



**DEPARTMENT OF
COMPUTER ENGINEERING

PROGRAMME HANDBOOK**

2025-2026

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Computer Engineering Department

The Department of Computer Engineering at the International University of Alasia provides a comprehensive education in the principles and practices of modern computing. The department is committed to preparing students for the challenges of today's interconnected world by combining a strong theoretical foundation with practical, hands-on experience.

The Bachelor of Science (B.Sc.) in Computer Engineering is a four-year undergraduate programme worth 240 ECTS, with English as the medium of instruction. The curriculum is structured to give students a solid grounding in mathematics, physics, and engineering sciences, while progressively building expertise in computer engineering fields such as programming, data structures, digital systems, electronics, algorithms, computer architecture, operating systems, networks, and software engineering. In the advanced stages of study, electives in areas such as artificial intelligence, embedded systems, digital signal processing, and internet programming allow students to specialize according to their interests and career goals.

The programme emphasizes applied and project-based learning. Courses are supported by laboratories, tutorials, and design projects that help students bridge the gap between theory and practice. Laboratory components in physics, electronics, programming, digital logic, and microprocessor systems provide opportunities to experiment and innovate. Throughout their studies, students are encouraged to engage in teamwork, problem-solving, and professional communication, with attention to ethical and social dimensions of engineering practice.

The department follows the semester system with Fall and Spring semesters and an optional Summer School. Assessments are based on a balanced mix of examinations, coursework, laboratory work, and projects, ensuring that students are evaluated fairly across theoretical knowledge and applied skills.

The overarching aim of the department is to nurture engineers who are not only technically competent but also adaptable, collaborative, and globally aware. Graduates are equipped to contribute to the advancement of technology in industry, research, and society, while upholding values of integrity and responsibility.

Mission

The mission of the Department of Computer Engineering is to provide a rigorous and engaging education that balances theoretical foundations with practical application. Through lectures, laboratories, projects, and collaborative learning, the programme develops technical expertise, problem-solving ability, and professional skills.

The department is committed to creating an environment where students learn to think critically, work effectively in teams, and approach engineering challenges with creativity and integrity. By aligning its curriculum with international standards and encouraging lifelong learning, the department prepares graduates to contribute to industry, research, and society in meaningful and responsible ways.

Vision

The vision of the Department of Computer Engineering is to be recognized as a center of high-quality education and innovation in computing, fostering graduates who are prepared to shape and respond to the technological developments of the future. The department aspires to nurture engineers who are globally minded, ethically responsible, and capable of applying their knowledge for the benefit of society.

Aim of the program

The Computer Engineering programme aims to produce competent and versatile engineers by providing them with a strong foundation in computing principles, hardware–software integration, and applied problem-solving. The programme seeks to prepare graduates who can design, implement, and manage computer-based systems with confidence and creativity, while remaining adaptable to the fast pace of technological change.

Beyond technical competence, the programme emphasizes the development of critical thinking, teamwork, communication, and ethical awareness. Through a structured progression from fundamental sciences to advanced computer engineering topics, students are equipped to address both theoretical and practical challenges across the discipline.

Graduates of the programme are expected to be ready for professional careers in industry, research, and technology-driven enterprises, as well as for further academic study. The overall goal is to produce engineers who can contribute

meaningfully to innovation, economic development, and societal progress in both local and international contexts.

In line with these aims, graduates of the programme will be able to:

- **Apply Knowledge of Computing and Engineering Fundamentals:** Demonstrate a solid understanding of mathematics, science, and core engineering principles as the basis for computer engineering practice.
- **Design and Implement Computer-Based Systems:** Analyze requirements, design effective solutions, and develop hardware–software systems that meet specified needs.
- **Use Modern Tools and Technologies:** Employ appropriate programming languages, engineering tools, and laboratory techniques for modeling, simulation, testing, and implementation.
- **Engage in Problem-Solving and Innovation:** Identify, formulate, and solve complex engineering problems with creativity, critical thinking, and adaptability to technological change.
- **Work Effectively in Teams:** Function productively as an individual and as part of multidisciplinary and multicultural teams, demonstrating collaboration and leadership skills.
- **Communicate Professionally:** Present ideas and technical solutions clearly in oral, written, and digital formats, addressing both professional and non-specialist audiences.
- **Understand Professional and Ethical Responsibility:** Recognize ethical, social, and environmental responsibilities in computer engineering practice and apply them in decision-making.
- **Apply Project and Time Management Skills:** Plan, execute, and deliver projects efficiently, balancing technical requirements with constraints such as cost, safety, and sustainability.
- **Appreciate the Global and Societal Impact of Technology:** Understand the role of computing technologies in shaping society, industry, and global development, with awareness of cultural and international contexts.

- Commit to Lifelong Learning: Demonstrate readiness to continuously update knowledge and skills in response to emerging technologies, industry practices, and societal needs.

Curriculum

1 st YEAR FALL TERM COURSES							
ID	Code	Name of the Course	Prerequisite	Type of the Course	In-Class Hours (T+P)	Credit	ECTS Credit
	ENL101	ENGLISH I	-	Compulsory	3+0	3	3
	HIS101 TUR101	HISTORY * TURKISH LANGUAGE*	-	Compulsory	2+0	2	2
					2+0	2	2
	COM105	COMPUTING FOUNDATIONS	-	Compulsory	3+2	4	8
	COM103	INTRODUCTION TO PROFESSION	-	Compulsory	2+0	0	3
	ENG121	PHYSICS I	-	Compulsory	3+0	3	5
	ENG131	PHYSICS I LAB	-	Compulsory	0+2	1	2
	MAT101	CALCULUS I	-	Compulsory	3+2	4	7
				Total Credit: 17		Total ECTS Credit: 30	
1 st YEAR SPRING TERM COURSES							
ID	Code	Name of the Course	Prerequisite	Type of the Course	In-Class Hours (T+P)	Credit	ECTS Credit
	ENL102	ENGLISH II	ENL101	Compulsory	3+0	3	3
	COM102	COMPUTER PROGRAMMING	COM105	Compulsory	3+2	4	7
	ENG122	PHYSICS II	ENG121	Compulsory	3+0	3	6
	ENG132	PHYSICS II LAB	ENG131	Compulsory	0+2	1	2
	MAT102	CALCULUS II	MAT101	Compulsory	3+2	4	7
	MAT104	LINEAR ALGEBRA	MAT101	Compulsory	3+0	3	5
				Total Credit: 18		Total ECTS Credit: 30	
2 nd YEAR FALL TERM COURSES							
ID	Code	Name of the Course	Prerequisite	Type of the Course	In-Class Hours (T+P)	Credit	ECTS Credit
	COM203	DIGITAL LOGIC DESIGN	-	Compulsory	3+2	4	6
	MAT203	DISCRETE MATHEMATICS	MAT102	Compulsory	3+0	3	5
	COM205	DATA STRUCTURES AND ALGORITHMS	COM102	Compulsory	3+2	4	7
	MAT201	ORDINARY DIFFERENTIAL EQUATIONS	MAT101	Compulsory	3+2	4	5
	COM207	ELECTRONICS FOR COMPUTER ENGINEERS	MAT101	Compulsory	3+2	4	7
				Total Credit: 19		Total ECTS Credit: 30	
2 nd YEAR SPRING TERM COURSES							

ID	Code	Name of the Course	Prerequisite	Type of the Course	In-Class Hours (T+P)	Credit	ECTS Credit
	COM202	OPERATING SYSTEMS	COM102	Compulsory	3+0	3	6
	COM204	OBJECT ORIENTED PROGRAMMING I	COM102	Compulsory	3+2	4	8
	MAT202	ENGINEERING MATHS	MAT101	Compulsory	3+0	3	5
	MAT204	PROBABILITY&STATISTIC METHODS	MAT101	Compulsory	3+0	3	5
	COM206	DIGITAL SYSTEM DESIGN	COM203	Compulsory	3+0	3	5
				Total Credit: 16		Total ECTS Credit: 30	

3 rd YEAR FALL TERM COURSES							
ID	Code	Name of the Course	Prerequisite	Type of the Course	In-Class Hours (T+P)	Credit	ECTS Credit
	COM303	ANALYSIS OF ALGORITHMS	COM102	Compulsory	3+0	3	4
	COM305	DATABASE MANAGEMENT SYSTEMS	COM205	Compulsory	3+2	4	7
	COM307	SYSTEMS PROGRAMMING	COM202	Compulsory	3+0	3	4
	COM301	COMPUTER ARCHITECTURE AND ORGANIZATION	COM203	Compulsory	3+2	4	8
	COM309	SIGNALS AND SYSTEMS	COM207	Compulsory	3+0	3	5
	IUAXX1	FREE ELECTIVE I		Elective	3+0	3	2
				Total Credit: 20	Total ECTS Credit: 30		
3 rd YEAR SPRING TERM COURSES							
ID	Code	Name of the Course	Prerequisite	Type of the Course	In-Class Hours (T+P)	Credit	ECTS Credit
	COM306	COMPUTER NETWORKS	-	Compulsory	3+0	3	5
	COM302	PRINCIPLES OF PROGRAMMING LANGUAGES	COM204	Compulsory	3+2	4	7
	COM304	MICROPROCESSOR SYSTEMS	COM203	Compulsory	3+2	4	5
	COM308	SOFTWARE ENGINEERING	COM204	Compulsory	3+0	3	6
	COMXX1	TECHNICAL ELECTIVE I		Elective	3+0	3	5
	IUAXX2	FREE ELECTIVE II		Elective	3+0	3	2
				Total Credit: 20	Total ECTS Credit: 30		
4 th YEAR FALL TERM COURSES							
ID	Code	Name of the Course	Prerequisite	Type of the Course	In-Class Hours (T+P)	Credit	ECTS Credit
	ECO441	ENGINEERING ECONOMICS		Compulsory	3+0	3	3
	BUS441	STRATEGIC PLANNING AND MANAGEMENT		Compulsory	3+0	3	4
	COM410	SUMMER TRAINING		Compulsory	0+0	0	1
	COM401	GRADUATION PROJECT I		Compulsory	0+3	1	10
	IUAXX3	FREE ELECTIVE III		Elective	3+0	3	2
	COMXX2	TECHNICAL ELECTIVE II		Elective	3+0	3	5
	COMXX3	TECHNICAL ELECTIVE III		Elective	3+0	3	5
				Total Credit: 16	Total ECTS Credit: 30		
4 th YEAR SPRING TERM COURSES							

ID	Code	Name of the Course	Prerequisite	Type of the Course	In-Class Hours (T+P)	Credit	ECTS Credit
	ENG444	ENGINEERING ETHICS		Compulsory	3+0	3	5
	COM402	GRADUATION PROJECT II	COM401	Compulsory	0+6	3	10
	COMXX4	TECHNICAL ELECTIVE IV		Elective	3+0	3	5
	COMXX5	TECHNICAL ELECTIVE V		Elective	3+0	3	5
	COMXX6	TECHNICAL ELECTIVE VI		Elective	3+0	3	5
				Total Credit: 15		Total ECTS Credit: 30	

ELECTIVE COURSES							
	Code	Name of the Course		Type of the Course	In-Class Hours (T+P)	Credit	ECTS Credit
	COM451	PRINCIPLES OF DIGITAL IMAGE PROCESSING		Elective	3+0	3	5
	COM453	ARTIFICIAL NEURAL NETWORKS		Elective	3+0	3	5
	COM455	INTERNET PROGRAMMING		Elective	3+0	3	5
	COM457	AUTOMATA THEORY		Elective	3+0	3	5
	COM459	ADVANCED COMPUTER GRAPHICS		Elective	3+0	3	5
	COM461	DISCRETE EVENT SYSTEM SIMULATION		Elective	3+0	3	5
	COM452	ARTIFICIAL INTELLIGENCE		Elective	3+0	3	5
	COM454	WIRELESS COMMUNICATION		Elective	3+0	3	5
	COM456	JAVA PROGRAMMING		Elective	3+0	3	5
	COM458	MODERN PROGRAMMING PLATFORM		Elective	3+0	3	5
	COM460	DATABASE SECURITY		Elective	3+0	3	5
	COM463	PATTERN RECOGNITION		Elective	3+0	3	5
	EEN405	DIGITAL SIGNAL PROCESSING		Elective	3+0	3	5
	SEN202	SOFTWARE REQUIREMENTS ANALYSIS AND SPECIFICATION		Elective	3+0	3	5
	SEN305	SOFTWARE DESIGN AND ARCHITECTURE		Elective	3+0	3	5
	SEN308	SOFTWARE QUALITY ASSURANCE AND TESTING		Elective	3+0	3	5
	SEN408	SOFTWARE PROJECT MANAGEMENT		Elective	3+0	3	5

Course Catalogue Descriptions

COMPULSORY COURSES

1 ST YEAR FALL TERM COURSES					
Code	Name of the Course	In-Class Hours (T+P)	Credit	ECTS	Description
ENL101	ENGLISH I	3+0	3	3	English I is a first-semester academic English course. It is designed to help students improve their English level to the B1+ level. The course connects critical thinking with language skills and incorporates learning Technologies. The purpose of the course is to consolidate students' knowledge and awareness of academic discourse, language structures, and lexis.
HIS101	HISTORY*	2+0	2	2	This course aims to gain an understanding of the meaning and importance of the Turkish War of Independence and to acquire knowledge about the revolutions and reforms carried out by Atatürk towards the goal of bringing the Turkish nation to the level of contemporary civilization. Contents of the course include the fall of the Ottoman Empire, Tanzimat and Islahat Eras, Tripoli and Balkan Wars, World War I, the Armistice of Moudros, the Occupation of Anatolia and the National Reactions, the Birth of the Turkish Revolution, Turkish War of Independence, the Armistice of Mudanya, and the Treaty of Lausanne.
					Definition and characteristics of language. Relationship between language and thought. Relationship between language and culture.

TUR101	TURKISH LANGUAGE*	2+0	2	2	Concepts of mother language, cultural language, and international language. Writing a letter of application. Languages of the world. The place of the Turkish Language among the world's languages. Historical development of the Turkish language. Phonological, morphological, semantic, and syntactic structure of the Turkish Language. Types of clauses. Spelling rules. Punctuation marks.
COM105	COMPUTING FOUNDATIONS	3+2	4	8	This course introduces students to both data structures and formalisms used in computer science, such as the asymptotic behavior of algorithms. Data structures and the formalisms used to both describe and evaluate those data structures simultaneously. By the end of the two-semester sequence, of which this course is the first part, each student will have a solid foundation in conceptual and formal models, efficiency, and levels of abstraction as used in the field of computer science.
COM103	INTRODUCTION TO PROFESSION	2+0	0	3	This course is intended for first-year students to serve both as a general introduction to engineering for all engineering majors, but also as a foundational course for the computer engineering and computer science degree programs. The course provides bottom-up coverage of the critical concepts in the operation and design of computing systems, starting with transistors, then logic gates, then complex logic structures, then gated latches and memory. The course removes all of the mystery about the operation of computer systems by methodically and progressively explaining the implementation and behavior of each important layer of abstraction in a computer system. The course will also explore the increasingly pervasive role that computing devices--particularly those embedded in appliance-like systems--play in modern society, as well as the historical importance of computing as a powerful tool and enabler for virtually all engineering and scientific disciplines. Within that context, the course will discuss the ethical, economic, social, and political impacts that computers have had on our society in the past fifty years and will continue to have in the future.

ENG121	PHYSICS I	3+0	3	5	This course offers a calculus-based physics course for students aspiring to become engineers. Students will gain a solid conceptual and practical understanding of physics in their field of expertise, essential for a top-quality engineering education. This course is designed to meet the requirements and backgrounds of all aspiring engineers.
ENG131	PHYSICS I LAB	0+2	1	2	This course contains: Motion Along a Straight Line, Projectile Motion, Hooke's Law, Conservation of Momentum, and Rotational Motion, Simple Pendulum.
MAT101	CALCULUS I	3+2	4	7	This course introduces the basic concepts of mathematical analysis used in science and engineering. The course teaches an introduction to differential and integral calculus. Topics include limits, the derivative, rates, Newton's method, the mean-value theorem, max-min problems, the integral and the fundamental theorem of integral calculus, areas, volumes, and average values.

1 ST YEAR SPRING TERM COURSES					
Code	Name of the Course	In-Class Hours (T+P)	Credit	ECTS	Description
ENL102	ENGLISH II	3+0	3	3	English II is the second semester, first-year English language course. It is designed to help students improve the level of their English to the A1 level, as specified in the Common European Framework of Reference for Languages. This course introduces the students to the English language and aims to develop listening, speaking, reading, and writing skills in academic settings.
COM102	COMPUTER PROGRAMMING	3+2	4	7	This course aims to develop the students' skills in the design, implementation, and debugging of C programs. Learning to think algorithmically is an essential part of achieving this objective. This means that students have to understand and be able to apply the basic building blocks of algorithms, which are sequence, selection, repetition, and abstraction, and express them using their equivalent C programming constructs. At the end of this course, students should feel

					comfortable with writing C programs; achieving this level of competence in C programming is important as it is the basis for many subsequent courses.
ENG122	PHYSICS II	3+0	3	6	This course is a continuation of Physics I. The course content includes the following topics: Kinetic theory of ideal gases. Equipartition of energy. Heat, heat transfer, and heat conduction. Laws of thermodynamics, applications to engine cycles. Coulomb's law and electrostatic fields. Gauss's law. Electric potential. Magnetic field. Amperes law. Faradays law.
ENG132	PHYSICS II LAB	0+2	1	2	This is an introductory Physics lab course. This course covers mechanics, kinematics, forces, vectors, electricity, and magnetism. Experiments are used to demonstrate principles discussed in the lecture courses ENG121-122.
MAT102	CALCULUS II	3+2	4	7	This course is a continuation of Calculus I. The course covers basic mathematical analysis and mathematical tools that are widely used and are essential for mathematical analysis and applications. Topics include sequences; infinite series; power series; conics; polar, cylindrical, and spherical coordinates; vectors and the geometry of space; and vector-valued functions.
MAT104	LINEAR ALGEBRA	3+0	3	5	This course covers matrix theory and linear algebra, emphasizing topics useful in other disciplines. Linear algebra is a branch of mathematics that studies systems of linear equations and the properties of matrices. The concepts of linear algebra are extremely useful in physics, economics and social sciences, natural sciences, and engineering.

2 nd YEAR FALL TERM COURSES					
Code	Name of the Course	In-Class Hours (T+P)	Credit	ECTS	Description

COM203	DIGITAL LOGIC DESIGN	3+2	4	6	This course presents the basic tools for the design and analysis of digital circuits and provides methods and procedures suitable for a variety of digital design applications in computers, control systems, data communications, etc. The course introduces data representation in binary systems, complements, Boolean algebra, logic gates, truth tables, logic circuits, timing diagrams, De Morgan's law, algebraic manipulation, minterms and maxterms, Sum of Products (SOP) and Product of Sums (POS) forms, Boolean function simplification tools and Karnaugh Map method, NAND and NOR implementations, don't care conditions, combinational circuit design and analysis procedures, and design of Adders, Subtracters and Code Converters.
MAT203	DISCRETE MATHEMATICS	3+0	3	5	This course introduces discrete mathematics, which is the study of discrete structures to formulate what a computer system is supposed to do. The course aims to teach notation and techniques needed to prove or to reason the efficiency of operations expected from such systems.
COM205	DATA STRUCTURES AND ALGORITHMS	3+2	4	7	The goal of this course is to deepen students' understanding of data structures and algorithms and how these can be employed effectively in the design of software systems. It is an important course in covering a range of core data structures and algorithms that will be used in context in later courses. At the end of the course, the students will be solid programmers, with knowledge of a range of useful data structures and programming techniques, capable of building significant software systems in a team environment, and ready to continue with further specialised studies in computing.
MAT201	ORDINARY DIFFERENTIAL EQUATIONS	3+2	4	5	This course is an introduction to the theory and application of ordinary differential equations and the Laplace transform. The main objective is for the student to develop competency in the basic concepts and master certain solution methods. Topics covered include linear and nonlinear first-order equations; higher-order linear differential equations; undetermined coefficients method; variation of parameters method;

					Cauchy-Euler equation; Laplace transform; linear systems solution; solution by series method.
COM207	ELECTRONICS FOR COMPUTER ENGINEERS	3+2	4	7	This course equips students with the theoretical knowledge, practical skills and competencies required to enter a range of Electronics and Computer Engineering related careers through the exploration of software/hardware design concepts and implementation, the analysis of emerging trends and innovations such as Internet of Things (IoT), Embedded Systems, electronic circuits, mobile application development, programmable electronics, sensor development, basic robotics, hardware artificial intelligence and control devices.
2nd YEAR SPRING TERM COURSES					
Code	Name of the Course	In-Class Hours (T+P)	Credit	ECTS	Description
COM202	OPERATING SYSTEMS	3+0	3	6	This course aims to make the students have an understanding of the design issues of different aspects of operating systems. To make the students have an in-depth understanding of the various OS services for threads, inter-process communication, process synchronization, process and memory management, and file systems, offered as system or library calls in UNIX and Linux operating systems.
COM204	OBJECT ORIENTED PROGRAMMING I	3+2	4	8	This course teaches programming and object-orientation concepts. Students will learn about program basics (variables, types, scope, lifetimes), control flow (if-constructs, for-loops, while-loops), data structures (strings, sets, lists, trees), objects (classes and inheritance), exceptions (throwing and catching), and file I/O (streams, file reading and writing). By the end of this course, a student should be able to solve basic programming tasks, understand and use basic object-oriented concepts, and demonstrate familiarity with core elements of the Java API.
					This course is about the basic mathematics that is fundamental and an essential component in all streams of undergraduate studies in sciences and engineering. The course consists of topics in

MAT202	ENGINEERING MATHS	3+0	3	5	differential calculus, integral calculus, linear algebra, and differential equations with applications to various engineering problems.
MAT204	PROBABILITY&S TATISTIC METHODS	3+0	3	5	Conceptual overview for understanding and effectively using the basic concepts of probability and statistics for solving engineering problems. The major objective of the course is to help the students develop an intuition and an interest in random phenomena, and to introduce both theoretical issues and applications that may be useful in real life.
COM206	DIGITAL SYSTEM DESIGN	3+0	3	5	This course exposes the students to principles, techniques, and applications of modern digital systems. Design and analysis techniques for combinational and sequential circuits will be discussed. In particular, students will be exposed to: digital system top-down design and analysis, timing, power, and performance issues in digital circuits. In addition, the student will be exposed to the Very High Speed Integrated Circuit Hardware Description Language (VHDL)-based system analysis and synthesis, hardware-software co-design, data-flow models, and digital system primitives.

3 rd YEAR FALL TERM COURSES					
Code	Name of the Course	In-Class Hours (T+P)	Credit	ECTS	Description
COM303	ANALYSIS OF ALGORITHMS	3+0	3	4	This course enables students to understand and analyze efficient algorithms for various applications. By the end of this course students will be able to understand asymptotic notations for the performance of different algorithms, derive and solve recurrences describing the performance of divide-and-conquer Algorithms, design optimal solutions by applying various methods like Dynamic Programming and Greedy Method, summarize certain graph algorithms and their analysis, apply pattern matching algorithms, and differentiate polynomial and non-polynomial problems.

COM305	DATABASE MANAGEMENT SYSTEMS	3+2	4	7	The students will have the ability to analyse and design databases, defining database querying techniques, and identify components of database management systems. So, the course content is composed of the entity-relationship model, relational data model, relational algebra, relational calculus, SQL, relational database design, query processing, query optimization, and XML.
COM307	SYSTEMS PROGRAMMING	3+0	3	4	This course aims to make students have experience and knowledge on advanced programming skills with threads, sockets, XML parsers and etc. Debugging, Java GUI development with Swing, platform-independent software development, using the powers of the operating system, applets, Database applications, file operations, threads, and logging are the main subjects of this course.
COM301	COMPUTER ARCHITECTURE AND ORGANIZATION	3+2	4	8	This course introduces the principles of computer organization and the basic architecture concepts. The course emphasizes performance and cost analysis, instruction set design, pipelining, memory technology, memory hierarchy, virtual memory management, and I/O systems. Basic technical writing skills are also taught in this class. At the end of the course, students will be able to: i) identify various components of a computer and their interconnection, ii) identify basic components and design of the CPU: the ALU and control unit, iii) compare and select various memory devices as per requirement, iv) compare various types of IO mapping techniques, and v) critique the performance issues of cache memory and virtual memory.
COM309	SIGNALS AND SYSTEMS	3+0	3	5	This course aims to provide analytical skills and numerical tools necessary for further study in communications, control, and signal processing. At the conclusion of this course, you should be able to: i) understand basic concepts of discrete-time signals and linear time invariant (LTI) systems, ii) provide time-domain and frequency-domain descriptions of these signals and systems, iii) employ Fourier analysis to design and analyze simple LTI systems, iv) proficiently use MATLAB as a programming and numerical analysis tool, v) implement simple discrete-time systems, such as linear filters, in MATLAB, and vi)

					program MATLAB to numerically perform Fourier analysis of signals and LTI systems.

3 rd YEAR SPRING TERM COURSES					
Code	Name of the Course	In-Class Hours (T+P)	Credit	ECTS	Description
COM306	COMPUTER NETWORKS	3+0	3	5	The course introduces the main concepts of networking: application areas, classification, reference models, transmission environment, technologies, routing algorithms, IP, UDP, and TCP protocols; reliable data transferring methods; application protocols; network security; management systems; perspectives of communication networks. The course structure consists of lectures, tutorials, laboratory work in a computer classroom, and individual work.
COM302	PRINCIPLES OF PROGRAMMING LANGUAGES	3+2	4	7	This course presents examples of important programming languages and paradigms such as LISP, ALGOL, ADA, ML, Prolog, and C++. Students write sample programs in some of the languages studied. The languages are used to illustrate programming language constructs such as binding, binding times, data types and implementation, operations (assignment, data-type creation, pattern matching), data control, storage management, parameter passing, and operating environment. The suitability of these various languages for particular programming tasks is also covered.
COM304	MICROPROCESSOR SYSTEMS	3+2	4	5	This course introduces students to microprocessor architecture and microcomputer systems, including memory and input/output interfacing. Topics include assembly language programming, bus architecture, bus cycle types, I/O systems, memory systems, interrupts, and other related topics. Upon completion, students should be able to interpret, analyze, verify, and troubleshoot fundamental microprocessor circuits and

					programs using appropriate techniques and test equipment.
COM308	SOFTWARE ENGINEERING	3+0	3	6	This course introduces students to the different software development lifecycle (SDLC) phases used in developing, delivering, and maintaining software products. Students will also acquire basic software development skills and understand common terminology used in the software engineering profession. Students will also learn and practice using traditional coding standards/guidelines.

4 th YEAR FALL TERM COURSES					
Code	Name of the Course	In-Class Hours (T+P)	Credit	ECTS	Description
ECO441	ENGINEERING ECONOMICS	3+0	3	3	After completing this course, students will be able to conduct simple economic studies. They will also be able to make an evaluation of engineering projects and make decisions related to investment.
BUS405	STRATEGIC MANAGEMENT	3+0	3	4	This course introduces the key concepts, tools, and principles of strategy formulation and competitive analysis. It is concerned with managerial decisions and actions that affect the performance and survival of business enterprises. The course is focused on the information, analyses, organizational processes, and skills and business judgment managers must use to devise strategies, position their businesses, define firm boundaries, and maximize long-term profits in the face of uncertainty and competition.

4th YEAR SPRING TERM COURSES
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Code	Name of the Course	In-Class Hours (T+P)	Credit	ECTS	Description
ENG444	ENGINEERING ETHICS	3+0	3	5	This course is designed to introduce the moral rights and responsibilities of engineers to society, employers, colleagues, and clients. Analysis of ethical and value conflict in modern engineering practice. Importance of intellectual property rights and conflicting interests. Ethical aspects in engineering design, manufacturing, and operations. Cost-benefit-risk analysis and safety and occupational hazard considerations.

ELECTIVE COURSES

Code	Name of the Course	In-Class Hours (T+P)	Credit	ECTS	Description
COM451	PRINCIPLES OF DIGITAL IMAGE PROCESSING	3+0	3	5	Digital image processing deals with the processing of images that are digital in nature. The study of the subject is motivated by three major applications. The first application is in the improvement of pictorial information for human perception, i.e., enhancing the quality of the image so that the image will have a better look. The second is for autonomous machine applications, which have wider applications in industries, particularly for quality control in assembly automation and many similar applications. This course will introduce various image processing techniques, algorithms, and their applications.
COM453	ARTIFICIAL NEURAL NETWORKS	3+0	3	5	This course aims to understand, design the structure of deep neural networks, and implement several industry-standard architectures in a wide range of application areas. By the end of the

					course, the students shall be able to i) understand and design the structure of deep neural networks, ii) understand the different layers and their operations, as well as backpropagation, iii) design a neural network for a given data set iv) develop a deep understanding of PyTorch and its use in designing one's deep architectures.
COM455	INTERNET PROGRAMMING	3+0	3	5	The course exposes students to today's web development methodologies and programming principles. It provides students with the opportunity to develop complex, data-driven web applications, enhancing their understanding of web development and their judgment of the effectiveness of different development techniques. Web application security concepts are also implemented.
COM457	AUTOMATA THEORY	3+0	3	5	This course provides a challenging introduction to some of the central ideas of theoretical computer science. It attempts to present a vision of "computer science beyond computers": that is, CS as a set of mathematical tools for understanding complex systems such as universes and minds. Beginning in antiquity, with Euclid's algorithm and other ancient examples of computational thinking, the course will progress rapidly through finite automata, Turing machines and computability, decision trees and other concrete computational models, efficient algorithms and reducibility, NP-completeness, the P versus NP problem, the power of randomness, cryptography and one-way functions, computational learning theory, interactive proofs, and quantum computing and the physical limits of computation. Class participation is important, as the class will include discussion and debate about many of these topics.
COM459	ADVANCED COMPUTER GRAPHICS	3+0	3	5	This course covers advanced 3D graphics techniques for realistic image synthesis. Students will learn how light interacts with objects in our world, and how to recreate these phenomena in a computer simulation to create synthetic images that are indistinguishable from photographs. This is a project-based course: students will initially receive a basic software package that lacks most

					rendering-related functionality. Towards the end of the course, students will realize a self-directed final project that extends their rendering software with additional features of their choosing. The objective of the final project is to create a single image of both technical and artistic merit that is entered into a rendering competition and judged by an independent panel of computer graphics experts.
COM461	DISCRETE EVENT SYSTEM SIMULATION	3+0	3	5	This course studies the important topics in discrete-event simulation theory and practice. Topics will include stochastic modeling of discrete-event systems, input modeling, random number generation, statistical analysis of simulation output, and techniques to improve the efficiency and accuracy of simulation results. A very important part of this course is for the students to learn to actually use simulation to model and analyze a discrete-event system. Simulation packages such as Arena will thus be extensively used throughout the course.
COM452	ARTIFICIAL INTELLIGENCE	3+0	3	5	Artificial Intelligence (AI) seeks to understand the mechanisms underlying thought and intelligent behavior, with a particular focus on their embodiment in machines. Core topics include the integration perspective of intelligent agents and how such systems can engage in: search and problem solving; symbolic and probabilistic knowledge representation and reasoning; planning; and machine learning. The course introduces both basic concepts and algorithms, and explores how to apply them in the construction of systems that can interact intelligently with complex environments.
COM454	WIRELESS COMMUNICATION	3+0	3	5	This course provides the basics for the design and analysis of wireless communications systems. It covers aspects ranging from the wireless propagation channel, digital communications theory, coding, to multiple access methods, frequency planning, and wireless standards. The course not only provides the individual pieces for understanding and designing such systems, but also stresses a holistic system view and shows how the different pieces are connected. The ultimate goal of this

					course is to give students the ability to take a practically occurring problem, recognize the different challenges to achieve the desired results, and design and analyze systems that meet the performance goals.
COM456	JAVA PROGRAMMING	3+0	3	5	This course aims to cover the essential topics of Java programming so that the participants can improve their skills to cope with the current demand of the IT industries and solve many problems in their field of study.
COM458	MODERN PROGRAMMING PLATFORM	3+0	3	5	This course covers topics related to various application development environments that are popularly needed to satisfy the modern computational needs. The course aims to provide students with practical insight into programming environments that can be applied to different fields, including, but not limited to, scientific computing, distributed programming, machine learning, data science, cloud computing, and Internet of Things. Upon successful completion of the Modern Programming Platforms course, the students are expected to gain skills and hands-on experience in modern application development tools and techniques, so that they can implement practical solutions to satisfy the emerging computational needs of the industry.
COM460	DATABASE SECURITY	3+0	3	5	The course provides a strong foundation in database security and auditing. This course utilizes Oracle scenarios and step-by-step examples. The following topics are covered: security, profiles, password policies, privileges and roles, Virtual Private Databases, and auditing. The course also covers advanced topics such as SQL injection, database management security issues, such as securing the DBMS, enforcing access controls, and related issues.
COM463	PATTERN RECOGNITION	3+0	3	5	The objective of this course is to impart a working knowledge of several important and widely used pattern recognition topics to the students through a mixture of motivational applications and theory. Upon completion of this course, the student will be able to i) identify relevant real-world problems as instances of canonical pattern recognition problems, ii) design and implement effective

					strategies for data preprocessing, iii) derive, reason and solve pattern recognition problems using the basics of statistical learning theory, iv) implement Python code to solve pattern recognition problems, v) explain and utilize concepts of pattern recognition for data science and electrical engineering.
EEN405	DIGITAL SIGNAL PROCESSING	3+0	3	5	This course covers topics related to the foundations of digital signal processing. After completing this course, students should understand the essential properties of discrete-time signals and systems; understand the sampling and reconstruction of signals; be able to perform transform analysis of digital signals and systems and apply filter design techniques; as well as understand the fundamental principles of multi-rate signal processing.
SEN202	SOFTWARE REQUIREMENTS ANALYSIS AND SPECIFICATION	3+0	3	5	This course will teach students how to derive and develop software requirements that are measurable, testable, and lead to a compliant software design and implementation. Using industry best practices and tools, students will learn how to elicit, analyze, specify, and validate functional and non-functional software requirements. Students will develop software requirements models and specifications that capture the customer/user's needs. They will also develop test plans and test procedures used in a formal software acceptance test to validate that the developed product meets its requirements as specified. In doing so, students will learn and use basic Java language constructs to implement specified requirements. Additionally, students will also learn how to establish and maintain a software requirement configuration baseline and the processes used to incorporate subsequent changes, updates, and enhancements to the software requirements over time.
SEN305	SOFTWARE DESIGN AND ARCHITECTURE	3+0	3	6	The general goal of the Software Architectures course is to give students a broad yet sound view of what software architecture is, how it is created, documented, and used in practice. This course draws fundamental concepts from a vast body of theoretical knowledge available about software

					architecture, and complements that with key information and best practices to be successful working with software architecture in industrial projects at any scale.
SEN308	SOFTWARE QUALITY ASSURANCE AND TESTING	3+0	3	5	This course focuses on the processes, methods, and techniques for developing quality software, and maintaining quality software. Software testing processes at the unit, module, subsystem, and system levels are discussed. Testing methods covered include: automatic and manual generation of test data, static vs. dynamic analysis, functional testing, inspections, and reliability assessment. This course introduces concepts, metrics, and models in software quality assurance. The course covers components of software quality assurance systems before, during, and after software development. It presents a framework for software quality assurance and discusses individual components in the framework, such as planning, reviews, testing, and configuration management. It also discusses metrics and models for software quality. The course will include case studies and hands-on experiences.
SEN408	SOFTWARE PROJECT MANAGEMENT	3+0	3	5	This course will introduce students to fundamental project management techniques and tools such as activity planning, milestone planning, estimation, work breakdown structures, and critical paths. The course will also look at hybrid methods such as Milestone Driven Agile Execution. The course has been designed for students seeking to acquire a working knowledge of project management methodologies, tools, and techniques with a focus on planning and project tracking. The course is organized around a running assignment that continues from activity to activity to provide a thorough understanding of how the planning artifacts relate to each other.

