26
Lecturer	
Contact hours per week	2
ECTS credits	3
Course type	Practice-oriented session
Examinations	continuous assessment
Language of instruction	English
Places for international students	4

Learning objectives:

n.a.

Content:

Probability theory: random experiments and probability, combinatorics, conditional probability and Bayes rule, random variables, expectation and variance, discrete distributions, joint distributions, (conditional) independence, continuous distributions, normal distribution and the central limit theorem. Basics of descriptive statistics

Inferential statistics: estimators and their properties, confidence intervals, basic concepts of hypothesis testing with binomial test and t-tests as examples. Exercises deepen the subjects of the lecture through practical examples.

Prerequisites:

MAT1

Basics of linear algebra and calculus

Lecture/Seminar profile:**Basics of Probability and Statistics (PST2VO)**

Degree course	AIS.ba
Course title	Basics of Probability and Statistics
Course code	PST2VO
Level	Bachelor
Term	SS26
Lecturer	Stephan Dreiseitl
Contact hours per week	2
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:

Probability theory: random experiments and probability, combinatorics, conditional probability and Bayes rule, random variables, expectation and variance, discrete distributions, joint distributions, (conditional) independence, continuous distributions, normal distribution and the central limit theorem. Basics of descriptive statistics
Inferential statistics: estimators and their properties, confidence intervals, basic concepts of hypothesis testing with binomial test and t-tests as examples. Exercises deepen the subjects of the lecture through practical examples.

Prerequisites:

MAT1

Basics of linear algebra and calculus

Lecture/Seminar profile:**Logic and Symbolic AI (SYM2UE)**

Degree course	AIS.ba
Course title	Logic and Symbolic AI
Course code	SYM2UE
Level	Bachelor
Term	SS26
Lecturer	
Contact hours per week	2
ECTS credits	3
Course type	Practice-oriented session
Examinations	continuous assessment
Language of instruction	English
Places for international students	4

Learning objectives:

n.a.

Content:

Logic as the language of science: propositional and predicate logic, knowledge representation, entailment vs. inference, soundness and completeness. Elementary AI algorithms: search (including informed search, game search and constraint satisfaction) and planning. Symbolic representation of uncertainty: Joint distributions of random variables, Bayesian networks, hidden Markov models to Markov reward and Markov decision processes and foundations of reinforcement learning. Exercises deepen the subjects of the lecture through practical examples.

Prerequisites:

IAI1, ALG1, PRO1, MAT1

Basics of AI, algorithms & data structures, Python programming, linear algebra, and calculus

Lecture/Seminar profile:**Logic and Symbolic AI (SYM2VO)**

Degree course	AIS.ba
Course title	Logic and Symbolic AI
Course code	SYM2VO
Level	Bachelor
Term	SS26
Lecturer	Stephan Dreiseitl
Contact hours per week	2
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:

Logic as the language of science: propositional and predicate logic, knowledge representation, entailment vs. inference, soundness and completeness. Elementary AI algorithms: search (including informed search, game search and constraint satisfaction) and planning. Symbolic representation of uncertainty: Joint distributions of random variables, Bayesian networks, hidden Markov models to Markov reward and Markov decision processes and foundations of reinforcement learning. Exercises deepen the subjects of the lecture through practical examples.

Prerequisites:

IAI1, ALG1, PRO1, MAT1

Basics of AI, algorithms & data structures, Python programming, linear algebra, and calculus

Lecture/Seminar profile:**Market Research (23_MRE2VO)**

Degree course	DDP.ba
Course title	Market Research
Course code	23_MRE2VO
Level	Bachelor
Term	SS26
Lecturer	Robert Schenkenfelder
Contact hours per week	2
ECTS credits	2
Course type	Lecture
Examinations	written examination
Language of instruction	German/English
Places for international students	2

Learning objectives:

n.a.

Content:

Introduction to the basics of the market (market definition and assessment of market potential, etc.), the key figures of market analysis (market potential, market volume, market exploitation, etc.) and methods of market analysis (primary and secondary research, SWOT analysis, strengths/weaknesses analysis, competitor analysis, customer/target group analysis, etc.). Definition of objectives, market segments and target groups in the course of market, competition and industry analysis.

Translated with DeepL.com (free version)

Prerequisites:

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

Lecture/Seminar profile:**Business English & Green Marketing (26_BEM4IL)**

Degree course	DDP.ba
Course title	Business English & Green Marketing
Course code	26_BEM4IL
Level	Bachelor
Term	SS26
Lecturer	Jordanka Kretzschmar
Contact hours per week	2
ECTS credits	3
Course type	Integrated course
Examinations	continuous assessment
Language of instruction	English
Places for international students	4

Learning objectives:

n.a.

Content:

Development of functional technical vocabulary in the field of business English, reception and production of written technical texts (e.g. commercial correspondence), basic job-related presentations and technical discourse at B2+ level.

Prerequisites:

n.a.

Lecture/Seminar profile:**AI in Creativity (AIC1IL_INT)**

Degree course	FHHGB
Course title	AI in Creativity
Course code	AIC1IL_INT
Level	Bachelor
Term	SS26
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	10

Learning objectives:

Participants will be able to:

- Understand the fundamentals of creativity and its different dimensions, including artistic, scientific, and technological perspectives.
- Acquire a solid foundation in artificial intelligence and its key applications within creative domains such as generative art, music composition, storytelling, video generation, image generation, multimedia content creation small process automations.
- Develop a critical understanding of the ethical, social, and cultural implications of using AI in creative production, with particular attention to the role of technology in shaping creativity.
- Analyse case studies and real-world examples of AI-generated and AI-supported creative works and business relevant use cases, evaluating their aesthetic, technical, emotional, and commercial qualities.
- Build practical, hands-on skills in applying AI tools and techniques through prompt engineering and low-code or no-code automation platforms to generate creative and business-relevant output.

Content:

Introduction to Creativity and AI

- The concept of creativity and its various dimensions
 - What is AI? Core concepts, types of AI, and applications across different domains
 - The intersection of creativity and AI: historical developments, current practices, and future trends
- AI in Creative and Business Fields
- Prompt-Building and wrttinging – the way to communicate with AI
 - Generative art: algorithms, models, and tools for creating visual content with AI
 - Music composition and sound design: using AI to generate music, audio assets, and explore new genres
 - Video & image generation for different purpose (Gaming, Social Media and more)

- Storytelling and content creation: AI tools for narratives, plot development, characters, marketing copy, and brand storytelling
- Practical use cases and insights for the business world, including marketing, communication, and innovation processes
- Automation of administrative, marketing, and operational tasks using AI-driven workflows
- The role of AI in jobs, personal life, and evolving skill requirements

Ethical and Social Implications

- Bias in AI systems and its impact on creative and business outputs
- Ownership, copyright, and intellectual property of AI-generated content
- How AI changes creative processes, professional roles, and the definition of “art” and “value creation”

Collaboration and Co-Creation

- Human-AI interaction in creative and professional workflows
- Integrating AI-generated output with human creativity, expertise, and decision-making
- Case studies of successful AI-human collaboration and co-creation projects in creative industries and business environments

Hands-on Practice

- Practical experimentation with AI tools and techniques for creative, administrative, and business-oriented output
- Project-based learning: developing AI-supported projects, including art, music, storytelling, images, videos, marketing assets, administrative workflows, and small business automation projects
- Feedback, reflection, and critique sessions to evaluate outcomes and improve practical skills

The Future of AI and Creativity

- The impact of AI on creative industries, business models, and professional roles
- Emerging and potential new forms of creative and economic expression enabled by AI
- Ethical, social, and regulatory considerations shaping the future use of AI in creativity and business

Prerequisites:

None

Lecture/Seminar profile:**German for Beginners (DEU1IL_INT)**

Degree course	FHHGB
Course title	German for Beginners
Course code	DEU1IL_INT
Level	Bachelor
Term	SS26
Lecturer	Gabriele Hofmüller
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	SS26
Lecturer	Gabriele Hofmüller
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:**Semester project (SEM1PR_INT2PT)**

Degree course	FHHGB
Course title	Semester project
Course code	SEM1PR_INT2PT
Level	Bachelor
Term	SS26
Lecturer	Johannes Schönböck, Mirjam Augstein, Thomas Neumayr
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 defined milestones. Report problems and argue why you have chosen which technology and how you solved upcoming problems.

The Semester Project is designed in such a way that we provide current problems and topics from our research projects. The topics are quite broad, but more or less revolve around the focus on (hybrid) collaboration, recommendation systems and the practical use of AI tools to solve problems in our research work. The project is carried out as a group. This means that at the beginning of the semester, we will present you with specific topics and you as a group will decide which topic you would like to work on.

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:

English II (ENG2-17ILV)

Degree course	HSD.ba
Course title	English II
Course code	ENG2-17ILV
Level	Bachelor
Term	SS26
Lecturer	Yan Philip Templier
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:**Adaptivity and Personalization (AUP6VO)**

Degree course	KWM.ba
Course title	Adaptivity and Personalization
Course code	AUP6VO
Level	Bachelor
Term	SS26
Lecturer	Mirjam Augstein
Contact hours per week	2
ECTS credits	3
Course type	Lecture
Examinations	written examination
Language of instruction	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. 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.

Assessment: The course will be assessed by a combination of 1) a written exam at the end of the semester which contributes 66,7% to the overall result and 2) a reading assignment of topically relevant publications with the students will summarize and present in an oral exam (contributing

33,3% to the overall result). Students need to achieve at least 50% of the obtainable points in order to complete the course positively.

Prerequisites:

Students participating in the course should have basic (web) programming skills and be familiar with the basics of human-centered design (both is no strict prerequisite but recommended).

Lecture/Seminar profile:**Client-Side Scripting (SCR2IL)**

Degree course	KWM.ba
Course title	Client-Side Scripting
Course code	SCR2IL
Level	Bachelor
Term	SS26
Lecturer	Johannes Schönböck
Contact hours per week	3
ECTS credits	3,5
Course type	Integrated course
Examinations	continuous assessment
Language of instruction	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 being scrutinized and explored using practical examples. The course consists of a lecture part and a practical part.

Content:

Introduction into Client Side Scripting

- JavaScript basics
- Document Object Model (DOM)
- Object-oriented programming in JavaScript

In the course, the theoretical contents are applied to concrete examples.

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	SS26
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:

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	SS26
Lecturer	Reinhard Koutny, Peter Heumader
Contact hours per week	1
ECTS credits	1
Course type	Integrated course
Examinations	continuous assessment
Language of instruction	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:

- o Objectives and overview of the lecture
- o What is accessibility and why is accessibility important.
- o Overview of guidelines
- o Assistive technologies and their types of interaction with user interfaces of web/software systems
- o Self-experience: browsing and using ICT without screen, mouse, and keyboard; target audience.

2. Accessibility guidelines, their exemplary implementation and application examples

- o Principle 1: Perceivability: equivalent alternatives, adaptation of content, ...

3. accessibility guidelines, their exemplary implementation and application examples

- o Principle 2: Operability: keyboard interface, navigation, time, ...

4. accessibility guidelines, their exemplary implementation and application examples

- o Principle 3: Understandability: readability, user guidance, error prevention, ...
- o Principle 4: Robustness: Compatibility with AT and other user agents, ...

- o WCAG 2.1

5. Accessible dynamic web and software systems: Accessible Rich Internet Applications (WAI-ARIA)

- o HTML 5 Accessibility
- o What is WAI-ARIA?
- o ARIA elements and methods
- o ARIA Examples

Prerequisites:

basic knowledge of programming

Lecture/Seminar profile:**Man: Physiology (09_PHS2UE)**

Degree course	MBI.ba
Course title	Man: Physiology
Course code	09_PHS2UE
Level	Bachelor
Term	SS26
Lecturer	Julia Vetter
Contact hours per week	1,86
ECTS credits	1,86
Course type	Practice-oriented session
Examinations	continuous assessment
Language of instruction	German/English
Places for international students	2

Learning objectives:

n.a.

Content:

Ongoing training for the lecture, practical application of the knowledge imparted in the lecture.

Prerequisites:

n.a.

Lecture/Seminar profile:**English 2 (21_KEN2UE)**

Degree course	MBI.ba
Course title	English 2
Course code	21_KEN2UE
Level	Bachelor
Term	SS26
Lecturer	Sandra Zwirchmayr, 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	SS26
Lecturer	Sandra Zwirchmayr, 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:

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	SS26
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:**Interaction and Game Programming (05_IGP4IL)**

Degree course	MTD.ba
Course title	Interaction and Game Programming
Course code	05_IGP4IL
Level	Bachelor
Term	SS26
Lecturer	Andreas Ernst Riegler
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	SS26
Lecturer	Dominik Hackl, 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 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:**Special Topic 3D (05_S3D4IL)**

Degree course	MTD.ba
Course title	Special Topic 3D
Course code	05_S3D4IL
Level	Bachelor
Term	SS26
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	SS26
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	4

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	SS26
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
- How 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	SS26
Lecturer	Johannes Alexander Karder
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 (Flynn's 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:**Distributed and Parallel Software Systems (14_VPS5UE)**

Degree course	SE.ba
Course title	Distributed and Parallel Software Systems
Course code	14_VPS5UE
Level	Bachelor
Term	SS26
Lecturer	Johannes Alexander Karder, Philipp Neuhauser
Contact hours per week	1
ECTS credits	1,5
Course type	Practice-oriented session
Examinations	continuous assessment
Language of instruction	German / English
Places for international students	4

Learning objectives:

n.a.

Content:

Übungen vertiefen den Stoff der Vorlesung durch praktische Beispiele.

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	SS26
Lecturer	Stephan Winkler, Ulrich Bodenhofer
Contact hours per week	0,67
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 admission requirements for the study program

Lecture/Seminar profile:**Computational Intelligence II (0_2CO2V)**

Degree course	DSE.ma
Course title	Computational Intelligence II
Course code	0_2CO2V
Level	Master
Term	SS26
Lecturer	Stephan Winkler, Ulrich Bodenhofer
Contact hours per week	1,33
ECTS credits	2
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:

According to admission requirements for the study program

Lecture/Seminar profile:**Modelling and Simulation (0_MOS2U)**

Degree course	DSE.ma
Course title	Modelling and Simulation
Course code	0_MOS2U
Level	Master
Term	SS26
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:

According to admission requirements for the study program

Lecture/Seminar profile:**Modelling and Simulation (0_MOS2V)**

Degree course	DSE.ma
Course title	Modelling and Simulation
Course code	0_MOS2V
Level	Master
Term	SS26
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:

According to admission requirements for the study program

Lecture/Seminar profile:**Big Data (BIG4IL)**

Degree course	IM.ma
Course title	Big Data
Course code	BIG4IL
Level	Master
Term	SS26
Lecturer	Oliver Krauss
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:

The students know the process in Big Data pipelines and know important techniques that are necessary for the implementation of the individual phases. They can correctly assess important techniques that are necessary for scaling and processing large data volumes and make a suitable technology selection (e.g. SQL vs. NoSQL database) or define the decision criteria for this. Students will be able to choose appropriate visualizations of the Big Data pipeline results.

Content:

Scaling horizontal vs vertical, Shards, ReplicaSets vs Partitions, Transactions ACID vs BASE, Coherent PaaS, Open Schema vs strict Schema, Document Oriented Databases, Map Reduce vs GROUP BY, HAVING, ROLLUP, CUBE, Indexes, Hashes, Vector Clocks, Paxos, RAFT In-Memory, Caching, CDN, Analytics + (AI), Statistics, Algorithms (NOT: NLP, Text Analytics and AI Basics), Graph Databases (e.g. Neo4J), CQL vs SQL recursive with, MongoDB, OpenSchema, vs JSON, Key Value Stores (e.g. Redis), Large RDBMS installations (e.g. PostgreSQL or Greenplum, Oracle Exadata), Polyglot Data Model. Big Data pipelines (e.g. ELK stack, Databricks), visualizations (e.g. with Kibana, Grafana, Phyton).

Prerequisites:

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

Lecture/Seminar profile:**Hypermedia Frameworks (HMF2IL)**

Degree course	IM.ma
Course title	Hypermedia Frameworks
Course code	HMF2IL
Level	Master
Term	SS26
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	SS26
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	4

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:**Real Time Engineering (RTE2IL)**

Degree course	IM.ma
Course title	Real Time Engineering
Course code	RTE2IL
Level	Master
Term	SS26
Lecturer	Andreas Ernst Riegler
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 software and architecture patterns in the context of interactive real-time applications. They have an overview of the internal processes and mechanisms of current game and physics engines, as well as a theoretical and practical understanding of real-time physics simulation and its requirements and limitations. You have practical knowledge regarding the implementation of domain-specific problems using classical and visual programming methods.

Content:

Fundamentals of interactive real-time applications. Requirements and solutions for delay-free processing of user input, adaptation of the data model and visual and auditory output (data structures, software design patterns, architecture patterns). Fundamentals of real-time physical simulations. Implementation and integration with visual programming techniques (visual scripting).

Prerequisites:

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

Lecture/Seminar profile:**Software Design Methods (SDM2IL)**

Degree course	IM.ma
Course title	Software Design Methods
Course code	SDM2IL
Level	Master
Term	SS26
Lecturer	Hans Prüller
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:

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

Prerequisites:

Basic experience in conducting Software Projects, object oriented programming (eg Java) in general.

Lecture/Seminar profile:**User Interfaces (UIN3IL)**

Degree course	IM.ma
Course title	User Interfaces
Course code	UIN3IL
Level	Master
Term	SS26
Lecturer	Kathrin Probst
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 possess detailed knowledge of the conception and design of user interfaces, taking into account various input and output modalities, interaction forms and interaction patterns. They are able to create responsive designs that ensure an optimized presentation of and interaction with content on displays of different sizes. In addition, they are able to design user interfaces that use new forms of interaction (e.g. gestures, tangibles, proxemics, speech). Students master useful techniques for realizing and testing user interface designs with the help of digital or physical prototypes (e.g. usability testing, Wizard-of-Oz experiment).

Content:

User interface design guidelines; mobile-first and responsive design of graphical user interfaces, creation of clickable prototypes, component-based UI design systems; planning, implementation and evaluation of methods for the evaluation of graphical user interfaces (e.g. usability study, heuristic evaluation); application of techniques for the design and evaluation of embodied user interfaces (e.g. elicitation study, wizard-of-oz experiment).

Prerequisites:

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

Lecture/Seminar profile:**Visual Computing (VCO2IL)**

Degree course	IM.ma
Course title	Visual Computing
Course code	VCO2IL
Level	Master
Term	SS26
Lecturer	David Christian Schedl
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 advanced methods and techniques from the field of machine vision. In addition to mathematical and theoretical understanding, students also acquire practical skills in the implementation and application of algorithms and software that are used, for example, in robotics, medicine, biology, astronomy and media technology.

Content:

Fundamentals of digital image processing and machine vision; visual perception; colours; cameras; linear and non-linear filters; spectral methods; geometric operations; interpolation methods; multi-perspective methods; artificial intelligence; algorithms and software.

Prerequisites:

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

Lecture/Seminar profile:**Diversity Management and Intercultural Collaboration (DIC2IL)**

Degree course	KWM.ma
Course title	Diversity Management and Intercultural Collaboration
Course code	DIC2IL
Level	Master
Term	SS26
Lecturer	Martina Gaisch
Contact hours per week	3
ECTS credits	5
Course type	Integrated course
Examinations	continuous assessment
Language of instruction	English
Places for international students	5

Learning objectives:

n.a.

Content:

This course teaches theories and key concepts of intercultural communication processes and supplements them with reflective practice. Students benefit from practical examples and specific fields of application, as well as exercises for further developing important key competencies. Case studies are used to train and thoroughly analyze intercultural negotiation and dialogue skills.

Students acquire in-depth knowledge of the dynamics in local and distributed teams and learn to use media appropriately in different communication contexts.

In addition, students gain knowledge, attitudes, and skills that enable them to act effectively and sensitively in intercultural, interdisciplinary, and diverse social contexts (e.g., perspective change, reflective ability, intersectionality, and the “Big 8” of diversity dimensions). They learn about essential tools of diversity management, including the HEAD Wheel (Higher Education Awareness for Diversity) and the DIVE-Too (Diversity & Inclusion Value Enabler). These instruments cover five dimensions of diversity - demographic, cognitive, disciplinary, functional, and institutional diversity - and provide essential frameworks for specifically promoting diversity and successfully integrating it into the organizational context.

Prerequisites:

According to the prerequisites for degree program access.

Lecture/Seminar profile:**Artificial Intelligence (25_AIN2IL)**

Degree course	SE.ma
Course title	Artificial Intelligence
Course code	25_AIN2IL
Level	Master
Term	SS26
Lecturer	Stephan Dreiseitl, Erik Pitzer
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:

Structure of intelligent systems, search algorithms, heuristics, constraint satisfaction problems, propositional logic and predicate logic as languages of knowledge representation and inference, planning algorithms, knowledge representation and inference in stochastic systems using Bayesian networks and Markov chains, optimal action selection in deterministic and stochastic environments through reinforcement learning.

Prerequisites:

Entsprechend den Zugangsvoraussetzungen des Studiengangs

Lecture/Seminar profile:**Data Mining and Machine Learning (25_DML2IL)**

Degree course	SE.ma
Course title	Data Mining and Machine Learning
Course code	25_DML2IL
Level	Master
Term	SS26
Lecturer	Michael Affenzeller
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 learning 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:**Formal Languages and Compilers (25_FLC2UE)**

Degree course	SE.ma
Course title	Formal Languages and Compilers
Course code	25_FLC2UE
Level	Master
Term	SS26
Lecturer	Johannes Alexander Karder, 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	4

Learning objectives:

n.a.

Content:

In the exercises, the theoretical aspects of formal languages are practiced with theoretical tasks, the aspects of compiler and tool construction are practiced using compiler generators and by the complete implementation of a real compiler for a simple example language that generates bytecode (CIL) for the .NET virtual machine (CLR).

Prerequisites:

Entsprechend den Zugangsvoraussetzungen des Studiengangs

Lecture/Seminar profile:**Formal Languages and Compilers (25_FLC2VO)**

Degree course	SE.ma
Course title	Formal Languages and Compilers
Course code	25_FLC2VO
Level	Master
Term	SS26
Lecturer	Gabriel Kronberger
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:

Formal languages: Terms and definitions (e.g., symbol, rule, grammar, language, derivation, reduction), overview of the Chomsky hierarchy, regular languages, regular expressions and finite automata, context-free languages and pushdown automata, in particular deterministic recognition, LL(k) and LR(k). Compiler and tool construction: Compiler topology (frontend, backend, data flow), lexical analysis, syntax analysis, error detection and handling, formal description of translation processes (attributed grammars) and implementation of these translation processes using compiler generators. Intermediate languages, methods from optimization and code generation.

Prerequisites:

Entsprechend den Zugangsvoraussetzungen des Studiengangs

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	SS26
Lecturer	Philipp Fleck
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:**Cross Cultural Business Communication (CCC2ILV)**

Degree course	ISM.ma
Course title	Cross Cultural Business Communication
Course code	CCC2ILV
Level	Master
Term	SS26
Lecturer	Martina Gaisch
Contact hours per week	2
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.