



UNIVERSITY
OF APPLIED SCIENCES
UPPER AUSTRIA

Course Offer

for Incoming Exchange
Students

Winter Semester 2026/27

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
Artificial Intelligence Solutions (Bachelor, Hagenberg Campus)							
AIS.ba	ALG1UE	Algorithms and Data Structures	Practice-oriented session	1	Bachelor	3	7
AIS.ba	ALG1VO	Algorithms and Data Structures	Lecture	1	Bachelor	2	8
AIS.ba	CPP3IL	Programming in C and C++	Integrated course	3	Bachelor	5	9
AIS.ba	DIS3IL	Data and Information Security	Integrated course	3	Bachelor	2,5	10
AIS.ba	FCS1IL	Foundations of Computer Science	Integrated course	1	Bachelor	5	11
AIS.ba	HEO3UE	Heuristic Optimization and Symbolic Regression	Practice-oriented session	3	Bachelor	3	12
AIS.ba	HEO3VO	Heuristic Optimization and Symbolic Regression	Lecture	3	Bachelor	2	13
AIS.ba	IAI1UE	Introduction to Artificial Intelligence	Practice-oriented session	1	Bachelor	3	14
AIS.ba	IAI1VO	Introduction to Artificial Intelligence	Lecture	1	Bachelor	2	15
AIS.ba	MAT1UE	Basics of Linear Algebra and Calculus	Practice-oriented session	1	Bachelor	3	16
AIS.ba	MAT1VO	Basics of Linear Algebra and Calculus	Lecture	1	Bachelor	2	17
AIS.ba	MLU3UE	Unsupervised Machine Learning	Practice-oriented session	3	Bachelor	3	18
AIS.ba	MLU3VO	Unsupervised Machine Learning	Lecture	3	Bachelor	2	19
AIS.ba	NDL3UE	Neural Networks and Deep Learning	Practice-oriented session	3	Bachelor	3	20
AIS.ba	NDL3VO	Neural Networks and Deep Learning	Lecture	3	Bachelor	2	21
AIS.ba	OPY1IL	Object-Oriented Programming With Python	Integrated course	1	Bachelor	5	22
AIS.ba	SBD3UE	Software Architectures for Big Data	Practice-oriented session	3	Bachelor	3	23
AIS.ba	SBD3VO	Software Architectures for Big Data	Lecture	3	Bachelor	2	24

Bachelor's Degree Programme

Programme (department)	Course unit code	Course unit title	Course type	Semester (level)	Level	ECTS	Page
Artificial Intelligence Solutions (Bachelor, Hagenberg Campus)							
AIS.ba	TIS3IL	Time Series Analysis	Integrated course	3	Bachelor	2,5	25
School of Informatics, Communications and Media (Bachelor, Hagenberg Campus)							
FHHGB	AIC1IL_INT	AI in Creativity	Integrated course	1	Bachelor	5	26
FHHGB	CDF1IL_INT	Computer Design and Firmware Programming	Integrated course	1	Bachelor	5	28
FHHGB	DEU1IL_INT	German for Beginners	Integrated course	1	Bachelor	2	29
FHHGB	DEU2IL_INT	German for Beginners with Prior Knowledge	Integrated course	1	Bachelor	2	30
FHHGB	DEU3IL_INT	German 3 - Intermediate Level	Integrated course	1	Bachelor	2	31
FHHGB	MAD1IL_INTIL	Mobile App Development	Integrated course	1	Bachelor	5	32
FHHGB	SEM1PR_INT2P T	Semester project	Project	1	Bachelor	10	34
Hardware-Software-Design (Bachelor, Hagenberg Campus)							
HSD.ba	EKI5-17ILV	Introduction Artificial Intelligence	Integrated course	5	Bachelor	2,5	35
HSD.ba	ENG1-17ILV	English I	Integrated course	1	Bachelor	2	36
HSD.ba	SCM3-ILV	Source-Code-Management	Integrated course	3	Bachelor	1	37
Communication and Knowledge Media (Bachelor, Hagenberg Campus)							
KWM.ba	COM1UE	Communication in the New Media Age	Practice-oriented session	1	Bachelor	1	38
KWM.ba	IDP3VO	Interaction Design and Prototyping	Lecture	3	Bachelor	2	39
KWM.ba	PRE3UE	Presentation Skills for Knowledge Transfer	Practice-oriented session	3	Bachelor	1	40
Medical and Bioinformatics (Bachelor, Hagenberg Campus)							
MBI.ba	09_GBC1UE	Biological and Chemical Basics	Laboratory session	1	Bachelor	1	41
MBI.ba	21_ALG5ILV	Bioinformatics Algorithms	Integrated course	5	Bachelor	2,5	42

Programme (department)	Course unit code	Course unit title	Course type	Semester (level)	Level	ECTS	Page
Medical and Bioinformatics (Bachelor, Hagenberg Campus)							
MBI.ba	21_KEN1UE	English 1	Practice-oriented session	1	Bachelor	2	43
MBI.ba	21_MAL5UE	Machine Learning and Data Mining	Practice-oriented session	5	Bachelor	1,5	44
MBI.ba	21_MAL5VO	Machine Learning and Data Mining	Lecture	5	Bachelor	1	45
MBI.ba	21_TEN3UE	Technical English 1	Practice-oriented session	3	Bachelor	1	46
MBI.ba	21_TEN5UE	Technical English 3	Practice-oriented session	5	Bachelor	1	47
Media Technology and Design (Bachelor, Hagenberg Campus)							
MTD.ba	05_GWP5IL	Games with a Purpose	Integrated course	5	Bachelor	5	48
MTD.ba	05_ISY5IL	Intelligent Systems	Integrated course	5	Bachelor	5	49
MTD.ba	06_3DD1IL	3D Design	Integrated course	1	Bachelor	2,5	50
MTD.ba	06_AVT1IL	Audio/Video Technology I	Integrated course	1	Bachelor	2,5	51
MTD.ba	06_GEC1IL	Game Engine Concepts	Integrated course	1	Bachelor	2	52
MTD.ba	06_IGA1UE	Introduction to Games	Practice-oriented session	1	Bachelor	1,5	54
MTD.ba	06_IGA1VO	Introduction to Games	Lecture	1	Bachelor	1,5	55
MTD.ba	06_MCO1UE	Modern Code	Practice-oriented session	1	Bachelor	2,5	56
MTD.ba	06_MCO1VO	Modern Code	Lecture	1	Bachelor	2,5	57
MTD.ba	06_MDE1IL	Motion Design	Integrated course	1	Bachelor	2,5	58
MTD.ba	06_PHO1IL	Photography	Integrated course	1	Bachelor	2	59
MTD.ba	06_VIA1IL	Visual Aesthetics	Integrated course	1	Bachelor	3	60
MTD.ba	06_WED1IL	Web Design	Integrated course	1	Bachelor	2	61

Programme (department)	Course unit code	Course unit title	Course type	Semester (level)	Level	ECTS	Page
Media Technology and Design (Bachelor, Hagenberg Campus)							
MTD.ba	06_WEF1UE	Web Fundamentals	Practice- oriented session	1	Bachelor	1,5	62
MTD.ba	06_WEF1VO	Web Fundamentals	Lecture	1	Bachelor	1,5	63
Software Engineering (Bachelor, Hagenberg Campus)							
SE.ba	09_VPS5VO	Distributed and Parallel Software Systems	Lecture	5	Bachelor	1	64
SE.ba	14_VPS5UE	Distributed and Parallel Software Systems	Practice- oriented session	5	Bachelor	1,5	65

Master's Degree Programme

Programme (department)	Course unit code	Course unit title	Course type	Semester (level)	Level	ECTS	Page
Data Science and Engineering (Master, Hagenberg Campus)							
DSE.ma	0_1CO1U	Computational Intelligence I	Practice-oriented session	1	Master	2	66
DSE.ma	0_1CO1V	Computational Intelligence I	Lecture	1	Master	3	67
Embedded Systems Design (Master, Hagenberg Campus)							
ESD.ma	DRS3-18UE	Distributed Realtime Systems	Practice-oriented session	3	Master	2	68
ESD.ma	DRS3-18VO	Distributed Realtime Systems	Lecture	3	Master	3	69
Interactive Media (Master, Hagenberg Campus)							
IM.ma	GDE1IL	Game Development	Integrated course	1	Master	5	70
IM.ma	HUX1IL	Hypermedia UX Engineering	Integrated course	1	Master	5	71
IM.ma	RTG1IL	Real Time Graphics	Integrated course	1	Master	5	72
IM.ma	SCO3IL	Spatial Computing	Integrated course	3	Master	5	73
Software Engineering (Master, Hagenberg Campus)							
SE.ma	25_BDV3IL	Big Data Analytics and Interactive Visualization	Integrated course	3	Master	5	74
SE.ma	25_DWO1IL	Data Warehousing, OLAP and Business Intelligence	Integrated course	1	Master	5	75
SE.ma	25_HEA1IL	Heuristic and Evolutionary Algorithms	Integrated course	1	Master	5	76
SE.ma	25_MSM1IL	Modeling and Simulation	Integrated course	1	Master	5	77
SE.ma	25_NDL3IL	Neural Networks and Deep Learning	Integrated course	3	Master	5	78
SE.ma	25_SWR3SE	Scientific Writing	Seminar	3	Master	4	79
Secure Information Systems (Master, Hagenberg Campus)							
SIM.ma	ATI3IL	Current topics in IT security	Integrated course	3	Master	3	80

Programme (department)	Course unit code	Course unit title	Course type	Semester (level)	Level	ECTS	Page
Human-Centered Computing (Master - Part Time, Hagenberg Campus)							
HCC.ma	17_INT3I	Intercultural Negotiation	Integrated course	3	Master	1,5	81
Information Engineering and -Management (Master - Part Time, Hagenberg Campus)							
IEM.ma	26_TEA3 I	Technology Assessment	Integrated course	3	Master	1	82

Lecture/Seminar profile:**Algorithms and Data Structures (ALG1UE)**

Degree course	AIS.ba
Course title	Algorithms and Data Structures
Course code	ALG1UE
Level	Bachelor
Term	WS26/27
Lecturer	Thomas Ziebermayr
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:

Standard operations on static data structures (arrays), creation and management of dynamic data structures (single and doubly linked lists and various types of trees) and standard operations on them. Elementary algorithms for searching (sequential and binary search) on arrays, linked lists and binary (search) trees. Concept of recursion, recursive algorithms and their process, transformation from recursive to iterative algorithms and vice versa. Sorting algorithms (selection and insertion sort, shell sort, exchange sort and quicks-sort), their application and analysis. Concept of pseudo-random numbers, generators for and properties of random number sequences as well as example for the applications of random numbers. Specifying and designing algorithms from a functional point of view (method of incremental refinement). Structure, memory and runtime complexity of algorithms and analysis of algorithms with regard to these types of complexity.

Exercises deepen the subjects of the lecture through practical examples.

Prerequisites:

None

Lecture/Seminar profile:**Algorithms and Data Structures (ALG1VO)**

Degree course	AIS.ba
Course title	Algorithms and Data Structures
Course code	ALG1VO
Level	Bachelor
Term	WS26/27
Lecturer	Thomas Ziebermayr
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:

Standard operations on static data structures (arrays), creation and management of dynamic data structures (single and doubly linked lists and various types of trees) and standard operations on them. Elementary algorithms for searching (sequential and binary search) on arrays, linked lists and binary (search) trees. Concept of recursion, recursive algorithms and their process, transformation from recursive to iterative algorithms and vice versa. Sorting algorithms (selection and insertion sort, shell sort, exchange sort and quicks-sort), their application and analysis. Concept of pseudo-random numbers, generators for and properties of random number sequences as well as example for the applications of random numbers. Specifying and designing algorithms from a functional point of view (method of incremental refinement). Structure, memory and runtime complexity of algorithms and analysis of algorithms with regard to these types of complexity.

Exercises deepen the subjects of the lecture through practical examples.

Prerequisites:

None

Lecture/Seminar profile:**Programming in C and C++ (CPP3IL)**

Degree course	AIS.ba
Course title	Programming in C and C++
Course code	CPP3IL
Level	Bachelor
Term	WS26/27
Lecturer	Florian Eibensteiner
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:

Introduction to compilable languages, compiler directives, make files, the basic language specifics of C and C++, elementary I/O functions, error handling and debugging, and basic concepts of object orientation.

Introduction to system architecture and real-time capabilities of microcontrollers and software development for embedded systems. Utilization of peripherals (e.g., sensors and actors), interfaces for communication, libraries, design patterns for embedded systems and interrupts.

Prerequisites:

FCS1, PRO1, ALG1

Lecture/Seminar profile:**Data and Information Security (DIS3IL)**

Degree course	AIS.ba
Course title	Data and Information Security
Course code	DIS3IL
Level	Bachelor
Term	WS26/27
Lecturer	Markus Zeilinger
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:

n.a.

Content:

Introduction to the basics of information security and its terms, protection goals as well as their definition. Analysis of threats and creation of threat models, as well as the acquisition of the necessary basics in the areas of computer networks and their security, internet/cybersecurity, system security and the application of cryptographic methods to achieve security goals. Authentication and access/access control technologies, privacy enhancement techniques, and secure systems engineering fundamentals.

Prerequisites:

IAI1, FCS1, PRO1, DAM2, DAP2, SWD2

Lecture/Seminar profile:**Foundations of Computer Science (FCS1IL)**

Degree course	AIS.ba
Course title	Foundations of Computer Science
Course code	FCS1IL
Level	Bachelor
Term	WS26/27
Lecturer	Johannes Sametinger
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:

Computer architecture: components of a computer and their interaction, von Neumann architecture, processor, main memory, buses, storage media, input and output devices. Operating systems: processes, threads, scheduling, synchronization, memory management, file management, device management, command line; Networks: ISO/OSI model, hubs, switches, routers, TCP/IP, application layer protocols: DNS and HTTP. Computational thinking: problem analysis, problem decomposition and abstraction, recognition of similarities in problems (pattern recognition), modelling, formal problem solving and creation of algorithms, automation of solution steps. Lectures will be interwoven with practical work and assignments to practice the acquired knowledge.

Prerequisites:

None

Lecture/Seminar profile:**Heuristic Optimization and Symbolic Regression (HEO3UE)**

Degree course	AIS.ba
Course title	Heuristic Optimization and Symbolic Regression
Course code	HEO3UE
Level	Bachelor
Term	WS26/27
Lecturer	Alexander Kinast
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:

Taxonomy of system models; taxonomy of optimization: differentiation between numerical and heuristic optimization, examples of combinatorial optimization problems; complexity theory: solution space behavior, P and NP problems; heuristic methods: problem-specific methods vs. metaheuristics, construction vs. improvement heuristics, proximity and distance of solutions, local search; trajectory-based methods: simulated annealing, tabu search; population-based methods: ant-colony optimization, swarm intelligence, genetic algorithms, evolution strategies, genetic programming, scatter search.v

Prerequisites:

IAI1, ALG1, PRO1, MAT1, MAT2, MAL2, DAP2

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

Lecture/Seminar profile:**Heuristic Optimization and Symbolic Regression (HEO3VO)**

Degree course	AIS.ba
Course title	Heuristic Optimization and Symbolic Regression
Course code	HEO3VO
Level	Bachelor
Term	WS26/27
Lecturer	Alexander Kinast
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:

Taxonomy of system models; taxonomy of optimization: differentiation between numerical and heuristic optimization, examples of combinatorial optimization problems; complexity theory: solution space behavior, P and NP problems; heuristic methods: problem-specific methods vs. metaheuristics, construction vs. improvement heuristics, proximity and distance of solutions, local search; trajectory-based methods: simulated annealing, tabu search; population-based methods: ant-colony optimization, swarm intelligence, genetic algorithms, evolution strategies, genetic programming, scatter search.v

Prerequisites:

IAI1, ALG1, PRO1, MAT1, MAT2, MAL2, DAP2

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

Lecture/Seminar profile:**Introduction to Artificial Intelligence (IAI1UE)**

Degree course	AIS.ba
Course title	Introduction to Artificial Intelligence
Course code	IAI1UE
Level	Bachelor
Term	WS26/27
Lecturer	Michael Konstantin Heckmann
Contact hours per week	2
ECTS credits	3
Course type	Practice-oriented session
Examinations	continuous assessment
Language of instruction	German
Places for international students	4

Learning objectives:

n.a.

Content:

Lecture part: definition of Artificial Intelligence; taxonomy and history of AI, narrow and strong AI; current applications of AI, prospective future applications of AI; the role of machine learning in AI, taxonomy of machine learning; overview of symbolic AI; overview of heuristic optimization and symbolic regression.

Practical part: low-threshold hands-on workshops how to use notebook templates and no-code solutions (Knime, HeuristicLab) for solving simple machine learning tasks; practical usage of Large Language Models and chatbots.

Prerequisites:

None

Lecture/Seminar profile:**Introduction to Artificial Intelligence (IAI1VO)**

Degree course	AIS.ba
Course title	Introduction to Artificial Intelligence
Course code	IAI1VO
Level	Bachelor
Term	WS26/27
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:

Lecture part: definition of Artificial Intelligence; taxonomy and history of AI, narrow and strong AI; current applications of AI, prospective future applications of AI; the role of machine learning in AI, taxonomy of machine learning; overview of symbolic AI; overview of heuristic optimization and symbolic regression.

Practical part: low-threshold hands-on workshops how to use notebook templates and no-code solutions (Knime, HeuristicLab) for solving simple machine learning tasks; practical usage of Large Language Models and chatbots.

Prerequisites:

None

Lecture/Seminar profile:**Basics of Linear Algebra and Calculus (MAT1UE)**

Degree course	AIS.ba
Course title	Basics of Linear Algebra and Calculus
Course code	MAT1UE
Level	Bachelor
Term	WS26/27
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:

Linear Algebra: vectors and vector spaces, linear functions, matrices, determinants, rank of a matrix, linear systems, inverse matrix, dot product, orthogonality, eigenvalues and eigenvectors.

Calculus: limits, continuity, derivatives, basic differentiation rules, partial derivatives, gradients, vector differentiation; Riemann integral and stem functions, basic integration rules.

Exercises deepen the subjects of the lecture through practical examples.

Prerequisites:

None

Lecture/Seminar profile:**Basics of Linear Algebra and Calculus (MAT1VO)**

Degree course	AIS.ba
Course title	Basics of Linear Algebra and Calculus
Course code	MAT1VO
Level	Bachelor
Term	WS26/27
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:

Linear Algebra: vectors and vector spaces, linear functions, matrices, determinants, rank of a matrix, linear systems, inverse matrix, dot product, orthogonality, eigenvalues and eigenvectors.

Calculus: limits, continuity, derivatives, basic differentiation rules, partial derivatives, gradients, vector differentiation; Riemann integral and stem functions, basic integration rules.

Exercises deepen the subjects of the lecture through practical examples.

Prerequisites:

None

Lecture/Seminar profile:**Unsupervised Machine Learning (MLU3UE)**

Degree course	AIS.ba
Course title	Unsupervised Machine Learning
Course code	MLU3UE
Level	Bachelor
Term	WS26/27
Lecturer	Mustafa Arikan
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 unsupervised machine learning and its applications. Cluster-ing: agglomerative clustering, k-means and k-medoid clustering, affinity prop-agation clustering, density-based clustering. Mining frequent item sets and association rules; the A-Priori algorithm. Projection methods: principal com-ponent analysis, independent component analysis, projection pursuit, t-SNE, UMAP. Basic idea of generative modeling and latent-variable models. Extensive practical exercises deepen the subjects of the lecture through practical examples.

Prerequisites:

IAI1, ALG1, PRO1, MAT1, MAT2, MAL2, DAP2

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

Lecture/Seminar profile:**Unsupervised Machine Learning (MLU3VO)**

Degree course	AIS.ba
Course title	Unsupervised Machine Learning
Course code	MLU3VO
Level	Bachelor
Term	WS26/27
Lecturer	Mustafa Arikan
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 unsupervised machine learning and its applications. Cluster-ing: agglomerative clustering, k-means and k-medoid clustering, affinity prop-agation clustering, density-based clustering. Mining frequent item sets and association rules; the A-Priori algorithm. Projection methods: principal com-ponent analysis, independent component analysis, projection pursuit, t-SNE, UMAP. Basic idea of generative modeling and latent-variable models. Extensive practical exercises deepen the subjects of the lecture through practical examples.

Prerequisites:

IAI1, ALG1, PRO1, MAT1, MAT2, MAL2, DAP2

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

Lecture/Seminar profile:**Neural Networks and Deep Learning (NDL3UE)**

Degree course	AIS.ba
Course title	Neural Networks and Deep Learning
Course code	NDL3UE
Level	Bachelor
Term	WS26/27
Lecturer	Michael Konstantin Heckmann, Philipp Geppner
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:

Basic idea of artificial neural networks: neurophysiological basics, function of a nerve cell, perceptrons, the perceptron learning algorithm, linear separability. Multi-layered networks and the backpropagation algorithm, online, batch, and minibatch training, tricks of the trade, regularization. The vanishing gradient problem; deep networks, alternative activation functions, dropout. Convolutional neural networks: basic idea and architecture, convolutional filters, pooling, flattening, training of convolutional networks, fully convolutional networks. Recurrent neural networks, the vanishing gradient problem revisited, long short-term memory cells and networks, gated recurrent units.

Extensive practical exercises deepen the subjects of the lecture through practical examples.

Prerequisites:

IAI1, ALG1, PRO1, MAT1, MAT2, MAL2, DAP2

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

Lecture/Seminar profile:**Neural Networks and Deep Learning (NDL3VO)**

Degree course	AIS.ba
Course title	Neural Networks and Deep Learning
Course code	NDL3VO
Level	Bachelor
Term	WS26/27
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:

Basic idea of artificial neural networks: neurophysiological basics, function of a nerve cell, perceptrons, the perceptron learning algorithm, linear separability. Multi-layered networks and the backpropagation algorithm, online, batch, and minibatch training, tricks of the trade, regularization. The vanishing gradient problem; deep networks, alternative activation functions, dropout. Convolutional neural networks: basic idea and architecture, convolutional filters, pooling, flattening, training of convolutional networks, fully convolutional networks. Recurrent neural networks, the vanishing gradient problem revisited, long short-term memory cells and networks, gated recurrent units.

Extensive practical exercises deepen the subjects of the lecture through practical examples.

Prerequisites:

IAI1, ALG1, PRO1, MAT1, MAT2, MAL2, DAP2

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

Lecture/Seminar profile:**Object-Oriented Programming With Python (OPY1IL)**

Degree course	AIS.ba
Course title	Object-Oriented Programming With Python
Course code	OPY1IL
Level	Bachelor
Term	WS26/27
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:

Elementary data types, control structures and functions/procedures; Python as a universal, dynamically typed scripting language; Python development environments (PyCharm) and notebooks (Jupyter / Google Colab); using the most important elements of the Python standard library; basics of object-oriented programming (classes, inheritance, polymorphism) and their realization in Python; the program library 'numpy' and its use to implement simple numerical algorithms. Lectures will be interwoven with practical work and assignments to practice the acquired knowledge.

Prerequisites:

None

Lecture/Seminar profile:**Software Architectures for Big Data (SBD3UE)**

Degree course	AIS.ba
Course title	Software Architectures for Big Data
Course code	SBD3UE
Level	Bachelor
Term	WS26/27
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 Big Data (Challenges/Impact of Big Data on data processing, sources of Big Data, e.g. Social Media, sensory networks, geographical data, traffic data, surveillance data, weather data); Theoretical foundations of Big Data architectures (Lambda, Kappa); Basics of application deployment in Big Data environments with containers (Docker), orchestration software (Kubernetes) and cloud providers (Azure); NoSQL databases for Big Data applications (e.g. Redis, Cassandra, MongoDB); Big Data Stacks like Apache Hadoop and Microsoft Azure; Application of tools and Big Data Components like MapReduce, HDFS, Spark, Airflow; Stream processing tools (e.g. Spark Streaming, Kafka); Example applications: recommender systems, analysis of social network graphs, sentiment analysis, opinion mining.

Prerequisites:

IAI1, FCS1, PRO1, DAM2, DAP2, SWD2

Lecture/Seminar profile:**Software Architectures for Big Data (SBD3VO)**

Degree course	AIS.ba
Course title	Software Architectures for Big Data
Course code	SBD3VO
Level	Bachelor
Term	WS26/27
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:

Introduction to Big Data (Challenges/Impact of Big Data on data processing, sources of Big Data, e.g. Social Media, sensory networks, geographical data, traffic data, surveillance data, weather data); Theoretical foundations of Big Data architectures (Lambda, Kappa); Basics of application deployment in Big Data environments with containers (Docker), orchestration software (Kubernetes) and cloud providers (Azure); NoSQL databases for Big Data applications (e.g. Redis, Cassandra, MongoDB); Big Data Stacks like Apache Hadoop and Microsoft Azure; Application of tools and Big Data Components like MapReduce, HDFS, Spark, Airflow; Stream processing tools (e.g. Spark Streaming, Kafka); Example applications: recommender systems, analysis of social network graphs, sentiment analysis, opinion mining.

Prerequisites:

IAI1, FCS1, PRO1, DAM2, DAP2, SWD2

Lecture/Seminar profile:**Time Series Analysis (TIS3IL)**

Degree course	AIS.ba
Course title	Time Series Analysis
Course code	TIS3IL
Level	Bachelor
Term	WS26/27
Lecturer	Franziskos Kyriakopoulos
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:

n.a.

Content:

preprocessing of time series data. Stationary processes and ARMA models. Spectral analysis. Nonstationary and seasonal time series models. Statespace models. Machine learning models for time series forecasting. Anomaly detection in time series. Using frameworks like 'prophet' and 'merlion'. Special challenges in sales forecasting and forecasting of financial time series. Extensive practical exercises deepen the subjects through practical examples.

Prerequisites:

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

Lecture/Seminar profile:

AI in Creativity (AIC1IL_INT)

Degree course	FHHGB
Course title	AI in Creativity
Course code	AIC1IL_INT
Level	Bachelor
Term	WS26/27
Lecturer	Alexander Schurr
Contact hours per week	3
ECTS credits	5
Course type	Integrated course
Examinations	continuous assessment
Language of instruction	English
Places for international students	2

Learning objectives:

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 writing – 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:**Computer Design and Firmware Programming (CDF1IL_INT)**

Degree course	FHHGB
Course title	Computer Design and Firmware Programming
Course code	CDF1IL_INT
Level	Bachelor
Term	WS26/27
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	WS26/27
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	WS26/27
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:

German 3 - Intermediate Level (DEU3IL_INT)

Degree course	FHHGB
Course title	German 3 - Intermediate Level
Course code	DEU3IL_INT
Level	Bachelor
Term	WS26/27
Lecturer	Gabriele Hofmüller
Contact hours per week	1,6
ECTS credits	2
Course type	Integrated course
Examinations	continuous assessment
Language of instruction	German/English
Places for international students	10

Learning objectives:

n.a.

Content:

n.a.

Prerequisites:

n.a.

Lecture/Seminar profile:**Mobile App Development (MAD1IL_INTIL)**

Degree course	FHHGB
Course title	Mobile App Development
Course code	MAD1IL_INTIL
Level	Bachelor
Term	WS26/27
Lecturer	Jens Krösche
Contact hours per week	4
ECTS credits	5
Course type	Integrated course
Examinations	continuous assessment
Language of instruction	English
Places for international students	2

Learning objectives:

By the end of this course, students will have the foundational skills to build functional Android applications using Kotlin and Jetpack Compose, setting a solid groundwork for further learning and development in mobile app development.

Content:

This introductory course is designed for beginners who want to start their journey into Android app development using Kotlin and Jetpack Compose. Throughout this course, students will learn the fundamentals of Android development, including the Kotlin programming language and the modern UI toolkit, Jetpack Compose, to build engaging and efficient mobile applications.

Course objectives:

- Understand the basics of the Kotlin programming language and its features.
- Get acquainted with the Android development environment and tools.
- Learn the principles and components of Jetpack Compose for building user interfaces.
- Develop hands-on experience by creating simple Android applications.
- Gain knowledge of best practices and design patterns in modern Android development.

Assessment:

- (Bi-)Weekly coding assignments and quizzes
- Final project presentation and code review

Prerequisites:

- Basic knowledge in object-oriented programming.
- Curiosity and willingness to learn.

Lecture/Seminar profile:**Semester project (SEM1PR_INT2PT)**

Degree course	FHHGB
Course title	Semester project
Course code	SEM1PR_INT2PT
Level	Bachelor
Term	WS26/27
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	6

Learning objectives:

You will work in a team on a specific topic (topics provided, or own choice of a topic is welcome), where you will iteratively develop a web or mobile app and evaluate its goal-orientedness and usability.

Content:

Define Milestones and a final goal of the project. After around 1/3 of the project, you will present an interactive or preliminary functional prototype to the lecturers and evaluate the prototype according to predefined criteria. You then iterate and revise your prototype design based on the feedback obtained in the evaluation. Towards the end of the project, you again evaluate the prototype and check if your iterations were successful in solving any issues of the initial prototype design. Write a reflective project report (may be created in the form of a self-explanatory presentation) 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 but are open to your own suggestions. 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 will choose. For a web project for example HTML, CSS, javascript, PHP and MySQL

Lecture/Seminar profile:**Introduction Artificial Intelligence (EKI5-17ILV)**

Degree course	HSD.ba
Course title	Introduction Artificial Intelligence
Course code	EKI5-17ILV
Level	Bachelor
Term	WS26/27
Lecturer	Dietmar Millinger
Contact hours per week	2
ECTS credits	2,5
Course type	Integrated course
Examinations	written examination
Language of instruction	German/English
Places for international students	2

Learning objectives:

n.a.

Content:

Definition and Context of AI

Machine Learning

Life cycle of Machine Learning Projects

The goal of the class is to provide actionable knowledge about the basic principles and structures as well as

functions of applied AI systems. This class has a focus on machine learning. With this knowledge the

student shall be able to select and integrate AI modules into larger software systems. Therefore the students

learn about a number of common AI modules, their functions and their interfaces. A special focus lies in the

life cycle of machine learning projects from proof of concept to production situations and the use of frameworks in production projects. In the practical part, 6 exercises are implemented in python on jupyter

notebooks and strategies for improvement of the results are developed.

Prerequisites:

n.a.

Lecture/Seminar profile:**English I (ENG1-17ILV)**

Degree course	HSD.ba
Course title	English I
Course code	ENG1-17ILV
Level	Bachelor
Term	WS26/27
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:

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

Prerequisites:

n.a.

Lecture/Seminar profile:

Source-Code-Management (SCM3-ILV)

Degree course	HSD.ba
Course title	Source-Code-Management
Course code	SCM3-ILV
Level	Bachelor
Term	WS26/27
Lecturer	Alexander Daum
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:

n.a.

Content:

n.a.

Prerequisites:

n.a.

Lecture/Seminar profile:**Communication in the New Media Age (COM1UE)**

Degree course	KWM.ba
Course title	Communication in the New Media Age
Course code	COM1UE
Level	Bachelor
Term	WS26/27
Lecturer	Annamaria Mähr
Contact hours per week	1
ECTS credits	1
Course type	Practice-oriented session
Examinations	written examination
Language of instruction	English
Places for international students	2

Learning objectives:

Broadening and revision of English communication skills.

Content:

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

Prerequisites:

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

Lecture/Seminar profile:**Interaction Design and Prototyping (IDP3VO)**

Degree course	KWM.ba
Course title	Interaction Design and Prototyping
Course code	IDP3VO
Level	Bachelor
Term	WS26/27
Lecturer	Thomas Neumayr
Contact hours per week	1
ECTS credits	2
Course type	Lecture
Examinations	written examination
Language of instruction	English
Places for international students	10

Learning objectives:

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

Content:

The usability and user experience of many interactive products (e.g., websites, apps, entertainment devices, smart homes, ...) could be substantially improved if the creators of such technologies would think more about their users' actual needs, goals, and skills. Therefore, the Interaction Design lecture is concerned with presenting tools and techniques that allow students to understand how human-centered design of user interfaces for interactive products works. Topics include usability, user experience, human-computer interaction, and human-centered design methods. Different methods for the design, prototyping, and testing of new user interfaces together with test users are discussed. The course teaches important methods from usability engineering and interaction design such as user observation, requirements analysis, sketching, wireframes, prototyping, etc. To pass the course, students 1) have to pass a final written exam at the end of the term (semester), and additionally 2) get assigned scientific literature to familiarize with recent topics, summarize the main contents, and orally present the essentials to the lecturer.

Prerequisites:

No previous knowledge required.

Lecture/Seminar profile:**Presentation Skills for Knowledge Transfer (PRE3UE)**

Degree course	KWM.ba
Course title	Presentation Skills for Knowledge Transfer
Course code	PRE3UE
Level	Bachelor
Term	WS26/27
Lecturer	Annamaria Mähr
Contact hours per week	1
ECTS credits	1
Course type	Practice-oriented session
Examinations	oral examination
Language of instruction	English
Places for international students	2

Learning objectives:

Enhancement of communication skills – with a focus on the mandatory professional internship.

Content:

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

Prerequisites:

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

Lecture/Seminar profile:**Biological and Chemical Basics (09_GBC1UE)**

Degree course	MBI.ba
Course title	Biological and Chemical Basics
Course code	09_GBC1UE
Level	Bachelor
Term	WS26/27
Lecturer	Louise Marie Buur, Julia Vetter
Contact hours per week	1
ECTS credits	1
Course type	Laboratory session
Examinations	continuous assessment
Language of instruction	English
Places for international students	4

Learning objectives:

n.a.

Content:

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

Prerequisites:

n.a.

Lecture/Seminar profile:**Bioinformatics Algorithms (21_ALG5ILV)**

Degree course	MBI.ba
Course title	Bioinformatics Algorithms
Course code	21_ALG5ILV
Level	Bachelor
Term	WS26/27
Lecturer	Julia Vetter
Contact hours per week	2
ECTS credits	2,5
Course type	Integrated course
Examinations	written examination
Language of instruction	English
Places for international students	2

Learning objectives:

n.a.

Content:

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

Prerequisites:

n.a.

Lecture/Seminar profile:**English 1 (21_KEN1UE)**

Degree course	MBI.ba
Course title	English 1
Course code	21_KEN1UE
Level	Bachelor
Term	WS26/27
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. All this should lead to an improvement in each student's oral and written communication skills. Some of the areas of topicality include job application documents, job interviews, and current bioinformatics issues as well as those from other areas.

Prerequisites:

n.a.

Lecture/Seminar profile:**Machine Learning and Data Mining (21_MAL5UE)**

Degree course	MBI.ba
Course title	Machine Learning and Data Mining
Course code	21_MAL5UE
Level	Bachelor
Term	WS26/27
Lecturer	Martin Hanreich
Contact hours per week	1
ECTS credits	1,5
Course type	Practice-oriented session
Examinations	continuous assessment
Language of instruction	English
Places for international students	2

Learning objectives:

n.a.

Content:

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

Prerequisites:

n.a.

Lecture/Seminar profile:**Machine Learning and Data Mining (21_MAL5VO)**

Degree course	MBI.ba
Course title	Machine Learning and Data Mining
Course code	21_MAL5VO
Level	Bachelor
Term	WS26/27
Lecturer	Ulrich Bodenhofer
Contact hours per week	1
ECTS credits	1
Course type	Lecture
Examinations	written examination
Language of instruction	English
Places for international students	2

Learning objectives:

n.a.

Content:

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

Prerequisites:

n.a.

Lecture/Seminar profile:**Technical English 1 (21_TEN3UE)**

Degree course	MBI.ba
Course title	Technical English 1
Course code	21_TEN3UE
Level	Bachelor
Term	WS26/27
Lecturer	Sandra Zwirchmayr
Contact hours per week	1
ECTS credits	1
Course type	Practice-oriented session
Examinations	continuous assessment
Language of instruction	English
Places for international students	2

Learning objectives:

n.a.

Content:

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

Prerequisites:

n.a.

Lecture/Seminar profile:**Technical English 3 (21_TEN5UE)**

Degree course	MBI.ba
Course title	Technical English 3
Course code	21_TEN5UE
Level	Bachelor
Term	WS26/27
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:

Primarily—but not exclusively—by means of group work, pair work, presentations, research, case studies, debates, as well as video and audio work the skills acquired in the module English for Communication as well as those from the third and fourth semesters will be honed and the process will be continued to expand each student's technical and general vocabulary skills as well as idiomatic usage in order to improve their written and oral communication skills.

In addition, areas dealing with stress situations within a company (employee conflicts, generational differences, tough decisions, heterogeneous company cultures, diverse employee interests, etc.) will be dealt with in order to study behavioral patterns and further interpersonal skills.

Prerequisites:

n.a.

Lecture/Seminar profile:**Games with a Purpose (05_GWP5IL)**

Degree course	MTD.ba
Course title	Games with a Purpose
Course code	05_GWP5IL
Level	Bachelor
Term	WS26/27
Lecturer	Georgi Yordanov Kostov, Jeremiah Diephuis
Contact hours per week	3
ECTS credits	5
Course type	Integrated course
Examinations	continuous assessment
Language of instruction	German/English
Places for international students	6

Learning objectives:

n.a.

Content:

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

Prerequisites:

Fundamentals in design, web, media technology, interaction and games.

Lecture/Seminar profile:**Intelligent Systems (05_ISY5IL)**

Degree course	MTD.ba
Course title	Intelligent Systems
Course code	05_ISY5IL
Level	Bachelor
Term	WS26/27
Lecturer	Oliver Krauss
Contact hours per week	3
ECTS credits	5
Course type	Integrated course
Examinations	continuous assessment
Language of instruction	German/English
Places for international students	2

Learning objectives:

n.a.

Content:

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

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

Prerequisites:

Fundamentals in design, web, media technology, interaction and games.

Lecture/Seminar profile:**3D Design (06_3DD1IL)**

Degree course	MTD.ba
Course title	3D Design
Course code	06_3DD1IL
Level	Bachelor
Term	WS26/27
Lecturer	Lukas Schmalzer
Contact hours per week	2,5
ECTS credits	2,5
Course type	Integrated course
Examinations	continuous assessment
Language of instruction	English
Places for international students	2

Learning objectives:

n.a.

Content:

Introduction to three-dimensional modeling and design: types of geometry, modeling techniques, shading models, texturing, lighting, rendering. Conceptual and design aspects of spatial design. Scripting in common 3D tools (e.g., Blender).

The theoretical concepts are practiced and reinforced in practical exercises using realistic examples. In addition to a solid basic education in 3D design, an overview of practical applications is also provided.

Prerequisites:

n.a.

Lecture/Seminar profile:**Audio/Video Technology I (06_AVT1IL)**

Degree course	MTD.ba
Course title	Audio/Video Technology I
Course code	06_AVT1IL
Level	Bachelor
Term	WS26/27
Lecturer	Manuel Mitterhuber, Patrick Proier
Contact hours per week	2,5
ECTS credits	2,5
Course type	Integrated course
Examinations	continuous assessment
Language of instruction	English
Places for international students	2

Learning objectives:

n.a.

Content:

Electrical fundamentals (signal transmission, power supply, power calculation based on typical film and studio productions). Digitization (sampling, quantization) of audio and video signals. Storage and transmission formats, compression methods. Technical fundamentals of digital video production for media designers. Introduction to video signals, cameras, image sensors, and lenses.

Prerequisites:

n.a.

Lecture/Seminar profile:**Game Engine Concepts (06_GEC1IL)**

Degree course	MTD.ba
Course title	Game Engine Concepts
Course code	06_GEC1IL
Level	Bachelor
Term	WS26/27
Lecturer	Andreas Ernst Riegler
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:

This course covers fundamental concepts of game engines to give graduates an in-depth understanding of game development and how games work.

The course includes an examination of game mechanics and modeling, where participants learn how game mechanics are designed and modeled. Various mechanics that shape the gaming experience are analyzed, and methods for modeling and implementing these mechanics in a game engine are presented.

A central component of the course is the concept of lock and key. This concept describes how certain game functions and elements are linked to challenge players and control progress. Students learn how this principle can be used to create motivating and balanced gaming experiences.

Games of emergence and games of progression are also covered. Students learn how emergence arises in games when complex systems and behaviors emerge from simple rules. The importance of progression is also analyzed, in which players are motivated to make continuous progress through structured challenges and rewards.

An important aspect of the course is dealing with randomization and uncertainty in games. Participants learn how random elements and uncertainty can be used in games to make gameplay varied and challenging. Techniques for implementing and controlling random mechanisms and their effects on the gaming experience are covered.

Finally, task analysis is covered in order to systematically analyze the various tasks and requirements that arise during game development. Students learn methods for task analysis in order to efficiently plan and implement complex game elements.

Prerequisites:

n.a.

Lecture/Seminar profile:**Introduction to Games (06_IGA1UE)**

Degree course	MTD.ba
Course title	Introduction to Games
Course code	06_IGA1UE
Level	Bachelor
Term	WS26/27
Lecturer	Wolfgang Hochleitner, Michael Lankes, Alina Menten
Contact hours per week	2
ECTS credits	1,5
Course type	Practice-oriented session
Examinations	continuous assessment
Language of instruction	English
Places for international students	2

Learning objectives:

n.a.

Content:

Introduction, basic concepts related to games; structure and design of game prototypes. Introduction to game design, level design, game art, game development process, interface design for games. Working methods and strategies in the context of game design (iterative working methods). Basic roles and tasks in the game development process.

Creating game designs and level design drafts, implementing game designs in the form of lo-fi prototyping (e.g., with 2D game engines, editor tools, and analog prototyping). Evaluation methods and playtesting (discount methods such as heuristic evaluations or informal playtests, questionnaires). Creation and structure of descriptive documents (high concept, treatment, game design document).

Prerequisites:

n.a.

Lecture/Seminar profile:**Introduction to Games (06_IGA1VO)**

Degree course	MTD.ba
Course title	Introduction to Games
Course code	06_IGA1VO
Level	Bachelor
Term	WS26/27
Lecturer	Wolfgang Hochleitner, Michael Lankes, Alina Menten
Contact hours per week	2
ECTS credits	1,5
Course type	Lecture
Examinations	oral or written examination
Language of instruction	English
Places for international students	2

Learning objectives:

n.a.

Content:

Introduction, basic concepts related to games; structure and design of game prototypes. Introduction to game design, level design, game art, game development process, interface design for games. Working methods and strategies in the context of game design (iterative working methods). Basic roles and tasks in the game development process.

Creating game designs and level design drafts, implementing game designs in the form of lo-fi prototyping (e.g., with 2D game engines, editor tools, and analog prototyping). Evaluation methods and playtesting (discount methods such as heuristic evaluations or informal playtests, questionnaires). Creation and structure of descriptive documents (high concept, treatment, game design document).

Prerequisites:

n.a.

Lecture/Seminar profile:**Modern Code (06_MCO1UE)**

Degree course	MTD.ba
Course title	Modern Code
Course code	06_MCO1UE
Level	Bachelor
Term	WS26/27
Lecturer	Reinhold Plösch
Contact hours per week	2,5
ECTS credits	2,5
Course type	Practice-oriented session
Examinations	continuous assessment
Language of instruction	English
Places for international students	2

Learning objectives:

n.a.

Content:

This course is an introduction to modern programming. It teaches the basic procedural concepts, introduces algorithmic thinking, and teaches important techniques for program development using modern tools such as code checkers and AI support, as well as methods including error handling and debugging. The content therefore covers: important fundamentals of computer architecture, the nature and representation of algorithms, the basic structure of programs, variables and data types, operators and arithmetic expressions, selections and iterations, arrays and strings, input/output operations, composite data types, procedures and functions, input and transition parameters, step-by-step refinement, programming style, and documentation. Concepts necessary for the development of games and the web, such as linear mappings, representation with matrices, and arithmetic operations with matrices and scalars.

Prerequisites:

n.a.

Lecture/Seminar profile:**Modern Code (06_MCO1VO)**

Degree course	MTD.ba
Course title	Modern Code
Course code	06_MCO1VO
Level	Bachelor
Term	WS26/27
Lecturer	Oliver Krauss
Contact hours per week	2,5
ECTS credits	2,5
Course type	Lecture
Examinations	oral or written examination
Language of instruction	English
Places for international students	2

Learning objectives:

n.a.

Content:

This course is an introduction to modern programming. It teaches the basic procedural concepts, introduces algorithmic thinking, and teaches important techniques for program development using modern tools such as code checkers and AI support, as well as methods including error handling and debugging. The content therefore covers: important fundamentals of computer architecture, the nature and representation of algorithms, the basic structure of programs, variables and data types, operators and arithmetic expressions, selections and iterations, arrays and strings, input/output operations, composite data types, procedures and functions, input and transition parameters, step-by-step refinement, programming style, and documentation. Concepts necessary for the development of games and the web, such as linear mappings, representation with matrices, and arithmetic operations with matrices and scalars.

Prerequisites:

n.a.

Lecture/Seminar profile:**Motion Design (06_MDE1IL)**

Degree course	MTD.ba
Course title	Motion Design
Course code	06_MDE1IL
Level	Bachelor
Term	WS26/27
Lecturer	Lisa Maria Gierlinger
Contact hours per week	2,5
ECTS credits	2,5
Course type	Integrated course
Examinations	continuous assessment
Language of instruction	English
Places for international students	2

Learning objectives:

n.a.

Content:

Introduction to the technical and aesthetic fundamentals of 2D animation and motion graphics. Learning how to use a current animation tool (e.g., Adobe After Effects) through practical exercises, taking design principles into account. Creating vector graphics and processing them using animation principles to produce professional live production graphics and ex-plainer animations.

Prerequisites:

n.a.

Lecture/Seminar profile:**Photography (06_PHO1IL)**

Degree course	MTD.ba
Course title	Photography
Course code	06_PHO1IL
Level	Bachelor
Term	WS26/27
Lecturer	Andrea Groisböck
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:

This course deals with image design itself. Both technical and aesthetic aspects are covered. Detailed structure: image aesthetics, image com-position, color design, technical aspects of photography (camera, light-ing, studio), lighting design, staging (object, scene), narrative aspects of photography, image editing/optimization.

Prerequisites:

n.a.

Lecture/Seminar profile:**Visual Aesthetics (06_VIA1IL)**

Degree course	MTD.ba
Course title	Visual Aesthetics
Course code	06_VIA1IL
Level	Bachelor
Term	WS26/27
Lecturer	Alina Menten, Roland Reznicek, Victoria Maria Wolfersberger
Contact hours per week	3
ECTS credits	3
Course type	Integrated course
Examinations	continuous assessment
Language of instruction	English
Places for international students	2

Learning objectives:

n.a.

Content:

Teaching basic artistic expression, the fundamentals of visual communication and aesthetics, and principles of perception.

Visual perception, image aesthetics, form, color, typography, text, layout, graphic/multimedia concepts: corporate design, narrative graphics/symbols, creativity techniques, idea generation. The focus of this course is on learning to think visually and communicate one's own thoughts. Sketching is the most immediate medium for this way of thinking. Ideas are formulated and put down on paper. Detailed structure: Basic drawing techniques (pencil, marker, digital sketching), perspective, description and definition of space, anatomy; storyboard, preparation for character development, game art, concept art, etc.

Prerequisites:

n.a.

Lecture/Seminar profile:**Web Design (06_WED1IL)**

Degree course	MTD.ba
Course title	Web Design
Course code	06_WED1IL
Level	Bachelor
Term	WS26/27
Lecturer	Klaus Fischer
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:

UI design for web applications (desktop and mobile websites), basics of web accessibility (WCAG), and designing accessible content. Designing responsive and adaptive web applications. Introduction and use of design and layout systems (e.g., Material Design). Typography for the web and color design.

Introduction to a prototyping tool (e.g., Figma), low-fidelity and high-fidelity prototypes, user flows, and preparation for prototype implementation.

Prerequisites:

n.a.

Lecture/Seminar profile:**Web Fundamentals (06_WEF1UE)**

Degree course	MTD.ba
Course title	Web Fundamentals
Course code	06_WEF1UE
Level	Bachelor
Term	WS26/27
Lecturer	Wolfgang Hochleitner
Contact hours per week	2
ECTS credits	1,5
Course type	Practice-oriented session
Examinations	continuous assessment
Language of instruction	English
Places for international students	2

Learning objectives:

n.a.

Content:

Introduction to the basics of hypertext and hypermedia, as well as the fundamental structure and layout of websites and their design and creation processes. Teaching of relevant basic technologies (HTML, CSS) and how layouts work, along with the associated concepts and technologies (e.g., box model, grid layout, etc.). Client-side scripting (JavaScript) and document object model, data formats (e.g., JSON and YAML), and technical fundamentals of web accessibility (WCAG, WAI-ARIA). Creating practical web applications with current tools and frameworks (e.g., Bootstrap) and development environments. Introduction to and active work with version control (e.g., Git).

Prerequisites:

n.a.

Lecture/Seminar profile:**Web Fundamentals (06_WEF1VO)**

Degree course	MTD.ba
Course title	Web Fundamentals
Course code	06_WEF1VO
Level	Bachelor
Term	WS26/27
Lecturer	Wolfgang Hochleitner
Contact hours per week	2
ECTS credits	1,5
Course type	Lecture
Examinations	oral or written examination
Language of instruction	English
Places for international students	2

Learning objectives:

n.a.

Content:

Introduction to the basics of hypertext and hypermedia, as well as the fundamental structure and layout of websites and their design and creation processes. Teaching of relevant basic technologies (HTML, CSS) and how layouts work, along with the associated concepts and technologies (e.g., box model, grid layout, etc.). Client-side scripting (JavaScript) and document object model, data formats (e.g., JSON and YAML), and technical fundamentals of web accessibility (WCAG, WAI-ARIA). Creating practical web applications with current tools and frameworks (e.g., Bootstrap) and development environments. Introduction to and active work with version control (e.g., Git).

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	WS26/27
Lecturer	Philipp Fleck
Contact hours per week	1
ECTS credits	1
Course type	Lecture
Examinations	written examination
Language of instruction	German
Places for international students	2

Learning objectives:

n.a.

Content:

Introduction to the development of parallel and distributed programs (motivation, application domains, Moore's law, TOP500 list), theoretical foundations (speedup, efficiency, Amdahl's law, Gustafson's law, consequences), overview of parallel hardware architectures (Flynn's taxonomy, pipelining, shared memory systems, distributed memory systems), challenges of implementing concurrent programs (deadlocks, livelocks, race conditions, overhead, synchronization), development of concurrent or parallel applications for .NET, OpenMP

Prerequisites:

Module PRO1 bis PRO3, BSY, SWE1

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	WS26/27
Lecturer	Philipp Fleck, Philipp Neuhauser
Contact hours per week	1
ECTS credits	1,5
Course type	Practice-oriented session
Examinations	continuous assessment
Language of instruction	German
Places for international students	4

Learning objectives:

n.a.

Content:

Exercises deepen the content of the lecture by practical examples.

Prerequisites:

Module PRO1 bis PRO3, BSY, SWE1

Lecture/Seminar profile:**Computational Intelligence I (0_1CO1U)**

Degree course	DSE.ma
Course title	Computational Intelligence I
Course code	0_1CO1U
Level	Master
Term	WS26/27
Lecturer	Philipp Fleck
Contact hours per week	1
ECTS credits	2
Course type	Practice-oriented session
Examinations	continuous assessment
Language of instruction	German
Places for international students	2

Learning objectives:

n.a.

Content:

exercises with python, weka, heuristic lab

Prerequisites:

Entsprechend der Zugangsvoraussetzungen des Studienganges

Lecture/Seminar profile:**Computational Intelligence I (0_1CO1V)**

Degree course	DSE.ma
Course title	Computational Intelligence I
Course code	0_1CO1V
Level	Master
Term	WS26/27
Lecturer	Philipp Fleck
Contact hours per week	2
ECTS credits	3
Course type	Lecture
Examinations	oral or written examination
Language of instruction	German
Places for international students	2

Learning objectives:

n.a.

Content:

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

Prerequisites:

Entsprechend der Zugangsvoraussetzungen des Studienganges

Lecture/Seminar profile:**Distributed Realtime Systems (DRS3-18UE)**

Degree course	ESD.ma
Course title	Distributed Realtime Systems
Course code	DRS3-18UE
Level	Master
Term	WS26/27
Lecturer	Dietmar Millinger
Contact hours per week	1
ECTS credits	2
Course type	Practice-oriented session
Examinations	continuous assessment
Language of instruction	German
Places for international students	2

Learning objectives:

n.a.

Content:

The lecture notes are composed of the following chapters:

- 1) Distributed Systems and Time
- 2) Real/Time Communication and Execution
- 3) Architectures
- 4) Faults and Fault/Tolerance

Prerequisites:

n.a.

Lecture/Seminar profile:**Distributed Realtime Systems (DRS3-18VO)**

Degree course	ESD.ma
Course title	Distributed Realtime Systems
Course code	DRS3-18VO
Level	Master
Term	WS26/27
Lecturer	Dietmar Millinger
Contact hours per week	2
ECTS credits	3
Course type	Lecture
Examinations	written examination
Language of instruction	German
Places for international students	2

Learning objectives:

n.a.

Content:

The lecture notes are composed of the following chapters:

- 1) Distributed Systems and Time
- 2) Real/Time Communication and Execution
- 3) Architectures
- 4) Faults and Fault/Tolerance

Prerequisites:

n.a.

Lecture/Seminar profile:**Game Development (GDE1IL)**

Degree course	IM.ma
Course title	Game Development
Course code	GDE1IL
Level	Master
Term	WS26/27
Lecturer	Johannes Lugstein
Contact hours per week	2,4
ECTS credits	5
Course type	Integrated course
Examinations	oral or written examination
Language of instruction	English
Places for international students	2

Learning objectives:

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

Content:

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

Prerequisites:

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

Lecture/Seminar profile:**Hypermedia UX Engineering (HUX1IL)**

Degree course	IM.ma
Course title	Hypermedia UX Engineering
Course code	HUX1IL
Level	Master
Term	WS26/27
Lecturer	Patrick James Niebrzydowski
Contact hours per week	2,4
ECTS credits	5
Course type	Integrated course
Examinations	continuous assessment
Language of instruction	English
Places for international students	2

Learning objectives:

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

Content:

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

Prerequisites:

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

Lecture/Seminar profile:**Real Time Graphics (RTG1IL)**

Degree course	IM.ma
Course title	Real Time Graphics
Course code	RTG1IL
Level	Master
Term	WS26/27
Lecturer	David Christian Schedl, Anna Maschek
Contact hours per week	2,4
ECTS credits	5
Course type	Integrated course
Examinations	continuous assessment
Language of instruction	English
Places for international students	2

Learning objectives:

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

Content:

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

Prerequisites:

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

Lecture/Seminar profile:**Spatial Computing (SCO3IL)**

Degree course	IM.ma
Course title	Spatial Computing
Course code	SCO3IL
Level	Master
Term	WS26/27
Lecturer	Jeremiah Diephuis, Ulrich Norbistrath, David Christian Schedl, Georgi Yordanov Kostov, Samuel Dieter Zühlke, Dominik Hackl
Contact hours per week	2,4
ECTS credits	5
Course type	Integrated course
Examinations	oral or written examination
Language of instruction	English
Places for international students	2

Learning objectives:

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

Content:

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

Prerequisites:

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

Lecture/Seminar profile:**Big Data Analytics and Interactive Visualization (25_BDV3IL)**

Degree course	SE.ma
Course title	Big Data Analytics and Interactive Visualization
Course code	25_BDV3IL
Level	Master
Term	WS26/27
Lecturer	Sebastian Pritz, Mandy Keck, Holger Stitz
Contact hours per week	3
ECTS credits	5
Course type	Integrated course
Examinations	oral or written examination
Language of instruction	German
Places for international students	2

Learning objectives:

n.a.

Content:

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

Prerequisites:

Entsprechend den Zugangsvoraussetzungen des Studiengangs

Lecture/Seminar profile:**Data Warehousing, OLAP and Business Intelligence (25_DWO1IL)**

Degree course	SE.ma
Course title	Data Warehousing, OLAP and Business Intelligence
Course code	25_DWO1IL
Level	Master
Term	WS26/27
Lecturer	Gabriel Kronberger
Contact hours per week	3
ECTS credits	5
Course type	Integrated course
Examinations	oral or written examination
Language of instruction	German
Places for international students	2

Learning objectives:

n.a.

Content:

Basics: Analytical vs. direct data processing – different architectures for different requirements; Data Warehouse as a holistic repository of analytical data; Real application examples of OLAP (Online Analytical Processing) Data warehouse systems.

Building a data warehouse: methodology of the data warehouse implementation process, preservation of data integrity, accuracy and completeness, ETL processes (extract-transform-load), task and meaning of metadata. Database design for Data Warehouse: database requirements for multidimensional queries; Database technologies for OLAP.

Purpose and typical areas of application of data mining in science and industry; data preprocessing and modelling; Feature identification; Critical factors for successful data mining; Data mining process; Methodologies for data mining.

Problem formulation for data mining: prediction problems; clustering; association rules; Text mining and web mining; Structure and pattern identification in time series data. Algorithms: Algorithms for feature selection; Linear methods for regression and classification;

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

Prerequisites:

Entsprechend den Zugangsvoraussetzungen des Studiengangs

Lecture/Seminar profile:**Heuristic and Evolutionary Algorithms (25_HEA1IL)**

Degree course	SE.ma
Course title	Heuristic and Evolutionary Algorithms
Course code	25_HEA1IL
Level	Master
Term	WS26/27
Lecturer	Michael Affenzeller, Stefan Wagner
Contact hours per week	3
ECTS credits	5
Course type	Integrated course
Examinations	oral or written examination
Language of instruction	German
Places for international students	2

Learning objectives:

n.a.

Content:

Taxonomy of optimization algorithms, distinction between numerical and heuristic optimization, examples of combinatorial optimization problems and complexity theory, solution space behavior and P and NP problems. Heuristic methods: Problem-specific methods vs. metaheuristics, construction vs. improvement heuristics, neighborhood and distance of solutions, local search, non-population-based methods, Simulated Annealing, Tabu Search. Population-based methods: Ant-Colony Optimization, Swarm Intelligence, Genetic Algorithms, Evolutionary Strategies, Genetic Programming.

In exercises the parameterization of algorithms will be trained, analytical as well as empirical analysis of different optimization techniques using HeuristicLab, a generic open source framework for heuristic optimization methods.

Prerequisites:

Entsprechend den Zugangsvoraussetzungen des Studiengangs

Lecture/Seminar profile:**Modeling and Simulation (25_MSM1IL)**

Degree course	SE.ma
Course title	Modeling and Simulation
Course code	25_MSM1IL
Level	Master
Term	WS26/27
Lecturer	Stephan Winkler, Elisabeth Maria Mayrhober
Contact hours per week	3
ECTS credits	5
Course type	Integrated course
Examinations	oral or written examination
Language of instruction	German
Places for international students	2

Learning objectives:

n.a.

Content:

Principles of the modeling of dynamical system, taxonomy of dynamic models; continuous modeling & simulation vs. discrete modeling & simulation; stochastic vs. deterministic simulation; linear vs. nonlinear modeling. Basics of optimization techniques, especially for optimizing model parameters as well as identifying system parameters based on measurement data. Growth models, oscillators, and population models. Discrete event specified systems.

In the practical part of the lectures we discuss application examples, especially technical / physical systems, basics of economics, epidemiology and the spreading of contagious diseases, and predator prey systems. MATLAB / Simulink and AnyLogic are used as frameworks for modeling and simulating systems.

Prerequisites:

Entsprechend den Zugangsvoraussetzungen des Studiengangs

Lecture/Seminar profile:**Neural Networks and Deep Learning (25_NDL3IL)**

Degree course	SE.ma
Course title	Neural Networks and Deep Learning
Course code	25_NDL3IL
Level	Master
Term	WS26/27
Lecturer	Ulrich Bodenhofer
Contact hours per week	3
ECTS credits	5
Course type	Integrated course
Examinations	oral or written examination
Language of instruction	German
Places for international students	2

Learning objectives:

n.a.

Content:

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

Prerequisites:

n.a.

Lecture/Seminar profile:

Scientific Writing (25_SWR3SE)

Degree-course	SE.ma
Course title	Scientific Writing
Course code	25_SWR3SE
Level	Master
Term	WS26/27
Lecturer	Christoph Anthes
Contact hours per week	1
ECTS credits	1
Course type	Seminar
Examinations	continuous assessment
Language of instruction	German
Places for international students	2

Learning objectives:

n.a.

Content:

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

Prerequisites:

Entsprechend den Zugangsvoraussetzungen des Studiengangs

Lecture/Seminar profile:**Current topics in IT security (ATI3IL)**

Degree course	SIM.ma
Course title	Current topics in IT security
Course code	ATI3IL
Level	Master
Term	WS26/27
Lecturer	Marcus Nohlberg
Contact hours per week	2
ECTS credits	3
Course type	Integrated course
Examinations	continuous assessment
Language of instruction	English
Places for international students	2

Learning objectives:

Upon completion of the course, students will be able to:

Understand the foundations of information security awareness
Design and communicate effective security awareness materials
Plan basic awareness initiatives
Demonstrate understanding of research on the human element in information security

Content:

The course addresses the human aspects of information security, with a focus on security awareness. Topics include information security awareness, research on the human element, and the design and communication of awareness initiatives.

Students analyze current media coverage, present challenges in security awareness, create and present awareness materials, and submit a short report.

Prerequisites:

n.a.

Lecture/Seminar profile:**Intercultural Negotiation (17_INT3I)**

Degree course	HCC.ma
Course title	Intercultural Negotiation
Course code	17_INT3I
Level	Master
Term	WS26/27
Lecturer	Martina Gaisch
Contact hours per week	1
ECTS credits	1,5
Course type	Integrated course
Examinations	oral or written examination
Language of instruction	English
Places for international students	2

Learning objectives:

Knowledge of concepts in intercultural communication.

Content:

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

Prerequisites:

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

Lecture/Seminar profile:**Technology Assessment (26_TEA3 I)**

Degree course	IEM.ma
Course title	Technology Assessment
Course code	26_TEA3 I
Level	Master
Term	WS26/27
Lecturer	Martina Gaisch
Contact hours per week	1
ECTS credits	1
Course type	Integrated course
Examinations	oral or written examination
Language of instruction	English
Places for international students	2

Learning objectives:

n.a.

Content:

This course introduces key concepts and methods for assessing the societal, ethical, and economic impacts of digital technologies, with a focus on AI systems. Students engage with frameworks for trustworthy AI, including transparency, accountability, robustness, and human oversight. Through interdisciplinary perspectives and case studies, the course develops skills to critically evaluate risks, unintended consequences, and long-term implications. The course prepares students to make informed, responsible decisions in the design and management of emerging technologies.

Prerequisites:

n.a.