DEPARTMENT OF SOFTWARE ENGINEERING

PROGRAMME HANDBOOK

2025-2026

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Software Engineering Department

The Department of Software Engineering at the International University of Alasia was established to provide high-quality education in line with modern engineering practices and industry demands. It is one of the core departments in the School of Engineering, designed to produce highly skilled graduates who are competent in both the theoretical and practical aspects of software systems development.

The Software Engineering undergraduate program offers a robust and modern curriculum aligned with international standards. Instruction is delivered entirely in English, and the program is structured to span 4 academic years (8 semesters), culminating in the award of a Bachelor of Science (B.Sc.) in Software Engineering. Students must complete a minimum of 240 ECTS (European Credit Transfer and Accumulation System) credits to graduate.

In keeping with the academic standards of Turkey and North Cyprus, the evaluation criteria for each course may include a combination of midterm exams, homework, laboratory work, presentations, projects, participation, final exams, make-up exams, and re-sit exams, with weightings determined by the respective course instructor and approved by the department.

The program emphasizes both academic excellence and professional readiness. In addition to theoretical knowledge, students are engaged in hands-on laboratory work, industry-based internships, and capstone projects, equipping them with the ability to solve real-world problems. The curriculum is also supported by elective courses in areas such as artificial intelligence, mobile development, cybersecurity, and cloud computing to allow for specialization and flexibility.

The department follows a semester-based academic year, consisting of Fall and Spring semesters, each lasting at least 14 weeks. A Summer School session may be offered based on Senate approval, targeting students who need to repeat courses or improve their academic standing. This summer session is compressed into 7 weeks with extended weekly instructional hours.

The Department shares laboratory and infrastructure resources with its sister departments, including Computer Engineering and Information Systems, allowing students to benefit from interdisciplinary learning and collaboration.

The Software Engineering Department operates under the academic and administrative regulations established by the University and aims to provide a forward-thinking, internationally relevant, and ethically grounded educational environment. Its vision and mission statements are in alignment with the broader goals of the International University of Alasia and are made available on the department's website.

Mission

The mission of the Department of Software Engineering at the International University of Alasia is to:

Equip students with the knowledge, skills, and ethical grounding required to design, develop, and manage high-quality software systems that solve real-world problems across diverse industries and communities.

The Department is committed to:

1. Delivering a globally competitive curriculum rooted in theoretical foundations and enriched with practical, hands-on experience.

2. Promoting critical thinking, innovation, and teamwork through project-based learning, internships, and research.

3. Fostering strong industry-academia linkages to ensure graduates are prepared for professional careers, entrepreneurship, and lifelong learning.

4. Upholding academic integrity and professional ethics in all aspects of education, software practice, and community engagement.

5. Supporting national and regional development by producing graduates who contribute meaningfully to technological advancement and economic growth.

Vision

The vision of the Department of Software Engineering at the International University of Alasia is to:

Become a center of excellence in software engineering education, research, and innovation — producing graduates who lead technological transformation and ethical digital advancement locally and globally.

The Department aspires to:

1. Lead in the development of cutting-edge software solutions through research and interdisciplinary collaboration.

2. Shape the future of technology in Africa, the Mediterranean, and beyond by training software engineers with a global mindset and local impact.

3. Establish a reputation for academic rigor, industrial relevance, and societal responsiveness in software development and digital systems.

4. Be recognized as a hub for ethical, entrepreneurial, and visionary software professionals equipped to adapt and thrive in an ever-evolving digital world.

Aim of the program

The primary aim of the Software Engineering Programme is to provide students with a solid and practical foundation in software development, engineering principles, and computing systems. The programme is designed to prepare graduates who can design, build, and manage complex and scalable software systems that meet real-world requirements across industries.

Our curriculum emphasizes a balanced integration of theory and hands-on experience, covering the entire software development lifecycle, including analysis, specification, design, implementation, testing, deployment, and maintenance. The programme also highlights the importance of teamwork, leadership, ethics, and communication in professional practice, equipping students to thrive both as team players and independent contributors.

The programme draws on global best practices and is responsive to the dynamic demands of the software industry and academia. Students are exposed to modern tools, programming environments, and current research to ensure they are prepared

for continual learning and innovation. Emphasis is also placed on entrepreneurship, critical thinking, and creative problem-solving.

We aim to produce competent software engineers who are job-ready, ethically grounded, and capable of adapting to emerging technologies in today's data-driven world. Graduates of the programme will be well-prepared to pursue careers in areas such as software development, quality assurance, systems analysis, IT consultancy, and to pursue postgraduate studies in computing and related fields.

Curriculum

1st 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+0	2 2	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	
1st 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	
2nd 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	COM102	Compulsory	3+2	4	7

	MAT201	ORDINARY DIFFERENTIAL EQUATIONS	MAT101	Compulsory	3+2	4	5
	SEN201	INTRODUCTION TO THE SOFTWARE ENGINEERING	-	Compulsory	3+0	3	7
				Total Credit: 18		Total ECTS Credit: 30	
2nd 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	7
	COM204	OBJECT ORIENTED PROGRAMMING I	COM102	Compulsory	3+2	4	8
	MAT202	ENGINEERING MATHS	MAT101	Compulsory	3+0	3	5
	MAT204	PROBABLITY&STATISTIC METHODS	MAT101	Compulsory	3+0	3	5
	SEN202	SOFTWARE REQUIREMENTS ANALYSIS AND SPECIFICATION	-	Compulsory	3+0	3	5
				Total Credit: 16		Total ECTS Credit: 30	

3rd 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
	SEN305	SOFTWARE DESIGN AND ARCHITECTURE	SEN202	Compulsory	3+0	3	5
	COM315	OBJECT ORIENTED PROGRAMMING II	COM102	Compulsory	3+2	4	8
	IUAXX1	FREE ELECTIVE I		Elective	3+0	3	2
				Total Credit: 20		Total ECTS Credit: 30	
3rd 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
	SEN308	SOFTWARE QUALITY ASSURANCE AND TESTING	COM102	Compulsory	3+0	3	5
	SEN312	HUMAN COMPUTER INTERACTION	-	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: 19		Total ECTS Credit: 30	
4th 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	

4th 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
	COM304	MICRPROCESSOR SYSTEMS		Elective	3+2	4	5
	COM309	SIGNALS AND SYSTEMS		Elective	3+0	3	5
	COM206	DIGITAL SYSTEM DESIGN		Elective	3+0	3	5
	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
	SEN408	SOFTWARE PROJECT MANAGEMENT		Elective	3+0	3	5
	COM304	MICRPROCESSOR SYSTEMS		Elective	3+2	3	5

Course Catalogue Descriptions

COMPULSORY COURSES

1ST 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.
TUR101	**TURKISH LANGUAGE***	2+0	2	2	Definition and characteristics of language. Relationship between language and thought. Relationship between language and culture. 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.

1ST 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.

2nd 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 Karnough 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.
SEN201	**INTRODUCTION TO THE SOFTWARE ENGINEERING**	3+0	4	7	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. The course will also lay the foundation for achieving academic and career success in Software Engineering.

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.
MAT202	**ENGINEERING MATHS**	3+0	3	5	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 differential calculus, integral calculus, linear algebra, and differential equations with applications to various engineering problems.
MAT204	**PROBABILITY&STATISTIC 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.
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.

3rd 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.
SEN305	**SOFTWARE DESIGN AND ARCHITECTURE**	3+0	3	5	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.
COM315	**OBJECT ORIENTED PROGRAMMING II**	3+2	4	8	This course introduces students to advanced features in the C# object-oriented programming language. After a quick review, students are introduced to graphical user interfaces, web applications, and database connectivity. Concepts are designed to provide maximum transfer of

					knowledge to any web-oriented development platform.

3rd 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.
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 systems 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 discuss individual components in the framework such as planning, reviews, testing and configuration management. It also discusses metrics and models for software quality.
SEN312	**HUMAN COMPUTER INTERACTION**	3+0	3	6	The course content is composed of HCI fundamentals, making interactive systems natural, user modeling in user-centred system design, the user-centred system design process, task analysis, requirements gathering, storyboarding and prototyping, cognitive physiology, the model human processor, advancing simplistic theories, theories of human perception, observational evaluation and protocol analysis, and experiments

4th 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					
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.
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.