

Republic of Iraq
Ministry of Higher Education &
Scientific Research
Alayen Iraqi University AUIQ
Engineering College
Department of Artificial Intelligent
Engineering



جمهورية العراق
وزارة التعليم العالي والبحث العلمي
جامعة العين العراقية
كلية الهندسة
قسم هندسة الذكاء الاصطناعي

Program Catalogue | ٢٠٢٦-٢٠٢٥ | دليل المواد الدراسية

First Cycle – Bachelor's degree (B.Sc.) – Artificial Intelligent Engineering

بكالوريوس – هندسة الذكاء الاصطناعي



Handwritten signatures and official stamps of the Ministry of Higher Education and Scientific Research, Alayen Iraqi University, and the College of Engineering, Department of Artificial Intelligence Engineering.

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1. Overview

This catalogue presents the courses (modules) offered by the Artificial Intelligence Engineering Program leading to the Bachelor of engineering degree. The program delivers 57 modules, with a total student workload of 7500 hours and 240 ECTS credits. The module delivery follows the Bologna Process.

نظرة عامة

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج هندسة الذكاء الاصطناعي للحصول على درجة بكالوريوس هندسة. يقدم البرنامج (57) مادة دراسية، مع (7500) ساعة حمل دراسي إجمالية للطلاب و (240) وحدة (ECTS) ويعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2023-2024

Module 1

Code	Course/Module Title	ECTS	Semester
AUI111	English language	2	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	17
Description			
This module is designed to enhance students' proficiency in reading, writing, listening, and speaking. It covers essential grammar rules, vocabulary expansion, and effective communication strategies for academic and professional contexts. Students will practice essay writing, report drafting, and presentation skills while developing critical thinking through textual analysis. The module also emphasizes pronunciation, conversational fluency, and comprehension of diverse English accents. Interactive activities, group discussions, and multimedia resources help reinforce learning. By the end			



of the course, students will be able to express ideas clearly, construct well-structured arguments, and engage confidently in English-speaking environments. Ideal for non-native speakers and those seeking to refine their language skills for higher education or global workplace demands.

Module 2

Code	Course/Module Title	ECTS	Semester
AUI112	Democracy and Human Rights	2	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	17
Description			
This module provides students with a foundational understanding of democratic systems and the principles of human rights. It explores the historical development, core values, and functioning of democracy, including the rule of law, political participation, separation of powers, and free elections. The module also examines the concept of human rights, their origins, classifications (civil, political, economic, social, and cultural rights), and international frameworks such as the Universal Declaration of Human Rights. Students will analyze the role of institutions, civil society, and global organizations in promoting and protecting human rights. Through discussions, case studies, and reflective activities, learners will gain awareness of issues like freedom of expression, gender equality, minority rights, and the challenges to democracy in modern societies. This course aims to foster critical thinking, civic responsibility, and a deep appreciation for the values of justice, equality, and human dignity.			

Module 3

Code	Course/Module Title	ECTS	Semester
COE113	Mathematics I	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	78	47
Description			
Further Techniques in Integration, Integration by Parts, Tabular Integration, Trigonometric Integrations, Integration by Trigonometric Substitutions, Integration by $Z=\tan(x/2)$ Substitutions, Partial Fractions Integration, Improper Integrals, Convergence and Divergence Theorem, Sequences of Numbers, Limit of Sequences, Infinite Series, Definition and Properties, Partial Sums test, Geometric Series, Nth. Term test,			



Alternating Series, Ratio test, Root test, Comparison test, Integral test, Harmonic Series, P-Series, Power Series, Taylor's Theorem, Maclaurin's Series, Intervals of Convergence, Matrices and Determinants, Definition of Matrix, Properties, Special Matrices, Matrix Algebra, Definition of Determinant, Properties, Cofactors and Cominors, Evaluation of determinants, Inverse of Matrix, Applications, Cramer's Rule.

Module 4

Code	Course/Module Title	ECTS	Semester
AIE114	Electrical Circuits	6	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1/2/1	93	57
Description			
This module introduces students to the fundamental concepts and analysis techniques of electrical circuits. It covers essential topics such as voltage, current, resistance, power, energy, and the application of Ohm's Law and Kirchhoff's Laws in circuit analysis. Students will learn to analyze series, parallel, and combination resistor networks, as well as capacitive and inductive circuits under both direct current (DC) and alternating current (AC) conditions. The module also introduces the use of basic circuit theorems (Thevenin's and Norton's), transient analysis, and the behavior of RL, RC, and RLC circuits. Practical lab sessions complement the theoretical knowledge, allowing students to build and test circuits using electronic components and measurement instruments such as multimeters and oscilloscopes. This module lays a critical foundation for understanding more advanced topics in electronics and electrical engineering, essential for students in AI, robotics, and engineering-related disciplines.			

Module 5

Code	Course/Module Title	ECTS	Semester
COE115	Engineering Drawing	4	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2/1	63	37
Description			
This module introduces the fundamental principles of engineering drawing as a universal language of engineers and designers. It covers the basics of technical drawing, including geometric constructions, orthographic projections, isometric views, section views, and dimensioning techniques. Students will learn to interpret and create accurate two-dimensional			



(2D) and three-dimensional (3D) drawings using both traditional drawing tools and modern computer-aided design (CAD) software. Emphasis is placed on developing spatial visualization skills, attention to detail, and adherence to engineering drawing standards (such as ISO and ANSI). The course also includes practice in reading and producing mechanical components, assembly drawings, and schematic diagrams. Through hands-on exercises and projects, students will gain the ability to communicate technical ideas clearly and effectively. This module serves as a critical foundation for courses in design, manufacturing, and mechanical systems within engineering disciplines.

Module 6

Code	Course/Module Title	ECTS	Semester
ENG112	Computer Programming I	6	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1/2/1	93	57
Description			
This introductory module provides students with the foundational skills in computer programming, focusing on problem-solving and algorithmic thinking. It covers the basic concepts of programming languages, including variables, data types, operators, control structures (such as conditionals and loops), functions, and arrays. Using a high-level programming language such as Python or C++, students will learn how to write, test, and debug simple programs. Emphasis is placed on structured programming, logical flow, and code readability. The module also introduces students to the basics of input/output handling, error handling, and documentation. Through hands-on lab sessions and practical assignments, students will develop the ability to create programs that solve real-world problems. This course serves as a foundation for more advanced programming and software development modules and is essential for students pursuing studies in engineering, artificial intelligence, and computer science.			

Module 7

Code	Course/Module Title	ECTS	Semester
AIE117	Computer Introduction	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
This module equips students with essential computer literacy and practical skills necessary for			



academic and professional success in engineering and technology fields. It introduces the fundamentals of computer hardware and software, operating systems (Windows and Linux), file management, and internet navigation. Students will gain hands-on experience with productivity tools such as word processors, spreadsheets, and presentation software. The module also covers the basics of programming, introducing logical thinking and problem-solving through beginner-friendly languages such as Python or Scratch. Additionally, students will explore safe and responsible use of technology, including data security, digital communication, and basic troubleshooting techniques. Emphasis is placed on developing the ability to use digital tools efficiently in academic tasks, technical documentation, and collaborative projects. By the end of the course, students will possess a strong foundation in computer usage that supports further study in more advanced computing and engineering modules.

Module 8

Code	Course/Module Title	ECTS	Semester
COE121	Workshop Technology	2	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	17
Description			
This module offers a practical introduction to Workshop Technology, equipping students with fundamental manufacturing skills and safety awareness. Through hands-on training, students learn essential machining operations—including turning, milling, drilling, and welding—and become familiar with both traditional and modern workshop tools. Emphasis is placed on workshop safety, precision measurement, material selection, and interpreting technical drawings. The course integrates theory with practice through lab sessions and project-based tasks, fostering problem-solving and quality control skills. By the end of the module, students will be able to perform basic fabrication tasks, operate workshop equipment safely, and apply manufacturing principles to real-world engineering contexts, preparing them for further specialization and industrial practice.			

Module 9

Code	Course/Module Title	ECTS	Semester
COE122	Physics	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/1	87	22



Description
This module introduces students to the fundamental principles of physics, providing a solid foundation for understanding the natural laws that govern the behavior of matter and energy. Topics include mechanics (motion, forces, energy, and momentum), thermodynamics, waves, sound, and basic electricity and magnetism. The course emphasizes the application of mathematical methods to solve physical problems and helps students develop analytical and critical thinking skills. Laboratory sessions accompany theoretical instruction, allowing students to conduct experiments, gather and analyze data, and draw meaningful conclusions. By understanding physical laws and phenomena, students will gain insight into the principles that underlie engineering systems, technological devices, and modern innovations. This module is particularly important for students in artificial intelligence and engineering programs, as it builds the scientific foundation required for advanced study in robotics, electronics, and system modeling.

Module 10

Code	Course/Module Title	ECTS	Semester
COE123	Mathematics II	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1/1	78	47
Description			
This module is a continuation of Mathematics I and focuses on advanced calculus and analytical methods essential for engineering and computer science. Topics covered include techniques of integration (such as integration by parts, trigonometric substitutions, and partial fractions), improper integrals, and convergence tests for series and sequences. Students will also study infinite series, including Taylor and Maclaurin series, power series, and their intervals of convergence. Additional topics include the theory and application of matrices and determinants, systems of linear equations, Cramer's rule, and the inverse of a matrix. Emphasis is placed on problem-solving and the application of mathematical tools to real-world scenarios. The course equips students with a strong mathematical foundation necessary for advanced modules in artificial intelligence, machine learning, control systems, and data analysis. Through lectures, tutorials, and practical exercises, students will enhance their analytical thinking and quantitative reasoning skills.			

Module 11

Code	Course/Module Title	ECTS	Semester
AIE124	Electronic Circuits	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/1	78	47



Description
This module provides students with a comprehensive understanding of the principles and operation of electronic components and circuits. It covers the behavior and applications of semiconductor devices such as diodes, bipolar junction transistors (BJTs), and field-effect transistors (FETs). Students will learn about biasing techniques, small-signal analysis, and the design of amplifiers, oscillators, and switching circuits. The module also explores the use of operational amplifiers (Op-Amps) in analog signal processing, including filtering, signal amplification, and waveform generation. Emphasis is placed on circuit analysis, design, and practical implementation through lab-based exercises and simulation tools. By the end of the course, students will be able to analyze and design basic to intermediate-level electronic circuits, understand their applications in real-world systems, and use electronic instruments for testing and troubleshooting. This module is essential for students in AI, robotics, and embedded systems, as it builds the groundwork for intelligent hardware design and integration.

Module 12

Code	Course/Module Title	ECTS	Semester
AIE125	Digital Technologies	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	37
Description			
This module introduces students to the essential concepts and components of modern digital technologies that form the backbone of computing and communication systems. It covers fundamental topics such as number systems (binary, octal, hexadecimal), logic gates, Boolean algebra, combinational and sequential logic circuits, flip-flops, multiplexers, decoders, and counters. Students will also gain insight into digital system design, memory units, microprocessors, and basic data representation techniques. Emphasis is placed on understanding how digital systems process, store, and transmit information in electronic devices. Through lab sessions and simulations, students will gain practical skills in analyzing and designing basic digital circuits using tools like logic simulators or digital trainer kits. This module lays the foundation for more advanced subjects in embedded systems, computer architecture, and intelligent systems, making it essential for students in artificial intelligence, robotics, and computer engineering programs.			

Module 13

Code	Course/Module Title	ECTS	Semester
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AIE126	Computer Programming II	6	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1/2/1	93	57
Description			
This module builds upon the foundations established in Computer Programming I, introducing more advanced programming concepts and methodologies. Students will explore object-oriented programming (OOP) principles such as classes, objects, inheritance, polymorphism, and encapsulation. The course also covers data structures including lists, stacks, queues, and basic file handling techniques. Emphasis is placed on writing modular, reusable, and efficient code using languages such as Python, Java, or C++. Students will develop and implement algorithms for solving complex problems and gain experience with debugging and testing strategies. The module includes hands-on programming assignments and projects to reinforce theoretical knowledge and enhance practical skills. By the end of the course, students will be able to design and develop intermediate-level applications with structured and object-oriented approaches, preparing them for more specialized topics in software development, artificial intelligence, and systems programming.			

Module14

Code	Course/Module Title	ECTS	Semester
AUI127	Arabic Language 1	2	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	17
Description			
This module aims to strengthen students' proficiency in Modern Standard Arabic, focusing on both linguistic and communicative skills. It covers key aspects of Arabic grammar, syntax, vocabulary development, and sentence structure, with an emphasis on accurate usage in academic and professional contexts. Students will engage in reading comprehension exercises using literary and informational texts, as well as practice writing coherent and grammatically correct essays and reports. The module also enhances oral and listening skills through structured dialogues, presentations, and discussions. By the end of the course, students will be able to express themselves clearly and effectively in Arabic, both in writing and speech. This module is essential for developing strong communication skills, preserving cultural and linguistic identity, and preparing students for professional environments where Arabic is the primary language of communication.			

Module 15

Code	Course/Module Title	ECTS	Semester
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AIE128	Introduction to AI	2	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		48	2
Description			
This module provides a foundational introduction to Artificial Intelligence (AI), exploring core concepts, methodologies, and real-world applications. Students will learn about intelligent agents, search algorithms, knowledge representation, and machine learning fundamentals. The course also covers essential topics such as problem-solving, reasoning, and an overview of natural language processing. Emphasis is placed on understanding the capabilities and limitations of AI systems, as well as the ethical considerations surrounding their development and use. Through a combination of theoretical study and practical exercises, students will gain hands-on experience in implementing basic AI techniques. By the end of the module, learners will be able to explain key AI principles, identify suitable applications, and assess the societal impact of AI technologies.			

Module 16

Code	Course/Module Title	ECTS	Semester
UAID005	Data Algorithms and Structures 1	5	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/1/1	93	32
Description			
The Data Algorithms and Structures 1 module introduces fundamental concepts for organizing, storing, and processing data efficiently. Students will learn essential data structures such as arrays, linked lists, stacks, queues, trees, and hash tables, along with their applications. The module covers key algorithms for searching, sorting, and recursion, analyzing their time and space complexity using Big-O notation. Practical implementation in a high-level programming language (e.g., Python, Java, or C++) reinforces theoretical understanding. Problem-solving techniques and optimization strategies are emphasized to enhance computational thinking. By the end of the module, students will be able to select appropriate data structures and algorithms for real-world problems, laying the groundwork for advanced studies in software development and computer science.			

Module 17

Code	Course/Module Title	ECTS	Semester
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COE212	Linear Algebra	5	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1/1	78	47
Description			
Mathematical concepts and their engineering applications. Students will explore matrix operations, vector spaces, and systems of linear equations, determinants, eigenvalues, and eigenvectors. The course emphasizes both theoretical understanding and practical problem-solving skills essential for engineering disciplines. Through analytical exercises and computational applications, students learn to apply linear algebra techniques to real-world problems in fields such as computer graphics, data analysis, and control systems. Emphasis is placed on developing mathematical reasoning and the ability to translate engineering challenges into algebraic formulations. By the end of the module, learners will be able to solve complex linear systems, perform matrix computations efficiently, and apply linear algebra concepts to multidisciplinary engineering applications.			

Module 18

Code	Course/Module Title	ECTS	Semester
AIE213	Computer networks	4	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2	63	34
Description			
This module provides students with a comprehensive understanding of computer networking concepts, architecture, and protocols. It covers key topics such as network topologies, the OSI and TCP/IP models, data transmission methods, IP addressing, subnetting, routing, switching, and network security fundamentals. Students will learn how data is transmitted and managed across local and wide-area networks (LANs and WANs), as well as the roles of different hardware components like routers, switches, and firewalls. Emphasis is placed on both theoretical foundations and practical skills, including network configuration, troubleshooting, and simulation using modern tools. By the end of the course, students will be able to analyze network performance, design basic network architectures, and implement secure communication systems. This module is essential for students in artificial intelligence, cybersecurity, and software engineering, as it forms the basis for understanding how intelligent systems communicate in distributed and connected environments.			

Module 19

Code	Course/Module Title	ECTS	Semester
AIE214	Mechanics & Robotics I	6	3



Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2/1	93	57
Description			
This module introduces students to the fundamental concepts of mechanics and the basics of robotics, laying the groundwork for intelligent machine design and control. It covers classical mechanics topics such as force, motion, torque, equilibrium, kinematics, and dynamics of rigid bodies, which are essential for understanding the physical behavior of robotic systems. In the robotics portion, students will explore the structure of robotic systems, types of robots, basic actuation and sensing mechanisms, and introductory concepts in robot control and programming. The course emphasizes practical applications through problem-solving, simulations, and hands-on laboratory sessions using robotic kits or simulators. By the end of the module, students will understand the mechanical principles that influence robot design and functionality and will gain initial experience in building and controlling simple robotic systems. This module serves as a foundation for more advanced studies in automation, intelligent systems, and mechatronics.			

Module 20

Code	Course/Module Title	ECTS	Semester
AIE215	DATA BASE	4	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/1	78	22
Description			
This module provides a comprehensive introduction to the design, implementation, and management of database systems, a critical component of modern software applications. Students will learn fundamental concepts including data modeling (ER diagrams, relational models), SQL programming (queries, joins, transactions), and database normalization (1NF to BCNF). The module covers both relational (MySQL, PostgreSQL) and NoSQL (MongoDB, Redis) systems, comparing their use cases in scalability and performance. Additional topics include index structures, concurrency control, and basic database administration. Hands-on projects involve designing schemas, optimizing queries, and building small applications with backend databases. By the end, students will be proficient in structuring efficient, secure databases and understanding their role in full-stack systems.			

Module 21

Code	Course/Module Title	ECTS	Semester
AIE216	Electrical Power and Machines	4	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)



2	1	63	37
Description			
This module provides a comprehensive introduction to Electrical Power and Machines, covering fundamental principles of power systems and electromechanical energy conversion. Students will study AC/DC circuits, transformers, rotating machinery, and power distribution networks. The course explores the operation, performance, and applications of various electrical machines including generators, motors, and transformers. Through theoretical analysis and practical laboratories, students learn to analyze power system behavior, calculate machine parameters, and understand control methodologies. Emphasis is placed on efficiency optimization, safety standards, and sustainable power practices. By the end of the module, learners will be able to evaluate electrical machine performance, design basic power circuits, and apply industry standards in power system analysis, preparing them for advanced studies and professional practice in electrical engineering fields.			

Module 22

Code	Course/Module Title	ECTS	Semester
AUI127	Arabic Language 2	2	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	17
Description			
This module aims to strengthen students' proficiency in Modern Standard Arabic, focusing on both linguistic and communicative skills. It covers key aspects of Arabic grammar, syntax, vocabulary development, and sentence structure, with an emphasis on accurate usage in academic and professional contexts. Students will engage in reading comprehension exercises using literary and informational texts, as well as practice writing coherent and grammatically correct essays and reports. The module also enhances oral and listening skills through structured dialogues, presentations, and discussions. By the end of the course, students will be able to express themselves clearly and effectively in Arabic, both in writing and speech. This module is essential for developing strong communication skills, preserving cultural and linguistic identity, and preparing students for professional environments where Arabic is the primary language of communication.			

Module 23

Code	Course/Module Title	ECTS	Semester
AIE221	Data Algorithms and Structures 2	5	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)



2	2/1	87	47
Description			
This module builds upon foundational data structures knowledge, introducing advanced algorithms and complex data organizations. Students explore sophisticated data types including trees, graphs, hash tables, and heaps, alongside advanced sorting and searching techniques. The course emphasizes algorithm analysis, computational complexity, and optimization strategies for large-scale data processing. Through practical programming assignments and theoretical studies, learners implement efficient algorithms for real-world problems, focusing on time-space tradeoffs and performance optimization. Topics include dynamic programming, greedy algorithms, graph traversal methods, and advanced tree structures. By the end of the module, students will be able to design, implement, and analyze complex algorithms, select appropriate data structures for specific applications, and solve computational problems efficiently using advanced algorithmic paradigms.			

Module 24

Code	Course/Module Title	ECTS	Semester
AUI222	Crimes of Defunct Baath Party	2	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	17
Description			
This module examines the historical and legal dimensions of the crimes committed by Iraq's Ba'ath Party under Saddam Hussein's regime (1968–2003). Students will analyze documented violations of international law, including wars of aggression (Iran-Iraq War, Kuwait invasion), genocide (Anfal Campaign against Kurds), mass executions, torture, and suppression of political dissent. The course explores evidence from tribunals like the Iraqi High Tribunal, testimonies from survivors, and declassified documents. Comparative case studies (e.g., Nuremberg Trials) contextualize accountability mechanisms. Ethical debates cover transitional justice, victim reparations, and the challenges of post-authoritarian reconciliation. By the end, students will critically assess the balance between justice and political pragmatism in addressing regime crimes.			

Module 25

Code	Course/Module Title	ECTS	Semester
AIE223	Mechanics & Robotics II	6	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/1	78	72



Description
The Mechanics & Robotics II module builds upon foundational principles to explore advanced topics in mechanical systems and robotic automation. Students will study kinematics and dynamics of robotic manipulators, including forward and inverse kinematics, Jacobian matrices, and trajectory planning. The module covers control systems such as PID, state-space modeling, and feedback mechanisms for precision robotics. Practical applications include sensor integration (vision, force, LiDAR), actuator selection, and embedded programming for autonomous robots. Hands-on projects involve designing and simulating robotic systems using tools like ROS (Robot Operating System) or MATLAB. By the end of the module, students will be able to model, analyze, and implement complex robotic solutions for industrial and research applications, preparing them for careers in automation, AI, and advanced manufacturing.

Module 26

Code	Course/Module Title	ECTS	Semester
AIE225	Measurements & Instruments	4	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/1	78	22
Description			
This module introduces the fundamental principles and techniques of measurement systems used in engineering and scientific applications. Students will explore sensor technologies, signal conditioning, data acquisition, and error analysis, with an emphasis on accuracy, precision, and calibration. Key topics include analog and digital instrumentation, transducers (temperature, pressure, strain, etc.), and measurement standards. The module also covers modern tools such as oscilloscopes, spectrum analyzers, and LabVIEW for real-time data processing. Practical lab sessions reinforce theoretical concepts, enabling students to design and evaluate measurement systems for industrial and research applications. By the end, students will be proficient in selecting appropriate instruments, analyzing measurement uncertainties, and applying best practices in experimental setups.			

Module 27

Code	Course/Module Title	ECTS	Semester
COE226	Statistics	5	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1/1	78	47
Description			



This module provides a comprehensive introduction to Statistics, focusing on fundamental concepts and analytical methods for data-driven decision making. Students will explore probability theory, descriptive and inferential statistics, hypothesis testing, regression analysis, and confidence intervals. The course emphasizes practical applications across various engineering and scientific disciplines. Through hands-on exercises and real-world case studies, students learn to collect, analyze, and interpret data using statistical software tools. Emphasis is placed on developing critical thinking skills for drawing meaningful conclusions from data and understanding statistical significance. By the end of the module, learners will be able to apply statistical methods to solve engineering problems, make data-informed decisions, and effectively communicate statistical findings to diverse audiences.

Module 28

Code	Course/Module Title	ECTS	Semester
AUI227	English Language	2	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	17
Description			
This module is designed to enhance students' proficiency in the English language, focusing on the four key skills: listening, speaking, reading, and writing. It aims to improve students' ability to communicate effectively in academic and professional settings. The course includes grammar and vocabulary development, reading comprehension, paragraph and essay writing, and oral communication through discussions and presentations. Emphasis is also placed on improving pronunciation, listening to academic lectures, and developing the ability to analyze and interpret written texts. Through interactive activities, assignments, and language labs, students will build confidence and fluency in English. This module is essential for students in engineering and technology programs, as it prepares them to engage with English-language academic content, participate in international research, and collaborate in global professional environments.			

Module 29

Code	Course/Module Title	ECTS	Semester
AIE311	signals and systems	5	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/1	78	47



Description
This module provides a comprehensive introduction to Signals and Systems, covering fundamental concepts of continuous-time and discrete-time signal analysis. Students explore signal classification, system properties, convolution, Fourier analysis, and Laplace/Z-transforms. The course emphasizes mathematical modeling of systems and the transformation between time and frequency domains. Through theoretical analysis and practical applications, students learn to analyze linear time-invariant systems, process signals, and understand sampling and reconstruction principles. Emphasis is placed on developing analytical skills for solving engineering problems in communications, control systems, and signal processing. By the end of the module, learners will be able to model and analyze various signal types, apply transform techniques, and design basic signal processing systems for real-world engineering applications.

Module 30

Code	Course/Module Title	ECTS	Semester
COE312	Discrete Mathematics	5	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1/1	78	47
Description			
This module provides a comprehensive introduction to Discrete Mathematics, focusing on mathematical structures that are fundamentally discrete rather than continuous. Students explore logical reasoning, set theory, combinatorics, graph theory, relations, functions, and proof techniques. Through theoretical exercises and practical problem-solving, students develop rigorous reasoning skills and learn to model computational problems using discrete structures. The course emphasizes algorithmic thinking and mathematical structures essential for computer science applications. By the end of the module, learners will be able to construct mathematical proofs, analyze discrete structures, solve combinatorial problems, and apply these concepts effectively to computer science and engineering challenges.			

Module 31

Code	Course/Module Title	ECTS	Semester
AIE313	Machine Learning	6	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/1/1	93	57
Description			



This module provides a comprehensive introduction to Machine Learning, covering fundamental algorithms and practical applications. Students explore supervised and unsupervised learning techniques, including regression, classification, clustering, and neural networks. The course emphasizes hands-on experience with data preprocessing, model training, and performance evaluation using real-world datasets. Through programming assignments and projects, students learn to implement ML algorithms and critically assess their results. By the end of the module, learners will be able to select appropriate ML methods for different problems, build predictive models, and understand the ethical considerations in deploying machine learning solutions.

Module 32

Code	Course/Module Title	ECTS	Semester
AIE314	Automatic Control	4	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1	63	37
Description			
This module provides a comprehensive introduction to Automatic Control systems, covering fundamental principles of feedback control and system dynamics. Students explore mathematical modeling of physical systems, stability analysis, and controller design techniques including PID and state-space methods. The course emphasizes both time-domain and frequency-domain analysis for continuous and discrete systems. Through theoretical studies and practical simulations, students learn to design, analyze, and optimize control systems for various engineering applications. By the end of the module, learners will be able to model dynamic systems, design effective controllers, and evaluate system performance using appropriate analytical and computational tools.			

Module 33

Code	Course/Module Title	ECTS	Semester
AIE315	Data Management	2	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1/1	78	22
Description			
This module provides a comprehensive introduction to Machine Learning, covering fundamental algorithms and practical applications. Students explore supervised and unsupervised learning techniques, including regression, classification, clustering, and neural networks. The course emphasizes hands-on experience with data preprocessing, model training, and performance evaluation using real-world datasets. Through programming			



assignments and projects, students learn to implement ML algorithms and critically assess their results. By the end of the module, learners will be able to select appropriate ML methods for different problems, build predictive models, and understand the ethical considerations in deploying machine learning solutions.

Module 34

Code	Course/Module Title	ECTS	Semester
AIE316	Data Management	4	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		78	22
Description			
This module provides a comprehensive introduction to Data Management, covering fundamental concepts of database design, implementation, and administration. Students explore data modeling techniques, SQL programming, normalization processes, and transaction management. The course emphasizes database security, integrity constraints, and efficient data retrieval methods. Through practical projects and case studies, students learn to design relational databases, optimize queries, and manage data systems using modern DBMS tools. By the end of the module, learners will be able to develop structured databases, implement data governance policies, and apply best practices in data management for organizational decision-making and business intelligence applications.			

Module 35

Code	Course/Module Title	ECTS	Semester
AIE316	Professional Ethics	2	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1/1	33	17
Description			
This module provides a comprehensive introduction to Professional Ethics, examining moral principles and ethical decision-making in professional contexts. Students explore ethical theories, corporate social responsibility, codes of conduct, and case studies from various industries. The course emphasizes critical thinking about ethical dilemmas, whistleblowing, conflict of interest, and sustainable practices. Through interactive discussions and real-world scenarios, students develop skills to analyze ethical issues and make principled decisions. By the end of the module, learners will be able to identify ethical challenges, apply ethical			



frameworks to professional situations, and demonstrate moral reasoning that aligns with both professional standards and societal expectations.

Module 36

Code	Course/Module Title	ECTS	Semester
AIE317	Computer Architecture	4	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1/1	78	22
Description			
This module provides a comprehensive introduction to Computer Architecture, exploring the fundamental design and organization of computer systems. Students examine processor design, memory hierarchy, input/output systems, and parallel processing architectures. The course emphasizes performance analysis, instruction set architecture, and the hardware-software interface. Through theoretical concepts and practical simulations, students learn to evaluate trade-offs in computer design and understand how architectural choices impact system performance. By the end of the module, learners will be able to analyze computer components, explain architectural principles, and assess the relationship between hardware design and computational efficiency in modern computing systems.			

Module 37

Code	Course/Module Title	ECTS	Semester
AIE321	Project Management	4	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	60	40
Description			
This module provides a comprehensive introduction to Project Management, covering essential methodologies and tools for successful project delivery. Students explore project planning, scheduling, resource allocation, risk management, and quality assurance frameworks. The course emphasizes both traditional and agile approaches, teaching students to define project scope, develop work breakdown structures, and monitor progress using key performance indicators. Through case studies and practical exercises, learners develop skills in stakeholder communication, budget control, and team leadership. By the end of the module, participants will be able to initiate, plan, execute, and close projects effectively while managing constraints of time, cost, and quality in various organizational contexts.			



Module 38

Code	Course/Module Title	ECTS	Semester
COE322	Engineering Mathematics	5	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	78	47
Description			
This module provides a comprehensive foundation in Engineering Mathematics, covering essential mathematical tools and techniques for solving engineering problems. Students explore differential equations, complex analysis, vector calculus, and numerical methods relevant to various engineering disciplines. The course emphasizes applying mathematical concepts to model, analyze, and optimize real-world engineering systems. Through problem-solving sessions and practical applications, students develop analytical skills and mathematical reasoning capabilities. By the end of the module, learners will be able to formulate engineering problems mathematically, apply appropriate solution techniques, and interpret results effectively for engineering design and decision-making processes across mechanical, electrical, and civil engineering contexts.			

Module 39

Code	Course/Module Title	ECTS	Semester
AIE323	Networks and Sensors	6	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/1	78	47
Description			
This module provides a comprehensive introduction to Networks and Sensors, covering the integration of sensor technologies with network infrastructures for data acquisition and communication. Students explore various sensor types, signal conditioning, data transmission protocols, and wireless sensor networks. The course emphasizes IoT architectures, network topologies, and real-time data processing from distributed sensor systems. Through hands-on projects and simulations, students learn to design, configure, and optimize networked sensor systems for monitoring and control applications. By the end of the module, learners will be able to select appropriate sensors, implement communication protocols, and develop integrated network-sensor solutions for smart environments and industrial automation systems.			



Module 40

Code	Course/Module Title	ECTS	Semester
AIE324	Signal Processing	5	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/1	78	47
Description			
This module provides a comprehensive introduction to Signal Processing, covering fundamental techniques for analyzing and manipulating continuous-time and discrete-time signals. Students explore time-domain and frequency-domain analysis, Fourier transforms, filter design, and sampling theory. The course emphasizes both analog and digital signal processing methods, including convolution, correlation, and spectral analysis. Through theoretical concepts and practical implementations using software tools, students learn to process various types of signals for noise reduction, feature extraction, and information enhancement. By the end of the module, learners will be able to design and analyze signal processing systems, apply appropriate transformation techniques, and implement processing algorithms for communications, audio, and biomedical applications.			

Module 41

Code	Course/Module Title	ECTS	Semester
AIE325	Deep Learning	6	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2/1	108	42
Description			
This module provides a comprehensive introduction to Deep Learning, exploring advanced neural network architectures and their applications in complex problem-solving. Students examine convolutional neural networks (CNNs), recurrent neural networks (RNNs), autoencoders, and generative models, with emphasis on both theoretical foundations and practical implementation. The course covers key concepts including backpropagation, optimization algorithms, regularization techniques, and transfer learning. Through hands-on projects using modern deep learning frameworks, students gain experience in training, validating, and deploying models for computer vision, natural language processing, and predictive analytics. By the end of the module, learners will be able to design appropriate network architectures, troubleshoot training challenges, and apply deep learning solutions to real-world datasets while considering computational requirements and ethical implications.			



Module 42

Code	Course/Module Title	ECTS	Semester
AIE326	Cybersecurity	4	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/1	78	22
Description			
This module provides a comprehensive introduction to Cybersecurity, covering fundamental principles of protecting digital systems, networks, and data from malicious attacks. Students explore threat landscapes, vulnerability assessment, cryptography, network security protocols, and access control mechanisms. The course emphasizes both defensive strategies and offensive security techniques, teaching students to identify vulnerabilities, implement security measures, and respond to incidents effectively. Through hands-on labs and real-world scenarios, learners develop practical skills in security monitoring, risk management, and digital forensics. By the end of the module, participants will be able to assess security risks, design protective measures, and apply cybersecurity best practices to safeguard organizational assets in various computing environments.			

Module 43

Code	Course/Module Title	ECTS	Semester
COE411	project 1	4	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
	3/1	60	40
Description			

Module 44

Code	Course/Module Title	ECTS	Semester
AIE412	robotics	5	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62



Description
This module provides a comprehensive introduction to Robotics, covering the fundamental principles of robot design, modeling, and control. Students explore kinematics, dynamics, motion planning, sensors, and actuators used in robotic systems. The course emphasizes both theoretical foundations and practical applications through hands-on projects involving robot programming and simulation. Learners will examine various robot architectures including manipulators, mobile robots, and autonomous systems while studying perception, localization, and human-robot interaction. By the end of the module, students will be able to model robotic systems, implement control algorithms, program robotic tasks, and integrate sensors with actuators to create functional robotic solutions for industrial, medical, and service applications.

Module 45

Code	Course/Module Title	ECTS	Semester
AIE413	applications AI	4	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1	48	52
Description			
This module explores practical implementations of Artificial Intelligence across various domains, focusing on real-world applications and deployment strategies. Students examine AI solutions in healthcare, finance, autonomous systems, natural language processing, and computer vision, learning to integrate AI tools and frameworks into existing systems. The course emphasizes data pipeline development, model deployment, performance monitoring, and ethical considerations in AI applications. Through case studies and hands-on projects, students gain experience in selecting appropriate AI techniques, optimizing models for specific tasks, and addressing challenges like bias mitigation and scalability. By the end of the module, learners will be able to design, implement, and evaluate AI-powered solutions that solve practical problems while considering technical constraints and societal impact.			

Module 46

Code	Course/Module Title	ECTS	Semester
AIE414	big data	6	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/1/1	93	57
Description			



This module provides a comprehensive introduction to Big Data, covering the fundamental concepts, technologies, and analytical methods for processing massive datasets. Students explore distributed computing frameworks like Hadoop and Spark, data storage solutions, and scalable processing techniques. The course emphasizes data ingestion, cleaning, transformation, and analysis using both batch and real-time processing approaches. Through practical exercises with large datasets, students learn to apply machine learning algorithms, perform predictive analytics, and visualize insights effectively. By the end of the module, learners will be able to design big data architectures, implement processing pipelines, and extract meaningful patterns from complex datasets while addressing challenges related to scalability, velocity, and veracity in various industry contexts.

Module 47

Code	Course/Module Title	ECTS	Semester
AIE415	neural networks	5	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
This module provides a comprehensive introduction to Embedded Systems, covering the design and implementation of dedicated computing devices for specific applications. Students explore microcontroller architectures, real-time operating systems, peripheral interfacing, and hardware-software co-design principles. The course emphasizes resource-constrained programming, power management, and reliability considerations in embedded environments. Through practical laboratory sessions and projects, students learn to develop firmware, interface with sensors and actuators, and optimize system performance under strict timing and memory constraints. By the end of the module, learners will be able to design, program, and debug embedded systems for automotive, consumer electronics, industrial control, and IoT applications while addressing challenges related to real-time operation and system integration.			

Module 48

Code	Course/Module Title	ECTS	Semester
AIE416	Embedded systems	4	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	37
Description			



This module provides a comprehensive introduction to Embedded Systems, covering the design and implementation of dedicated computing devices for specific applications. Students explore microcontroller architectures, real-time operating systems, peripheral interfacing, and hardware-software co-design principles. The course emphasizes resource-constrained programming, power management, and reliability considerations in embedded environments. Through practical laboratory sessions and projects, students learn to develop firmware, interface with sensors and actuators, and optimize system performance under strict timing and memory constraints. By the end of the module, learners will be able to design, program, and debug embedded systems for automotive, consumer electronics, industrial control, and IoT applications while addressing challenges related to real-time operation and system integration.

Module 49

Code	Course/Module Title	ECTS	Semester
AIE416	Marketing	2	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	17
Description			
This module provides a comprehensive introduction to Marketing, covering fundamental principles and contemporary strategies for creating, communicating, and delivering value to customers. Students explore market research, consumer behavior, segmentation, branding, digital marketing channels, and integrated marketing communications. The course emphasizes both theoretical frameworks and practical applications through case studies and real-world projects. Students learn to develop marketing plans, analyze competitive environments, and utilize digital tools for customer engagement and relationship management. By the end of the module, learners will be able to conduct market analysis, formulate effective marketing strategies, and implement tactical campaigns across traditional and digital platforms while understanding ethical considerations and measuring marketing performance.			



Module 50

Code	Course/Module Title	ECTS	Semester
COE421	project 2	4.00	8

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
0	\3\	60	40
Description			
This course aims to enable students to apply the knowledge and skills acquired in the major through the implementation of an integrated project in one of the fields of engineering or computing. The course includes the development and implementation of a practical project based on research, analysis, design, programming, and testing, with a focus on solving a real-world problem or developing a system or application model using modern engineering tools and methods. The course encourages teamwork, time management, project documentation, and the preparation of technical reports and presentations. The course also requires students to demonstrate proficiency in analytical and creative thinking and adhere to ethical and professional standards.			

Module 51

Code	Course/Module Title	ECTS	Semester
AIE422	data mining	6.00	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	\2\ \1	93	57
Description			
This course aims to introduce students to the basic concepts of data mining and its various methods for extracting useful knowledge from large data sets. The course covers the theoretical principles and practical applications of mining techniques such as classification, clustering, association rules, and anomaly detection. It also focuses on the stages of the data mining process, from data collection, cleaning, and transformation to model building and analysis of the results. These concepts are applied using specialized data analysis tools and software such as WEKA or Python (Scikit-learn), with case studies in business, engineering, and artificial intelligence.			

Module 52

Code	Course/Module Title	ECTS	Semester
AIE423	multimedia systems	4.00	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	\2\ \1	78	22



Description
This course covers the basic principles and techniques for designing and developing multimedia systems, with an emphasis on the integration of text, images, audio, video, and animation in an interactive digital environment. The course aims to introduce students to the components of multimedia systems, data representation and compression standards, and methods for storing, retrieving, and transmitting data over networks. The course also covers the software aspects related to developing multimedia applications, design and editing tools, and studies multimedia applications in the fields of education, entertainment, advertising, and e-commerce.

Module 53

Code	Course/Module Title	ECTS	Semester
AIE424	advanced programing	5.00	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	\2\ \1\	78	47
Description			
This course aims to develop students' skills in designing and implementing programs using high-level programming languages, with a focus on advanced concepts in object-oriented programming, data structures, memory management, error handling, multithreading techniques, and file programming. The course also covers the design of efficient algorithms, analyzing their performance, and using modern programming principles to build highly efficient, reusable, and integrated applications. The course includes practical applications and programming projects aimed at honing students' skills in analytical thinking and solving complex programming problems.			



Module 54

Code	Course/Module Title	ECTS	Semester
AIE425	IOT	5.00	8

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
This course aims to introduce students to the concept of the Internet of Things (IoT) and its basic components, and how smart devices are interconnected across networks to exchange data and make decisions. The course covers IoT infrastructure, sensors, microcontrollers, wireless communication technologies, cloud platforms, and data analysis. It also focuses on security aspects and practical applications of IoT in areas such as smart cities, smart agriculture, healthcare, and smart homes. The course also includes practical exercises to design and implement simple projects using tools such as Arduino, Raspberry Pi, and modern IoT frameworks.			

Module 55

Code	Course/Module Title	ECTS	Semester
AIE426	HCI	3.00	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	42
Description			
This course aims to introduce students to the basic concepts and principles of human-computer interface design and evaluation, with a focus on making computer systems more effective, efficient, and user-friendly. The course examines the relationship between human capabilities (cognitive, perceptual, and psychological) and interactive systems design, in addition to user-centered design approaches and modeling and evaluation methods. The course also includes practical applications for user interface design, user experience analysis, and usability evaluation, utilizing modern tools and techniques in interaction design.			



Module 56

Code	Course/Module Title	ECTS	Semester
AIE427	quantum computing	3.00	8

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	42
Description			
This course aims to introduce students to the basic concepts of quantum computing, a future trend in advanced computing. It examines the physical principles underlying quantum mechanics and their application in building computing systems capable of processing information in ways beyond the capabilities of conventional computers. The course covers quantum bits, superposition, and entanglement, as well as quantum gate operations and quantum circuits. The course also covers fundamental quantum algorithms such as Shor's Algorithm and Grover's Algorithm, along with practical applications in cryptography, research, and computational performance optimization. The course also focuses on comparing quantum computing with classical computing and reviews the technical and research challenges associated with developing quantum computers.			

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