SEMESTER I (FALL)

Programming and Problem Solving
(Course type: required; Course code: AII102; Cr: 4; ECTS: 5)

Course objective: The aim of this course is to provide an introduction to fundamental concepts of programming.
Course content: This course provides a use of built-in data structures in solving problems using the Python general-purpose programming language. In this course, students study how to write user-defined functions using iteration as well as recursion. This course also stresses the importance of programming tools such as programming editors and debuggers. The students are expected to work within a GNU/Linux environment. The course provides a basic introduction into object-oriented programming.

General Chemistry
(Course type: required; Course code: CHM101; Cr: 4; ECTS:5)
Course objective: The aim of this course is to provide the basic concepts of chemistry and main elements of its content.
Course content: A basic course emphasizing the metric system. Introduction to atomic theory, stoichiometry. The structural and physical properties of matter. Periodic relationship among elements and periodic table. Gaseous state. Thermo-chemistry. Energy and enthalpy. Electronic structure of atoms. Chemical bonding.

English I
(Course type: required; Course code: ENG101; Cr: 3; ECTS: 3)
Course objective: This course aims at enabling students to understand their lessons and to express themselves in English
Course content: This course offers intermediate levels including a wide range of grammatical structures and vocabulary of English in order to build onto the foundation established at the Preparatory School. This course aims to bring the students to a level that will enable them to fulfil the requirements of main courses of their departments. Students will be encouraged to read a variety of texts as well as chapters from textbooks so that they can pursue their undergraduate studies at the university without major difficulty. ENG 101 is designed to improve the students' presentation ability. Students are expected to do an oral presentation. At the end of the course they submitted their written projects.

Calculus I

(Course type: required; Course code: MTH101; Cr: 4; ECTS: 5)

Course objective: The primary aims of the course are to help students develop new problem solving and critical reasoning skills and to prepare them for further study in mathematics, the physical sciences, or engineering.

Course content: Functions, limits and continuity. Derivatives. Mean value theorem. Sketching graphs. Definite integrals, infinite integrals (antiderivatives). Logarithmic, exponential, trigonometric and inverse trigonometric functions and their derivatives. L'Hospital's rule. Techniques of integration. Applications of the definite integral, improper integrals.

Physics I

(Course type: required; Course code: PHY101 Cr: 4; ECTS: 5)

Course objective: The goal of physics is to understand how things work from first principles.

Course content: Measurement, vectors, kinematics, force, mass. Newton's laws, applications of Newton's laws. Work and kinetic energy. Conservation of linear momentum. Impulse, collisions, rotation, moments of inertia. Torque, angular momentum, conservation of angular momentum, static equilibrium.

Linear Algebra

(Course type: required; Course code: MTH113 Cr: 3; ECTS: 5)

Course objective: This course aims to teach Systems of linear equations and Matrices.

Course content: Systems of linear equations and Matrices: elementary row operations, echelon forms, Gaussian elimination method, matrices and matrix operations, invertible matrices, diagonal, triangular and symmetric matrices. Determinants: determinants by cofactor expansion, evaluating determinants by row reduction, ad joint and inverse matrices, Cramer's rule. Euclidean vector spaces: Euclidean n-space, linear transformation from R n to Rm. General vector spaces: Real vector spaces, subspaces, linear independence, basis and dimensions, row space, column space, and null space, rank and nullity. Inner product spaces: inner products, orthogonality in inner product spaces, orthonormal bases, Cauchy-Schwarz inequality, Gram-Schmidt orthogonalization, change of bases, orthogonal matrices. Eigenvalues and eigenvectors: Eigenvalues and eigenvectors, diagonalization, orthogonal diagonalization.

Campus Orientation

(Course type: required; Course code: CAM100 Cr: 0; ECTS:2)

CAM100 is a foundational course designed to help new students transition into university life at Near East University. Through interactive

activities, presentations, and educational videos, students will explore the university's history, academic and social opportunities, and the support services available on campus. Key topics include developing effective academic habits, understanding university regulations, fostering social and cultural integration, and embracing the role of academic research. This course is essential for building a strong foundation for academic success and personal growth within the university environment.

SEMESTER II (SPRING) Object Oriented Programming
(Course type: required; Course code: All108; Prerequisite: All102; Cr: 3; ECTS: 6)
Course objective: This course provides an in-depth discussion of object-oriented programming and how object-oriented programming can be used in solving real-life problems.
Course content: This course requires a more advanced use of programming tools (mainly editors and debuggers) that were introduced in ECC102 (Programming and Problem Solving). This course uses Python 3 to teach the fundamental concepts of object-oriented programming. The students are expected to work within a GNU/Linux environment. The course builds upon the knowledge of ECC102 and ECC201 and is the third course in line that uses Python as a programming language. The students who wish to take this course are expected to have a good understanding of basic Python programming, data structures and algorithms.

Calculus II
(Course type: required; Course code: MTH102; Prerequisite: MTH101; Cr: 4; ECTS: 6)
Course objective: The aim of this course is to offer the basic fundamentals of needs to apply the principles of mathematical logic, and to use proof techniques such as induction, and to reason about the efficiency of an algorithm.
Course content: Plane and polar co-ordinates, area in polar co-ordinates, arc length of curves. Limit, continuity and differentiability of function of several variables, extreme values, method of Lagrange multipliers. Double integral, triple integral with applications. Line integrals, Green’s theorem. Sequences, infinite series, power series, Taylor’s series. Complex numbers.

Discrete Structures
(Course type: required; Course code: All104; Cr: 3; ECTS: 5)
Course objective: The aim of this course is to offer the basic fundamentals of needs to apply the principles of mathematical logic, and to use proof techniques such as induction, and to reason about the efficiency of an algorithm.

Course content: Sets and Logic, Proofs, Functions, Sequences and Relations, Algorithms, Introduction to Number Theory, Counting Methods and the Pigeonhole Principle, Recurrence Relations, Graph Theory, Trees, Network Models, Boolean Algebras and Combinatorial Circuits, Automata, Grammars and Languages, Computational Geometry.

English II

(Course type: required; Course code: ENG102; Prerequisite: ENG101; Cr: 3; ECTS:3)

Course objective: This course aims to bring the students to a level that will enable them to fulfil the requirements of the main courses of the departments.

Course content: This course offers the students a wide range of grammatical structures and key language and vocabulary of English in the technical, industrial, and scientific sectors at intermediate level for everyday communication at work. The ability to evaluate, analyze and synthesize information in written discourse will be highlighted. Documentation in writing will be introduced at the beginning of the course, in order to solidly establish the skill by the end. Students will learn the discourse patterns and structures to be used in different essay types that they need for real life, hands-on tasks like explaining processes, organizing schedules, reporting or progress, or analyzing risk.

Physics II

(Course type: required; Course code: PHY102; Prerequisite: PHY101; Cr: 4; ECTS:6)

Course objective: This course aims to bring the students to a level that will enable them to understand how things work from an electrical point of view.

Course content: Electrical charges. Coulomb's law. Electrical fields. Gauss's law. Electrical potential. Capacitance and dielectrics. Current and resistance. Direct current circuits. Magnetic fields. Sources of the magnetic field. Faraday's law of induction. Inductance and inductors.

CAR100 Career Planning

CAR100 is a foundational course aimed at equipping students with essential career planning skills to navigate the dynamic professional world. Students will explore career development models, learn effective job search techniques, and master the art of CV and cover letter writing. The course emphasizes self-awareness, effective communication, professional networking, and interview preparation. By aligning personal interests, values, and strengths with career goals, students will be empowered to adapt to evolving economic, social, and cultural landscapes and develop a lifelong learning mindset for career success.

SEMESTER III (FALL)

Data Structures and Algorithms (Course type: required; Course code: AII201; Prerequisite: AII108; Cr: 4; ECTS: 6)

Course objective: This course aims to offer understanding the algorithm and data structures used for some problem is much more important than knowing the exact code for it in some programming language.
Course content: This course comprises an introductory exploration into the design and implementation of Abstract Data Types (ADTs) along with the study of algorithm design and complexity analysis. Even though the discussions during lectures about ADTs are language independent, this course uses Python, a very high-level general programming language, to implement these ideas using object-oriented programming. This class starts with a brief introduction to object-oriented programming.

Logic Design (Course type: required; Course code: All001; Prerequisite: All104; Cr: 4; ECTS: 6)
Course objective: This course aims to offer understanding of basic EE abstractions on analysis and design of electrical and electronic circuits and systems. Also, the capability to use abstractions to analyze and design simple electronic circuits.
Course content: Digital Systems and Information, Combinational Logic Circuits, Combinational Logic Design, Arithmetic Functions and HDLs, Sequential Circuits, Selected Design Topics, Registers and Register Transfers, Memory Basics, Computer Design Basics, Instruction Set Architecture, RISC and CISC Processors, Input-Output and Communication, Memory Systems.

Probability and Statistics

(Course type: required; Course code: MTH251; Prerequisite: MTH113; Cr: 3; ECTS: 6)
Course objective: The aim of the course is to provide information to create, simulate, and analyze elementary probability models and to explain the limitations of the statistical inferences made therefrom.
Course content: Statistics, Data and Statistical Thinking, Methods for Describing Sets of Data, Probability, Random Variables and Probability Distributions, Inferences Based on Samples, Design of Experiments and Analysis of Variance, Categorical Data Analysis, Simple Linear Regression, Multiple Regression and Model Building, Methods for Quality Improvement: Statistical Process Control, Time Series, Nonparametric Statistics.

CHC100
Cyprus History and Culture

CHC100 is a comprehensive course designed for first-year students to explore the rich historical, cultural, and social heritage of Cyprus. This course covers the island's geography, biodiversity, and historical periods, from prehistoric times to modern developments. It delves into the Ottoman and British colonial influences, the evolution of education, art, and literature, and the socio-political dynamics that shaped the

island's identity. Students will gain a deep understanding of the Mediterranean's cultural interplay and Cyprus's role as a bridge between East and West, fostering an appreciation for its unique heritage and environment.

Software Engineering

(Course type: required; Course code: AII003; Prerequisite: AII104; Cr: 3; ECTS: 6)

Course objective: The objective of the course is to provide the student with necessary background of software engineering, principles and programming.

Course content: Principles of software engineering: Requirements, design and testing. Review of principles of object orientation. Object oriented analysis using UML. Frameworks and APIs. Introduction to the client-server architecture. Analysis, design and programming of simple servers and clients. Introduction to user interface technology.

Technical Report Writing and Presentation

(Course type: required; Course code: ENG201; Prerequisite: ENG102; Cr: 3; ECTS: 4)

Course objective: This course aims to offer critical technical writing and presentation skills for students for their future and professional lives.

Course content: To reinforce and consolidate the language and 4 skills that students have learned from earlier courses, as well as developing their level of knowledge, communicative capacity, and ability to analyse and reflect on language.Courses on upper - intermediate AND ADVANCED levels include interesting and up-to-date topics, encouraging students to recognize the importance of acquiring a foreign language in a modern context; prepare them to for their future professional life.

Advanced Object Oriented Programming

(Course type: required; Course code: SWE395; Cr: 3; ECTS: 4)

Course objective: In this course, students will have theoretical and practical knowledge about Java Programming and will have the opportunity to transfer this knowledge to the applications they develop.

Course content: Able to understand related concepts/theories, Will be able to apply related concepts/theories to real life/other given situations/cases, Will be able to develop/create a new approach, Will be able to develop/create a new product within the given parameters. Count and explain related concepts.

SEMESTER IV (SPRING)

Computer Architecture and Organisation

(Course type: required; Course code: AII203; Prerequisite: AII001; Cr: 4; ECTS: 5)

Course objective: The main objective of this subject is to understand the

overall basic computer hardware structure, including the peripheral devices.
Course content: Introduction to computers. Micro-programming control. Memory organization. Input/output system. Non-standard computer architectures, pipeline, RISC and vector computers.

Database Systems

(Course type: required; Course code: AII202; Prerequisite: AII201; Cr: 4; ECTS: 5)
Course objective: This course aims to cover fundamentals of database architecture, database management systems, and database systems. Principles and methodologies of database design, and techniques for database application development.
Course content: Introduction to Databases, Relational Data Model and SQL, Conceptual Modeling and Database Design, Models, Database Programming Techniques, Database Normalization Theory, File Structures-Indexing and Hashing, Query Processing-Optimization and Database Tuning, Transaction Processing-Concurrency Control and Recovery, Security and Distribution, Advanced Database Models-Systems and Applications

Software Construction

(Course type: required; Course code: SWE202; Prerequisite: AII003; Cr: 3; ECTS: 4)
Course objective: This course aims to engage students with concepts related to the construction of software systems at scale, building on their understanding of the basic building blocks of data structures, algorithms, program structures, and computer structures.
Course content: General principles and techniques for disciplined low-level software design. BNF and basic theory of grammar and parsing. Use of parser generators. Basics of language and protocol design. Formal languages. State-transition and table-based software design. Formal methods for software construction. Techniques for handling concurrency and inter-process communication. Techniques for designing numerical software. Tools for model-driven construction. Introduction to Middleware. Hot-spot analysis and performance tuning.

Human Computer Interaction

(Course type: required; Course code: SWE234; Cr: 3; ECTS: 3)
Course objective: The main objective is to perform analysis, establish requirements, design and evaluate interactive computer-based systems and products. The purpose of this course is to give the student basic knowledge about human-computer interaction. It will discuss how to understand human cognition and human perspective by working with computers.
Course content: Psychological principles of human-computer interaction. Evaluation of user interfaces. Usability engineering. Task

analysis, user-centred design, and prototyping. Conceptual models and metaphors. Software design rationale. Design of windows, menus, and commands. Voice and natural language I/O. Response time and feedback. Colour, icons, and sound. Internationalization and localization. User interface architectures and APIs. Case studies and projects.

YİT101 Turkish as a Foreign Language I (for non-natives)
The course is designed for students who are interested in learning about other cultures and languages, and who have no previous knowledge of Turkish language. This course mainly introduces the student to the Turkish language, through the development of the basic skills: listening, speaking, reading and writing. Also included is an examination of Turkish culture through an exploration of its historical roots and its most significant social, literary and artistic trends. The ultimate goal of the course is that students will gain awareness and appreciation of and insight into Turkish culture.

SWE299

Summer Practice I (Course type: required) (0 Credits)

Course objective: This course provides real working life experience for students. Students will be able to apply their theoretical knowledge into practice.
Course content: A minimum of 20 working days for this practice is required in a manufacturing or service organization. This one can involve 20 working days minimum. **Prerequisite:** --

SEMESTER V (FALL)

Operating Systems (Course type: required; Course code: All302; Prerequisite: All201; Cr: 3; ECTS: 6) 45
Course objective: This course intends to generally understand the structure of modern computers, purpose, structure and functions of operating systems, and illustration of key OS aspects by example.
Course content: Principles of operating systems. Memory management. Multiprocessing. Virtual memory concepts. Memory protection. Scheduling. Process management. Time-slicing and priorities, deadlocks and process synchronization. Peripheral control. Filing system management. Resource control and monitoring. Linux and Windows Operating Systems.

Management Information Systems

(Course type: required; Course code: All311; Prerequisite: All427; Cr: 4; ECTS: 7)
Course objective: This course aims to offer the roles played by information technology in today's business and define various technology architectures on which information systems are built. Define and analyze typical functional information systems and identify how they meet the needs of the firm to deliver efficiency and competitive advantage**.**

Course content: This course covers management principles and managerial functions; organization and its interaction with the environment; marketing management; production management; personnel (human resources) management; managerial control; and budgeting and control within the framework of accounting and financial reports.

Software Design and Architecture

(Course type: required; Course code: SWE301; Prerequisite: SWE202; Cr: 4; ECTS:6)

Course objective: The main aim of this course is to familiarize with concepts and methods of software design and architecture, learn how to perform architectural design and OO design and basic project management tasks using examples, and experience design and architecture in a larger project.

Course content: An in-depth look at software design. Continuation of the study of design patterns, frameworks, and architectures. Survey of current middleware architectures. Design of distributed systems using middleware. Component based design. Measurement theory and appropriate use of metrics in design. Designing for qualities such as performance, safety, security, reusability, reliability, etc. Measuring internal qualities and complexity of software. Evaluation and evolution of designs. Basics of software evolution, reengineering, and reverse engineering.

YIT102

Turkish for Foreigners II (course type: only for Foreign Students) (2 Credits)

Course objective: The aim of this course is to introduce Turkish Language for Foreign Students of NEU.

Course Content: Vocabulary of the Turkish (Recognition of words as words, relations between words), sentence information (sentence organizations, general structure and sentence types), reading-writing (reading rules and writing techniques, spelling rules, comprehension of speech and writing language, spelling rules.), reading comprehension (reading comprehension techniques, texts), applications on the texts suitable for their own professions. speech (learning the techniques of speech, specific emphasis, learning of the forms such as intonation on appropriate texts)

Prerequisite: YIT101

All439 - Occupational Health and Safety (course type: compulsory) (2 Credits – 4 ECTS)

Course objective: To provide students with essential knowledge and awareness of workplace health and safety principles, regulations, and practices to promote a safe working environment.

Course Description: This course introduces the fundamental concepts of occupational health and safety, including hazard identification, risk assessment, accident prevention, safety regulations, and emergency procedures. It aims to develop students' understanding of the responsibilities of employers and employees in ensuring workplace safety and compliance with legal standards.

SEMESTER VI (SPRING)

Internet Programming

(Course type: required; Course code: AII005; Prerequisite: AII004; Cr: 3; ECTS: 5)

Course objective: The main aim of this course is to be familiar with the main uses of the Internet as the primary modern technology for online communication, understand the generic principles of computer programming as applied to implementing basic web-based applications.
Course content: Internet concepts. HTML programming principles. Graphical User Interface design principles. Using ASP to develop internet applications. Uploading and testing internet applications.

Advanced Object Oriented Programming II

(Course type: required; Course code: SWE396; Cr: 3; ECTS: 4)
Course objective:Will be able to explain/define the determined concept/concepts Will be able to develop the selected/determined skills.
Course content: In this course, students will gain theoretical and practical knowledge about C# Programming and will have the opportunity to transfer this knowledge to the applications they develop.

Data Communications and Networking

(Course type: required; Course code: AII303; Prerequisite: AII001; Cr: 4; ECTS: 5)
Course objective: This course aims to provide the knowledge and skills required to design, model and effectively operate secure and dependable digital IP-based networks. It will provide an opportunity to gain a sound understanding of the internet protocol suite that forms the core for current data networks. The fusion of the internet world and multimedia is also addressed, as well as wireless communications.
Course content: Introduction to Computer Networks and Data Communications, Fundamentals of Data and Signals, Conducted and Wireless Media, Making Connections, Making Connections Efficient, Errors, Error Detection and Error Control, Local Area Networks, Introduction to Metropolitan Area Networks and Wide Area Networks, The Internet, Voice and Data Delivery Networks, Network Security, Network Design and Management.

Software Quality Assurance and Testing

Course type: required; Course code: SWE302; Prerequisite: SWE301; Cr: 4; ECTS: 4)
Course objective: The aim of this course is to inform the students about Understanding the fundamental concepts and theory of Software testing and Software Quality Management Implement process that ensures the Software is developed with good quality standards.
Course content: Quality: how to assure it and verify it, and the need for a culture of quality. Avoidance of errors and other quality problems. Inspections and reviews. Testing, verification and validation techniques. Process assurance vs. Product assurance. Quality process standards. Product and process assurance. Problem analysis and reporting. Statistical approaches to quality control.

Software Requirements Analysis
Course type: required; Course code: SWE304 Prerequisite: SWE301; Cr: 3; ECTS: 4)
Course objective: The aim of this course is to understand the fundamental concepts of software requirements for implementation processes of a software development. **Course content:** Domain engineering. Techniques for discovering and eliciting requirements. Languages and models for representing requirements. Analysis and validation techniques, including need, goal, and use case analysis. Requirements in the context of system engineering. Specifying and measuring external qualities: performance, reliability, availability, safety, security, etc. Specifying and analyzing requirements for various types of systems: embedded systems, consumer systems, web-based systems, business systems, systems for scientists and other engineers. Resolving feature interactions. Requirements documentation standards. Traceability. Human factors. Requirements in the context of agile processes. Requirements management: Handling requirements changes.

Summer Practice (course type: required; course code: SWE399)
Course objective: This course provides real working life experience for students. Students will be able to apply their theoretical knowledge into practice.
Course content: A minimum of 40 working days for this practice is required in a manufacturing or service organization.

AIT102 - Ataturk's Principles and Reforms II (course type: compulsory - only for Turkish Students) (2 Credits – 2 ECTS)
Course objective: The aim of this course is to give a detailed introduction to the Turkish Republic's History for Turkish students.
Course Content: General situation before the 1st World War, Kurtulus War and manner of Ottoman Empire, Occupations, Ataturk and liberation of Samsun on 19 May 1919, Ataturk's life and personal characteristics, and various features and reforms.

SEMESTER VII (FALL)

Principles of Information Security Course type: required; Course code: All430; Prerequisite: All303; Cr: 3; ECTS:6)
Course objective: The aim of this course is to provide an understanding of the key themes and principles of information security and be able to apply these principles in designing solutions to managing security risks effectively. Also, understand how to apply the principles of information security in a variety of contexts.
Course content: Introduction to Information Security, The Need for Security, Legal, Ethical, and Professional Issues in Information Security, Risk Management, Planning for Security, Security Technology, Cryptography, Physical Security, Implementing Information Security, Security and Personnel, Information Security Maintenance.

Graduation Project I Course type: required; Course code: SWE491; Cr: 2; ECTS: 3)
Course objective: This course aims that each student must choose an individual topic or theme on which he/she would like to do a scientific research project.
Course content: In this course every student will do a project in the industrial engineering area to apply their technical knowledge and develop their professional abilities.

All427 - Management for Engineers (course type: elective) (3 Credits – 5 ECTS) Course objective: This course comprises an introductory exploration of Management.
Course Content: Principles of management. Functions of managers. Organisation and environment. Marketing management. Production management. Personnel management. Managerial control. Accounting and financial reports. Budgeting and overall control.

SEMESTER VIII (SPRING)
Graduation Project II (Course type: required; Course code: SWE492; Prerequisite: SWE491; Cr: 4; ECTS: 4)
Course objective: This course aims to critically evaluate and assess the student's projects via oral presentations and written technical reports.
Course content: This course is the second part of the Graduation Project. In this course every student will do a project in the industrial engineering area to apply their technical knowledge and develop their professional abilities.

Software Project Management
(Course type: required; Course code: SWE401; Cr: 3; ECTS: 6)
Course objective: The aim of this course is to deliver successful software projects that support organization's strategic goals and match organizational needs to the most effective software development model, as well as develop the skills for tracking and controlling software deliverables.

Course content: Project planning, cost estimation, and scheduling. Project management tools. Factors influencing productivity and success. Productivity metrics. Analysis of options and risks. Planning for change. Management of expectations. Release and configuration management. Software process standards and process implementation. Software contracts and intellectual property. Approaches to maintenance and long-term software development. Case studies of real industrial projects.

TECHNICAL ELECTIVES:

AII002 System Simulation (Course Type: Technical Elective) (3 Credits)

Course Objective: The aim of this course is to teach students how to use simulation as a tool for problem solving.
Course Content: Viewing simulation as a problem-solving tool. Simulation models and the classification of simulation techniques. Discrete and continuous system structures. Stages of a simulation experiment. Simulation experiments with random events and sequencing systems. Simulation languages and their characteristics. Examples of simulation programming.

AII404 Neural Networks (course type: elective) (3 Credits)
Course Objective: Teaching the basics of neural networks. To illustrate the basic applications of neural networks using Matlab. To give the principles of neural networks approaches.
Course Content: The Neural network paradigm and fundamentals. Training by error minimization. Back propagation algorithms. Feedback and recurrent networks. Hopfield network, Genetic algorithms. Probability and neural networks. Optimizations and constraints.

AII406 System Programming (course type: elective) (3 Credits)
Course Objective: To study the function of the common operating system kernel routines that are provided by an operating system and accessible from a systems programming language. Design, write, and test moderately complicated low-level programs using a systems programming language. Proficiently use a preprocessor to implement code that is portable between different computing platforms. Use operating system kernel calls from within a programming language to allocate/free virtual memory, initiate and synchronize multiple threads/processes, interact with the file system, set and respond to timers/interrupts.
Course Content: Introduction to system programming, operating systems and fundamental concepts of programming language processors, one and two pass assemblers, symbol tables, compilers and compiler design, parsing, syntax and semantic phases, optimization, relocatable and linkable loaders, operating systems design principles

AII413 Introduction to Artificial Intelligence (course type: elective) (3 Credits) Course Objective: The aim of this course is to introduce students to the fundamental concepts, methods, and application areas of artificial intelligence. Within the scope of the course, students will understand basic AI approaches such as search strategies in artificial intelligence, fuzzy logic, neural networks, expert systems, and probabilistic reasoning. Students will also become familiar with different artificial intelligence programming languages and analyze how these approaches are applied to real-world problems.

Course Description: This course serves as an introduction to artificial intelligence and focuses on search strategies in AI, fuzzy logic and fuzzy sets, artificial neural networks and learning processes, the NeroSell program, expert systems, and programming languages for artificial intelligence. In addition, the course covers hybrid systems, probabilistic uncertainty reasoning, belief networks, and distributed artificial intelligence.

AII408 Advanced Object Oriented Programming (course type: elective) (3 Credits) Course Objective: Teaching object-oriented programming using C# (C sharp). To develop students' skills and dispositions regarding problem analysis and development of different projects using object oriented programming. To show the advantages of object oriented programming and visual programming in project development. To teach inheritance, multiple inheritance, polymorphism, operator overloading and implement them in examples using C sharp. Development of different programs using aggregation, delegates, Events. To teach the design of windows applications using object-oriented and visual programming.
Course Content: Modeling the real world using object-oriented software. Overview of the .NET Framework. Components and Languages in the .NET. Structure of a C# Program. Input/Output. Console class, Namespace, Generating Extensible Markup Language (XML) document. Data Types. Control Statements. Methods, Parameters. Overloaded Methods. C# and Object Orientation, Classes and Objects, Encapsulation, Constructors, Creating and Destroying Objects, Destructors, Inheritance, Interfaces, Aggregation, Namespaces, Modules, Operator Overloading, Delegates, Events. Windows Forms Class Hierarchy, Properties, Events, Controls, Dialogs, Menus, Multiple Document Interface, Data Access and Data Binding, DataGridView, ADO.NET, .NET Data Providers, Interacting with XML Data, .NET controls.

AII409 Object-oriented Programming Language II (course type: elective) (3 Credits) Course Objective: Design, compile and run Java applications and applets. Understand the role of the Java Virtual Machine in achieving platform independence. Use the Object Oriented paradigm in design of Java programs. Understand the division of classes into Java packages. Use exceptions to handle run time errors. Use threads in

order to create more efficient Java programs. Design Java applications with database access.
Course Content: Introduction to Java. Java and object-oriented programming. Introduce advanced Java concepts – inheritance, polymorphism, abstract classes, exception handling, use of collections and database connectivity. Gain more practice cal experience by designing and writing Java applications. Components of Java projects. Designing Graphic User Interface GUI. Java Internet applications. Java applets.

AII417 Mobile Programming (course type: elective) (3 Credits)
Course objective: The aim of the course is to give the basics of mobile programming.
Course Content: Getting Mobile, Starting Your Mobile Site, Adapting to User Devices, Developing Standards- Compliant Sites, Sending Text Messages, Adding Spice to Messages: MMS, Making Money via Mobile Devices, Interactive Voice, Mobile AJAX, Mobile Web.

AII407 PROGRAMMING LANGUAGES II (course type: elective) (3 Credits) Course Objective: The aim of this course is to introduce students to the Delphi programming environment and its fundamental components. Within the scope of the course, students will gain knowledge and skills related to the organization of forms and units, the use of the Object Inspector, the role of code in Delphi, the use of the components palette, and the management of component properties. In addition, students will be able to develop basic database-driven and Windows-based applications.

Course Description: This course serves as an introduction to Delphi programming and covers the organization of forms and units, the structure and use of the Object Inspector, coding in Delphi, and component management. The course also includes the file structure of Delphi projects, text files, database formats, and the development of simple database applications. Furthermore, the integration of Windows-based applications into Delphi projects, data access methods, and the development of Access-based applications using DB Navigator are addressed.

AII431 E-commerce (course type: elective) (3 Credits)
Course objective: The aim of the course is to prepare students for design e-commerce sites.
Course Content: Starting an E-Commerce Site, Laying Out the Foundations, Starting a Project, Creating the Product Catalog, Product Attributes, Search Engine Optimization,
Searching the Catalog, Receiving Payments Using PayPal, Catalog Administration, Creating Shopping Cart, Implementing AJAX Features,

Accepting Customer Orders, Product Recommendations, Managing Customer Details, Storing Customer Orders, Implementing the Order Pipeline, Processing Credit Card Transactions, Product Reviews, Using Web Services.

AII412 Database Application (course type: elective) (3 Credits)

Course Objective: The aim of this course is to provide students with fundamental knowledge and skills related to database concepts, database management systems, and the development of database applications.

Course Content: This course covers fundamental database concepts, the relational database model, the SQL language, table creation and management, data insertion, update and deletion operations, querying techniques, and the development of simple database applications. Prerequisite: YZB202

Economics for Engineers

Course type: required; Course code: AII426; Cr: 3; ECTS: 6)

Course objective: The aim of this course is to introduce key conceptual issues in economics. It analyses contemporary global business and finance topics for engineering.

Course content: Principles and economic analysis of engineering decision making. Cost concept. Economic environment. Price and demand relations. Competition. Make-versus-purchase studies. Principles and applications of money-time relations. Depreciation. Many and banking. Price changes and inflation. Business and company finance.

AII006 - Web Design and Programming (course type: compulsory) (3 Credits – 4 ECTS)

Course objective: The aim of this course is to cover basic and advanced features of Web design.

Course Content: HTML Values and Units, Text Structuring Essentials, Character Formatting Essentials, Lists, Links, Tables, Frames, Forms, Colors and Images, Multimedia, Special Characters, Internationalization and Localization, Scripts, Dynamic HTML, Web Development Software, Publishing a Site, An Introduction to XML, Creating Mobile Documents, Tidying and Validating Documents, CSS Basics, Style Definitions, CSS Values and Units, CSS Inheritance and Cascade, Font Properties, Text Formatting, CSS Lists, Padding, Margins, and Borders, Colors and Backgrounds, CSS Layouts, Pseudo-Elements and Generated Content,

Dynamic HTML with CSS, Media Styles and Defining Documents for Printing, User Interface Styles, Testing and Validating CSS.
Prerequisite: AII102

AII007 - Multimedia Systems (course type: compulsory) (3 Credits – 4 ECTS)
Course objective: The aim of this course is to introduce students to Multimedia Systems.
Course Content: Introduction to Computer Science and Media Computation, Introduction to Programming in Jython, Modifying Pictures Using Loops, Modifying Pixels in a Range, Advanced Picture Techniques, Modifying Sounds Using Loops, Modifying Samples in a Range, Making Sounds by Combining Pieces, Building Bigger Programs, Creating and Modifying Text, Advanced Text Techniques: Web and Information, Making Text for the Web, Creating and Modifying Movies, Speed, Functional Programming, Object-Oriented Programming.
Prerequisite: AII102, MTH113

SWE482 SOFTWARE ENGINEERING TRENDS (Course type: elective) (3 Credits)
Course Objective: The aim of this course is to enable students to identify major emerging trends in software engineering technologies. Throughout the course, students will analyze the impact of new tools and methods on software development processes, discuss ethical, sustainability, and security issues in modern software systems, and evaluate the applications of emerging technologies in industry.

Course Description: This course explores emerging trends in software engineering, including cloud computing, artificial intelligence, blockchain, the Internet of Things (IoT), and automation of critical systems. Students will critically analyze current technologies shaping the software industry and evaluate their impact on real-world software applications.

SWE488 SOFTWARE İMPLEMENTATION (Course type: elective) (3 Credits)
Course Objective: The aim of this course is to provide students with both theoretical and practical knowledge related to software implementation. The course focuses on the software development lifecycle from an applied perspective, enabling students to gain competencies in coding practices, software quality assurance, testing methodologies, and software security. Students will also analyze the impact of modern software tools and techniques on real-world applications.

Course Description: This course offers a practical and application-oriented approach to software implementation. It covers the software

development lifecycle with an emphasis on coding standards, quality assurance, testing methodologies, and software security. Through case studies and hands-on examples, students will experience the design, development, and evaluation of software systems in real-world contexts.

AII419 Image processing (Course type: elective) (3 Credits)

Course objective: The aim of this course is to introduce students to the fundamental techniques, concepts, and methods of image processing and image analysis. Students will learn the entire pipeline, from how an image is acquired to the processes of enhancing it, analyzing it, and extracting meaningful information such as objects and features.

Course Content: Imaging sensors and their principles, how images are digitally represented, stored, and compressed. Techniques for noise reduction and improving image clarity through contrast manipulation, histogram equalization, and edge highlighting. Mathematical techniques for image processing, including two-dimensional Fourier transforms, wavelets, and convolution. Methods for partitioning an image into meaningful regions (e.g., object and background) using techniques like thresholding. Morphological Operations. Feature Extraction. Object Recognition and Tracking.

AII415 Decision Making (Course type: elective) (3 Credits)

Course objective: The fundamental aim of this course is to provide students with a comprehensive understanding of the theory and practice of the decision-making process. It aims to equip them with the necessary knowledge and skills to make the most effective and sound decisions in both individual and group settings by making them competent in analyzing situations involving risk and uncertainty, utilizing critical thinking, and applying quantitative models such as decision trees.

Course Content: Introduction to decision making. Decision making process. Decision making under uncertainty. Utility theory. Risk theory, under uncertainty. Risk aversion. Decision making under conflict. Queuing theory. Decision Trees. Decision Trees. Under uncertainty. Multiple regression models. Exponential smoothing. Group decision making. Linear regression model and correlation. Time series. Forecast accuracy. Non linear models for forecasting.

AII461 – Generative AI (course type: elective) (3 Credits – 5 ECTS)

Course objective: This course introduces the fundamental concepts and modern applications of generative artificial intelligence. Students will gain an understanding of how generative models work, explore their mathematical foundations, and learn to apply them in diverse fields such as image, text, and audio generation. The course aims to develop both theoretical knowledge and practical skills for designing and evaluating generative AI systems.

Course content: Overview of generative AI and its historical development. Probabilistic modeling and key mathematical foundations. Generative Adversarial Networks (GANs) and their variants. Variational Autoencoders (VAEs). Diffusion models and recent advancements. Applications in natural language processing, computer vision, and creative industries. Ethical considerations, societal impact, and responsible use of generative AI. Hands-on laboratory sessions with modern frameworks and tools.

Restricted Technical Electives

Engineering Ethics (Course type: required; Course code: AII429; Cr: 3; ECTS: 5)
Course objective: This course aims to deal with different aspects of the International Political Economy, which is concerned with the interconnectedness of various areas such as economics, politics, history, sociology, etc.
Course content: In the first part of this course, we will introduce the fundamental paradigms of IPE by looking at the three different theoretical perspectives: mercantilism, liberalism, and structuralism. In the second part of the course, we will analyze structural connections of IPE, leading to sections that explore international trade, international finance, international institutions and global problems.