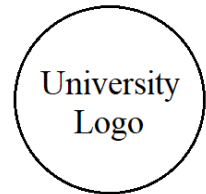


University of Mosul جامعة الموصل



Bachelor's Degree (B.Sc.) – Artificial Intelligence

بكالوريوس علوم - ذكاء اصطناعي



University of Al Mosul

Bachelor of Computer Science and Mathematics / Department of Artificial Intelligence

بكالوريوس علوم الحاسوب والرياضيات/ قسم الذكاء الاصطناعي

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1. Overview

This catalogue is about the courses (modules) given by the program of Artificial Intelligence science to gain the Bachelor of Science degree. The program delivers (46) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

نظرة عامة

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج علوم في الذكاء الاصطناعي للحصول على درجة بكالوريوس العلوم. يقدم البرنامج (48) مادة دراسية، على ، مع (٦٠٠٠) إجمالي ساعات حمل الطالب و ٢٤٠ إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Modules 2024-2025

Module 1

Code	Course/Module Title	ECTS	Semester
UOMAI102	Logic Design	6	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	87
Description			
This introductory course provides a comprehensive foundation in digital logic design, focusing on the essential principles and techniques used in the development of digital systems. Students will study the basic components of digital circuits, including logic gates, combinational logic, and sequential logic circuits. Key topics include Boolean algebra, truth tables, logic expressions, and circuit simplification techniques such as Karnaugh maps. The course emphasizes practical learning through simulation-based labs using logic circuit design software, allowing students to visualize, design, and test digital circuits in a virtual environment. Additionally, students will work on a series of hands-on projects that involve building and analyzing digital logic circuits to solve real-world problems. By the end of the course, students will have acquired strong analytical and practical skills in digital logic design, providing a solid foundation for advanced studies in computer engineering, electronics, or related fields.			

Module 2

Code	Course/Module Title	ECTS	Semester
UOMAI105	Algorithms and Structured Programming (1)	8	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	4	93	107
Description			
The module " Algorithms and Structured Programming (1)" introduces students to the fundamental concepts of problem solving and programming using the C++ language. Through a combination of theoretical knowledge and practical exercises, students learn how to approach problems systematically, design algorithms, design flowchart, and implement solutions using C++ programming constructs. The course covers essential topics such as variables, data types, operators, control structures, and iterative statements, and basic input/output operations in C++. Students gain hands-on experience in writing and executing C++ programs, developing their skills in problem analysis, logical thinking, and algorithmic design. They also learn the importance of code organization, readability, and debugging techniques. By the end of the course, students acquire a strong foundation in C++ programming, problem-solving strategies, and the ability to translate real-world problems into well-structured and efficient C++ programs. This course serves as a stepping stone for further exploration in advanced programming concepts and application development using C++.			

Module 3

Code	Course/Module Title	ECTS	Semester
UOMAI106	Discrete Structures	3	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1	48	27
Description			
Discrete Structures is a foundational course in computer science and artificial intelligence that explores non-continuous mathematical frameworks. It introduces key concepts such as propositional and predicate logic, set theory, relations, functions, graph theory, trees, combinatorics, and finite state machines. The module emphasizes problem-solving, logical reasoning, and the application of mathematical structures in programming and algorithms. It also covers string manipulation, isomorphism, and algebraic structures. With applications in computing, business, and economics, the course equips students with essential tools for analyzing and designing complex systems in a structured, logical manner—laying the groundwork for advanced topics in AI and computer science.			

Module 4

Code	Course/Module Title	ECTS	Semester
UOMAI107	Artificial Intelligence	6	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	87
Description			
The AI course is a comprehensive program crafted to equip students with foundational and advanced skills in artificial intelligence. Designed by experts to address both theoretical and practical aspects, the course covers core topics such as machine learning, data processing, and neural networks, providing hands-on experience with real-world applications. The primary objective of this course is to develop students' ability to solve complex problems using AI technologies, fostering skills that are highly valuable in today's digital economy. By focusing on practical knowledge and industry-relevant tools, the course prepares students to enter various fields where AI plays a critical role, from healthcare to finance and beyond. This course aims to cultivate a generation of tech-savvy innovators who can leverage AI to drive positive change, contribute to technological advancement, and enhance community economic development. Graduates will be equipped to pursue career opportunities and entrepreneurial paths in high-demand AI sectors.			

Module 5

Code	Course/Module Title	ECTS	Semester
UOM101	Arabic Language	2	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	33	17
Description			
In this chapter we focus on Arabic speech, its divisions and the signs of each division, and learning about linguistic skills in developing linguistic taste and improving style among learners and overcoming common errors among speakers and writers through the original and subsidiary grammatical movements, in addition to studying the Arabic verb in terms of soundness, weakness, transitivity, intransitivity and time. There are many details that we will address in this chapter.			

Module 6

Code	Course/Module Title	ECTS	Semester
UOM1040	Democracy and Human Rights	2	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	33	17
Description			
The Democracy and Human Rights course aims to introduce students to the concepts of democracy and human rights and their importance in society. The course addresses the values and principles that form the foundation of democracy, such as freedom of expression, the right to vote, and the right to political participation. It also discusses fundamental human rights, such as the right to life, women's rights, minority rights, and workers' rights. The course also focuses on the importance of protecting human rights and promoting social justice. The course curriculum includes the study of several important topics, such as national and international human rights legislation, the impact of democracy on achieving sustainable development, and the analysis of conflicts and human rights violations. Case studies are also discussed, along with an analysis of the social and political context of human rights challenges in different societies. The teaching strategies in this course rely on a combination of explanatory lectures, group discussions, current studies, and practical activities. Students are encouraged to actively participate and employ analytical and critical thinking skills in discussing issues of human rights and democracy. These strategies aim to expand students' understanding of the concepts of democracy and human rights and their application in practical life.			

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Module 7

Code	Course/Module Title	ECTS	Semester
UOM1031	Computer	3	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	48	27
Description			
Basic computer skills refer to your ability to perform fundamental tasks on a computer. This can include understanding certain software, applications, programs and tools. Computer skills fall into two categories: software and hardware. Hardware refers to the computer's operation, whereas software involves the use of various programs and applications. Software skills help you to efficiently use computer programs and applications. There are some software skills that employers may consider as prerequisites to employment. Introduction to computer system, Computer Generations Parts of Computer System (Hardware, Software, User, Data), Types of Computers, Computer's Performance Factors Computer Hardware, The Main Components of Computers (CPU, Memory, I/O) Computer memory, Representing Data in the memory, Memory Capacity Measurements, Memory Process, characteristic of the Memory, Types of			

memory Computer Software Software Types Application Software System Software Programming Languages, Types of Programming Languages, Compilers and Interpreters. Operating Systems, Operating System Objectives, Functions of Operating Systems, Types of Operating Systems Software Interface Types of Software Interface Accessibility Options Computer Network Types of Networks Network Topology Network Hardware Data Communication, Characteristics of Data Communication, Components of Data Communication, Data Representation, Communication Protocols, Data Transmission Modes Digital and Analog Transmission Asynchronous and Synchronous Transmission Viruses Types of Viruses Protection Against Viruses Software Copyright, Licensing, Type of License Agreements Software Piracy Types of Software Piracy Plagiarism Site License

Module 8

Code	Course/Module Title	ECTS	Semester
UOMAI202	Mathematics for AI	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	37
Description			
Mathematics for AI is a core course designed to equip students with essential mathematical foundations for artificial intelligence and computer engineering. The course covers key areas such as linear algebra, calculus, probability, statistics, and optimization. Students learn to apply mathematical proofs and techniques to solve AI-related problems. Topics include matrix operations, vectors, derivatives, eigenvalues, PCA, gradient descent, and data visualization. Practical labs using Python and Jupyter help visualize and implement mathematical concepts. By integrating theory and application, the course builds the analytical skills necessary for developing and understanding AI models and algorithms in real-world scenarios.			

Module 9

Code	Course/Module Title	ECTS	Semester
UOMAI203	Computer Organization	6	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	87
Description			
This course offers a comprehensive study of computer organization and architecture, with a particular emphasis on the Intel 8086 microprocessor. It covers the internal structure of the 8086 processor, including its registers, instruction set, and various addressing modes. Students will explore memory organization and addressing schemes, as well as the interaction between the processor, memory, and input/output (I/O) interfaces. The course also addresses interrupt handling, system buses, and the basics of system integration. Hands-on exercises and			

programming projects provide practical experience in writing and debugging assembly language programs for the 8086 processor. Advanced topics such as memory segmentation, multitasking, and protected mode operation are also introduced. Upon successful completion of the course, students will gain a thorough understanding of the principles of computer organization and will be able to design and implement low-level software systems using the 8086 architectures.

Module 10

Code	Course/Module Title	ECTS	Semester
UOMAI204	Web Development	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	37
Description			
The web development course aims to explain the fundamentals of web accessibility technologies and web programming using HTML, CSS, and JavaScript, highlighting their role in building websites and web applications. Students will learn the essential skills to efficiently and visually design and structure websites, focusing on concepts like layout, formatting, and the principles of integrating interactive web elements and multimedia components. The course also aims to clarify the fundamentals of internet and client-server communication. Throughout this semester, students will learn how to design simple, effective websites, and foster students' creativity and problem-solving skills, enabling them to collaboratively design projects in web development.			

Module 11

Code	Course/Module Title	ECTS	Semester
UOMAI205	Algorithms and Structured Programming (2)	8	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	4	93	107
Description			
The Advanced Programming module builds upon the foundational programming knowledge and skills gained in previous module (Algorithms and Structured Programming (1)). It delves into more advanced concepts and techniques in C++, empowering students to develop complex software solutions and tackle challenging programming problems. This module typically covers the following areas: Functions, Array of One Dimension, Array of two Dimension, String, Structures and Files Throughout the module (Algorithms and Structured Programming (2)), students typically engage in hands-on programming assignments, projects to apply the advanced concepts and			

techniques they have learned. They develop critical thinking, problem-solving, debugging, and programming skills required for developing high-quality, efficient, and scalable software solutions.

The Advanced Programming module aims to equip students with the knowledge and skills needed to excel in professional programming development roles. It prepares them to handle complex programming challenges, and the ability to translate real-world problems into well-structured.

Module 12

Code	Course/Module Title	ECTS	Semester
UOMAI206	Knowledge Representation	6	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	87
Description			
This course introduces the fundamental concepts, techniques, and formalisms of Knowledge Representation (KR) in Artificial Intelligence (AI). It focuses on how knowledge about the world can be structured, represented, and used by intelligent systems to make decisions, reason logically, and solve complex problems. Students will explore various approaches to representing knowledge, including logic-based representations (propositional and first-order logic), semantic networks, frames, ontologies, and rule-based systems. The course also covers reasoning mechanisms such as inference, non-monotonic reasoning, and default logic, and discusses applications in expert systems, natural language processing, and intelligent agents. By the end of the course, students will have the skills to design and implement knowledge representation models and understand their role in building intelligent AI systems.			

Module 13

Code	Course/Module Title	ECTS	Semester
UOM1021	English Language	2	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	33	17
Description			
English for AI is a foundational course designed to develop essential English language skills with a focus on information technology contexts. The course covers listening, speaking, reading, and writing, emphasizing communication in everyday and professional AI situations. Topics include meeting people, jobs in AI, schedules, spelling, and understanding the tech industry. Grammar areas such as the present and past simple tenses, present continuous, and prepositions of time are integrated. Vocabulary related to computer systems, hardware, software, and working with computers is introduced. Learners also practice comparatives and functional language, enabling them to effectively communicate in academic and workplace			

environments in AI.

Module 14

Code	Course/Module Title	ECTS	Semester
UOMAI301	Object- Oriented Programming	6	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	87
Description			
To deliver this module effectively, we will adopt a blended approach that combines theoretical instruction with hands-on programming practice. Students will actively engage in structured lectures and interactive lab sessions designed to build a solid foundation in object-oriented concepts and their application. Emphasis will be placed on developing problem-solving skills through practical exercises, code walkthroughs, and collaborative learning. To enhance students' programming proficiency and real-world readiness.			

Module 15

Code	Course/Module Title	ECTS	Semester
UOMAI302	Software Engineering	2	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	33	17
Description			
Introduce students to the fundamental principles, methodologies, and tools used in development of software systems. Develop the ability to plan, design, document, implement, test, and maintain quality software. Equip students with skills in project estimation, requirements engineering, design paradigms, and software process models. Promote best practices in software development, including team collaboration and ethical considerations.			

Module 16

Code	Course/Module Title	ECTS	Semester
UOMAI303	Microprocessors and Assembly Language	6	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	87
Description			

This module aims to provide students with a solid understanding of microprocessor architecture, assembly language programming, and digital logic design. It focuses on equipping students with practical skills in programming microprocessors and designing digital systems. The course integrates the theoretical foundation of control and data path design with practical experience in developing and debugging assembly programs.

Module 17

Code	Course/Module Title	ECTS	Semester
UOMAI304	Numerical Methods	2	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	33	17
Description			
Numerical methods curricula are concerned with studying and developing algorithms and mathematical techniques for solving complex problems that are difficult or impossible to solve using traditional (analytical) mathematical methods, and for finding approximate solutions as well as understanding and analyzing errors. The course focuses primarily on building software algorithms to transform continuous mathematical equations into numerical and approximate computational forms that can be implemented with high accuracy and speed.			

Module 18

Code	Course/Module Title	ECTS	Semester
UOMAI305	Computational Theory	2	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	33	17
Description			
This course is considered among the foundational subjects to be studied in the context of computer languages, as it fundamentally engages with numerous concepts, including the recognition of natural languages and compilers, and also intersects with the domain of electronic circuit processing. This subject constitutes a branch of computer science that determines whether a given problem is computationally solvable, employing various mathematical models. By the end of this course, students will be able to acquire a thorough command of the core			

concepts in computational theory and automata theory. They will also be able to distinguish between the different types of languages and the automata that recognize each language. In addition, students will become familiar with regular expressions as mathematical models that assist in defining programming languages and formal languages. Finally, they will develop the capability to utilize concepts from computational theory as essential tools in the construction of various information systems, such as compilers.

Module 19

Code	Course/Module Title	ECTS	Semester
UOMAI306	Data Structure	6	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	87
Description			
This course introduces the basic concepts of data structures and how they are used to organize and manage data efficiently. It covers arrays, linked lists, stacks, queues, trees, and graphs. The course helps students develop problem-solving and programming skills needed for artificial intelligence applications.			

Module 20

Code	Course/Module Title	ECTS	Semester
UOMAI307	Data Science	6	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	87
Description			
To deliver this module effectively, we will adopt a blended approach that combines theoretical instruction with hands-on data analysis practice. Students will actively engage in structured lectures and interactive lab sessions designed to build a solid foundation in data science tools and techniques, utilizing Excel, Python, and SQL. Emphasis will be placed on developing analytical thinking and practical skills in data cleaning, transformation, and visualization through hands-on projects and data storytelling. To enhance students' ability to evaluate outcomes, make data-driven decisions, and confidently apply data science methods to real-world datasets.			

Module 21

Code	Course/Module Title	ECTS	Semester
UOMAI401	Artificial Intelligence Ethics	2	4

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	33	17
Description			
Understand the fundamental principles and scope of ethics as applied to artificial intelligence technologies. Explore the social, legal, and philosophical foundations that underpin ethical AI development. Develop awareness of contemporary concerns such as privacy, bias, accountability, and transparency in AI systems. Examine major ethical theories and their relevance to moral decision-making in intelligent systems. Analyze the societal impacts of AI on employment, governance, environment, and human relationships. Investigate global frameworks, regulations, and governance models for responsible AI use. Encourage critical and reflective thinking to evaluate ethical challenges and propose balanced solutions. Promote ethical awareness and professional responsibility in the design, deployment, and oversight of AI systems.			

Module 22

Code	Course/Module Title	ECTS	Semester
UOMAI402	Artificial Intelligence Programming	8	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	4	93	107
Description			
An overview of AI fundamentals such as data types, collection and preprocessing; machine learning fundamentals including supervised and unsupervised learning principles; an introduction to deep learning concepts; implementation of multi-layered and convolutional neural networks; reinforcement learning fundamentals; Natural Language Processing (NLP) including text preprocessing, decoding, and word representation; computer vision, image preprocessing, and feature extraction; convolutional neural networks for image classification, object detection, and recognition; real-time vision applications; and learning the fundamentals of robotics and intelligent control. This is followed by integrating AI subsystems (language, vision, and robotics) within unified architectures with real-world examples of AI system applications.			

Module 23

Code	Course/Module Title	ECTS	Semester
UOMAI403	Knowledge Base	6	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	87
Description			

This course introduces students to the fundamental principles, architecture, and operational mechanisms of knowledge-based systems and expert systems, as well as their role within artificial intelligence. The module further provides a precise understanding of problem formulation and the methodologies for transforming real-world scenarios into formal search problems. In addition, it enhances students' analytical thinking and problem-solving skills through practical laboratory exercises, integrating theoretical algorithm design with hands-on implementation using Python.

By the end of this course, students will be able to comprehend the architectural structure, typologies, and constraints of knowledge-based and expert systems. They will also be capable of representing problem states and search spaces using tree and graph data structures in Python. Furthermore, students will evaluate and compare various search approaches based on traversal behavior, efficiency, and suitability for specific problems. Finally, they will integrate foundational programming skills (Python) with artificial intelligence theory to construct functional, search-based solutions.

Module 24

Code	Course/Module Title	ECTS	Semester
UOMAI404	Sorting and Searching Algorithms	6	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	87
Description			
This course introduces fundamental sorting and searching algorithms used in computer science and artificial intelligence. Students learn how to design, implement, and analyze algorithms such as Bubble Sort, Selection Sort, Insertion Sort, Binary Search, and Linear Search, with emphasis on efficiency, complexity, and practical problem-solving.			

Module 25

Code	Course/Module Title	ECTS	Semester
UOMAI405	Database	6	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	87
Description			
To deliver this module effectively, we will adopt a blended approach that combines theoretical instruction with hands-on database management practice. Students will actively engage in structured lectures and interactive lab sessions designed to build a solid foundation in general			

database concepts and their core benefits. Emphasis will be placed on developing analytical skills to interpret business rules, alongside practical proficiency in designing robust database systems using comprehensive E-R diagrams. To enhance students' technical programming proficiency and real-world readiness, practical exercises will heavily focus on implementing database operations using SQL.

Module 26

Code	Course/Module Title	ECTS	Semester
UOM2050	Baath Party Crimes	2	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	33	17
Description			
It is to enlighten this generation about the violations that affected human rights in Iraq through the crimes committed by the then-Baathist regime, which, according to the Iraqi Higher Criminal Court in 2005, were considered violations of human rights. The crimes as investigated by the Iraqi Higher Criminal Court in 2005, the concept of crimes, their types and classifications, the rulings issued by the Higher Court, in addition to psychological crimes and their mechanisms and effects, social crimes, the militarization of society, violations of Iraqi laws and their forms, places of prisons and detention, environmental crimes, war and radioactive pollution, landmines, the destruction of cities and villages, the draining of the marshes, the uprooting of palm groves, trees, and crops, cemetery crimes, and the acts of genocide committed.			

Module 27

Code	Course/Module Title	ECTS	Semester
UOMAI501	Machine Learning	6	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	87
Description			
This course provides students with a comprehensive introduction to the fundamental concepts, techniques, and applications of Machine Learning. It covers the main types of machine learning, including supervised and unsupervised learning, with emphasis on regression, classification, and clustering algorithms. It introduces the fundamental concepts of neural networks, including the Perceptron, feed-forward neural networks, activation functions, and backpropagation. Ensemble learning techniques such as Random Forest and Gradient Boosting are also discussed, together with			

their practical applications.

Module 28

Code	Course/Module Title	ECTS	Semester
UOMAI502	Compilers Design	4	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	37
Description			
This course introduces the fundamental principles and techniques used in the design and implementation of compilers. It covers the main phases of compilation, including lexical analysis, syntax analysis, and semantic analysis. Students learn about context-free grammars, parsing techniques, symbol tables, and type checking. The course also addresses intermediate code generation, runtime environments, and target code generation. Code optimization techniques are introduced to improve the efficiency of generated programs. In addition, students learn methods for error detection and recovery throughout the compilation process. Laboratory activities provide practical experience in implementing compiler components and integrating them into a complete compiler.			

Module 29

Code	Course/Module Title	ECTS	Semester
UOMAI503	Data Analysis	6	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	87
Description			
This module provides a comprehensive introduction to data analysis, covering the full pipeline from data collection and cleaning to preprocessing, exploratory data analysis (EDA), and statistical analysis including hypothesis testing, correlation, and regression. It equips students with practical skills in data visualization using Matplotlib and Seaborn, as well as classification and clustering techniques for categorizing and grouping structured datasets. The course also introduces machine learning approaches for building predictive models, with emphasis on feature engineering, model pipelines, and evaluation. Delivered through lectures and hands-on labs, the module adopts a data-driven inquiry approach using Python tools (Pandas, NumPy, Scikit-learn) on real-world datasets. It culminates in case studies and real-world applications, preparing students to perform end-to-end data analysis and communicate findings effectively.			

Module 30

Code	Course/Module Title	ECTS	Semester
UOMAI504	Computer Network	6	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	87
Description			
This course introduces the fundamental concepts of computer networking, including network architectures, topologies, standards, and communication models. It covers the OSI and TCP/IP reference models, their layers, functions, and associated protocol suites. Students will learn data transmission techniques, including encoding, multiplexing, error detection, and error correction mechanisms, as well as IP addressing, subnetting, and routing protocols such as RIP, OSPF, and BGP. The course also examines transport and application layer protocols, including TCP, UDP, HTTP, DNS, DHCP, and FTP, along with client-server and peer-to-peer network architectures. Furthermore, it explores network security principles, wireless and mobile networking technologies (IEEE 802.11, 3G, 4G, and 5G), and network management concepts using SNMP, monitoring tools, and troubleshooting techniques to ensure efficient, reliable, and secure network operations.			

Module 31

Code	Course/Module Title	ECTS	Semester
UOMAI505	Computer Architecture	4	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	37
Description			
Computer architecture course aims to provide a strong foundation for students to understand modern computer system architecture science and art of designing, selecting and interconnecting hardware components to create a computer that meets functional, performance and cost goals. This course introduces the basic hardware structure of a modern programmable computer, including the basic laws underlying performance evaluation. Also learn, how to design the control and data path hardware for a MIPS-like processor, how to make machine instructions execute simultaneously through pipelining and simple superscalar execution, and how to design fast memory and storage systems.			

Module 31

Code	Course/Module Title	ECTS	Semester
UOMAI506	Computer Vision	4	5

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	37
Description			
Computer Vision is a fundamental area of Artificial Intelligence concerned with enabling computers to acquire, process, analyze, and interpret visual information from images and video. This course provides third-year Artificial Intelligence students with a systematic study of the fundamental and advanced concepts of Computer Vision. It begins with the principles of image formation, digital image representation, image processing, feature extraction, pattern recognition, and image segmentation. Students then progress to higher-level vision tasks including image classification, object recognition, feature matching, motion analysis, object detection, object tracking, and 3D computer vision. The course also includes a dedicated introduction to the role of deep learning in Computer Vision, explaining the transition from hand-crafted visual features to learned representations. This topic provides students with the conceptual background necessary to understand modern vision systems while keeping the main focus of the course on fundamental Computer Vision principles and algorithms. The course combines mathematical concepts, algorithmic understanding, and practical implementation. Students will use programming tools such as Python and OpenCV to implement, analyze, and evaluate computer-vision techniques.			

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