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FACULTY OF ENGINEERING AND NATURAL SCIENCES
COMPUTER ENGINEERING

	Course Code	Name	Theoric/ Lab./Prac.	ECTS	Course Content
1. PERIOD	1213101 1220101	Mathematics I	4+2+0	7	• Natural, Integer, Rational, Irrational, Real, Decimal, Repeating decimal, Extended Real, and Exponential numbers, Sum and sigma notations • Root numbers, absolute values, equations and equalities • Functions, function kinds, special-defined functions, trigonometric functions and their inverse forms, hyperbolic functions and their inverse forms • Functions, function kinds, special-defined functions, function shifting and scaling, trigonometric functions and their inverse forms, hyperbolic functions and their inverse forms • Limits and continuity, limit of a function, limit theorems, formal definition of limit, one sided (left-right sided) limits, limits containing infinity
	1213156 1220156			5	• Limits and continuity, limit of a function, limit theorems, formal definition of limit, one sided (left-right sided) limits, limits containing infinity • Derivative and its definition and theorems, Concept of derivative • Derivative, Extremum points-concavity-convexity-asymptotes • Function drawings, indefinite forms and L'Hopital rules • Indefinite integrals, Techniques of integration, integrals of some fundamental functions • Riemann integral, Riemann sums, fundamental theorem of calculus, properties of Riemann integrals, equalities for integrals, mean value theorems, estimation of integrals • Applications of Riemann integrals, Area and arc length of plane regions on Cartesian coordinates, Area and volume of surfaces of revolution on Cartesian coordinates • Sequences, Convergence of sequences, monotone sequences, lower-upper limits of sequences, almost equivalent sequences, boundedness and operations of sequences, neighbour sequences, Cauchy and Fibonacci sequences • Applications of Riemann integrals, Area and arc length of plane regions on Cartesian coordinates, Area and volume of surfaces of revolution on Cartesian coordinates
	1213121 1220121	Turkish Language and Literature I	2+0+0	2	• Week 1: Vocabulary (Word Types) • Week 2: Vocabulary (Word Groups) • Week 3: Sentence Types- Elements Of The Sentence • Week 4: Sentence Types- Elements Of The Sentence (Analysis) • Week 5: Oral Composition (Prepared Speech) • Week 6: Oral Composition (Impromptu Speech) • Week 7: Written Composition (Narrative Techniques) • Week 8: Written Composition (Types Of Texts) • Week 9: Midterm Exam • Week 10: Narrative Disorders • Week 11: Narrative Disorders • Week 12: Scientific Research Method • Week 13: Writing Scientific Texts • Week 14: Literary Texts- Thought Texts • Week 14: Literary Texts- Thought Texts
	1213122 1220122	Ataturk's Principles and History of Turkish Revolution I	2+0+0	2	• XIX. Century Ottoman Modernization (Period of Selim III - Period of Mahmut II; Tanzimat Period; I. Constitutional Period) • II. Announcing the Constitutional Monarchy; II. Constitutional Period; 31 March Incident • Thought Movements Towards Saving the Ottoman Empire; Tripoli War; Balkan wars • World War I; The First World War in terms of the Ottoman Empire; Causes and Consequences of the First World War • Armistice of Mudros (30 October 1918), Political Developments and Ottoman Governments during the Armistice Period • Political Events After the Armistice, Press and Broadcasting Activities, Paris Peace Conference and the Occupation of Izmir • Helpful and Harmful Societies; Mustafa Kemal Pasha during the Armistice Period • Mustafa Kemal Pasha's Landing in Samsun (May 19, 1919); Period of Circulars and Congresses; Amasya Circular • Amasya Protocol, Opening of the Last Ottoman Parliament and Acceptance of the National Pact • Opening of the First Turkish Grand National Assembly (23 April 1920); Structure and 13. Functioning of the Turkish Grand National Assembly; Riots After the Opening of the Turkish Grand National Assembly; Measures Taken by the Turkish Grand National Assembly; Treaty of Sèvres, Reaction of the Grand National Assembly of Turkey to the Treaty of Sèvres • Establishment of the Regular Army; Eastern Front Gyumri Peace Treaty and Its Results; Southern Front (Adana-Antep-Maraş-Urfa Front) • Western Front ; I. Battle of İnönü, Organization-I Fundamental Law, London Conference, Acceptance of the National Anthem, Relations with the Soviets and the Treaty of Moscow, II. Battle of İnönü, Battles of Kütahya and Eskişehir, Battle of Sakarya, Great Offensive and Its Results

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1. PERIOD	1213130 1220130	Physics I	2+2+0	5	• Physics and Measurement • Motion in One Dimension • Vectors • Motion in Two Dimensions • The Laws of Motion • Circular Motion and Other Applications of Newton's Laws • Energy and Energy Transfer • Potential Energy • Linear Momentum and Collisions • Rotation of a Rigid Object about a Fixed Axis • Angular Momentum • Static Equilibrium and Elasticity • Oscillatory Motion • Universal Gravitation
	1213131 1220131	English I	3+0+0	3	• Present simple, Reading and Analysis of Paragraphs • Article (a/an/the), extended, Reading and Analysis of Paragraphs • Past simple, Reading and Analysis of Paragraphs • Adjectives,Adverbs, Reading and Analysis of Paragraphs • Future Simple, Reading and Analysis of Paragraphs • Comparatives and superlatives, Reading and Analysis of Paragraphs • Present continuous, Will and going to, for prediction, Reading and Analysis of Paragraphs • Broader range of intensifiers such as too, enough, Reading and Analysis of Paragraphs • Past Continuous, Reading and Analysis of Paragraphs • Qauntifiers, extended, Reading and Analysis of Paragraphs • Future continuous, Reading and Analysis of Paragraphs • Present perfect/past simple, Reading and Analysis of Paragraphs • Past perfect, Reading and Analysis of Paragraphs • Future Perfect, Reading and Analysis of Paragraphs
	1213146 1220146	Algorithms and Programming I	2+0+2	7	• Basic Computer Architecture • Introduction of operating systems and their tasks, introduction of low and high level programming languages, compilers. • Flowcharts, conditional branching, loops, algorithmic approaches • Fundamentals of algorithm and programming. Executable code, Central processing unit, RAM, code running on hardware. • Number systems, binary number system, hexadecimal number system, number system conversions • General structure of C language, include, define, variable types, simple sample programs. • If, if - else, if - else if - else structures, switch structure, looping. Logical expressions, logical conjunctions • Using while, do-while, for. • Using break and continue in the loop. • Array operations • Multi-dimensional arrays • Functions • Using global and local variables with functions • Ascii table, character variable, strings, text operations

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	Course Code	Name	Theoric/ Lab./Prac.	ECTS	Course Content
2. PERIOD	1213201 1220201	Mathematics II	4+2+0	7	• Series, convergence and divergence of series, Convergence of positive series, Integral, limit and comparison tests • D'Alambert and Cauchy tests, Alternative series, functional sequences, power series, Taylor and Maclaurin series expansions of functions • Improper integrals, Gamma and Beta functions • Parametric equations and polar coordinates, Function drawings on polar coordinates, Areas and arc lengths on polar coordinates • Vector valued functions and their limit, continuity and derivative concepts • Multi-variable functions and their domains, Limits and continuity of multi-variable functions, Partial derivative • Chain rule, directional derivative and gradient vectors, Tangent planes • Taylor and Maclaurin series of multi-variable functions • Extremum values and saddle points of multi-variable functions • Lagrange multipliers, Region transformations • Multiple integrals, Double integrals • Double integrals, Calculations of area, surface area, arc lengt, mass, center of a mass via double integrals • Triple integrals on Cartesian coordinates • Region transformations, Triple integrals on cylindrical and spherical coordinates
	1213221 1220221	Turkish Language and Literature II	2+0+0	2	• Week 1: Vocabulary (Word Types) • Week 2: Vocabulary (Word Groups) • Week 3: Sentence Types- Elements Of The Sentence • Week 4: Sentence Types- Elements Of The Sentence (Analysis) • Week 5: Oral Composition (Prepared Speech) • Week 6: Oral Composition (Impromptu Speech) • Week 7: Written Composition (Narrative Techniques) • Week 8: Written Composition (Types Of Texts) • Week 10: Narrative Disorders • Week 11: Narrative Disorders • Week 12: Scientific Research Method • Week 13: Writing Scientific Texts • Week 14: Literary Texts- Thought Texts
	1213222 1220222	Ataturk's Principles and History of Turkish Revolution II	2+0+0	2	• End of the National Struggle: Mudanya Armistice, Lausanne Conference and Lausanne Peace Treaty (4 July 1923) • Turkish Revolutions Under the Leadership of Atatürk: Turkish Economy Congress, Deputies Elections, Establishment of the People's Party, II. Assembly of the Assembly, Ankara Becoming the Capital • Political Revolutions and Reactions: Proclamation of the Republic, Abolition of the Caliphate, 1924 Constitution, Experiences and Reactions of Transition to Multi-Party Life, Progressive Republican Party, Sheikh Said Rebellion, İzmir Assassination, Free Republic Party, Menemen Incident • Revolutions Made in the Field of Law: Meaning of Law and Major Legal Systems, Ottoman Legal System, Changes in Turkish Civil Code, Constitutional Developments • Revolutions in Education: Pre-Republican Education Systems, Republican Educational Policies, Unity in Education; The Law of Unification of Education and Its Applications, 1933 University Reform, Minority and Foreign Schools • Revolutions in the Field of Culture: Alphabet Revolution, Establishment of the Turkish Historical Society, Establishment of the Turkish Language Society, Press in the Republican Period • Revolutions in the Social Field: Hat Revolution, Dressing Revolution, Closure of Lodges, Zawiyas and Tombs, Adoption of Surname Law, International Calendar, Adoption of Clock, Numbers and Measurement Units, Development of Women's Rights • Developments in the Field of Economy: Abolition of Tithe Tax, Law on Landing the Farmer, Adoption of the Cabotage Law, Adoption of the Customs Protection Law • Developments in Industry: Encouragement-i Industry Law, Preparation of Five-Year Industrial Development Plan, Developments in Mining • Developments in the Field of Transportation, Developments in the Field of Banking, The Effects of the 1929 World Economic Crisis on the Turkish Economy, Establishment of the State Institute of Statistics, Adoption of the Law on the Protection of the Value of the Turkish Currency • The Foreign Policy of the New Turkish State: Settling the Issues Left After Lausanne, Turkish-British Relations and the Mosul Issue, Turkish-French Relations and the Accession of Hatay to the Motherland, Turkish-Greek Relations, Turkish-Italian Relations • Relations with the Balkan States and the Balkan Entente, Relations with the Eastern States and the Pact of Sadabat, Turkish-Soviet Relations, Turkey's Entry to the League of Nations, Montreux Convention • Atatürk's Personal Characteristics, Basic Principles of the Republic; Republicanism, Populism, Secularism, Statism, Revolutionism, Integrative Principles • Developments After Atatürk's Death and İsmet İnönü's Election as Preside

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2. PERIOD	1213230 1220230	Physics II	2+2+0	5	• Properties of Electric Charges, Electric fields, Coulomb's Law, • Electric Flux, Gauss's Law and Applications, • Electric Potential, Potential Differences in a Uniform Electric Field, Electric Potential Due to Continuous Charge Distribution • Capacitance, Connecting Capacitors, Energy Stored in Charged Capacitors, Dielectric Capacitors • Electric Current, Resistance and Ohm's Law, Electric Energy and Power • Direct Current Circuits, Kirchhoff Rules, RC Circuits, • Magnetic Fields, Motion of a Charged Particle in a Uniform Magnetic Field • Biot Savart's Law, Magnetic Forces Between Two Parallel Conductors, Ampere's Law • Faraday's Law of Induction, Motion emf, Lenz's Law • Self Induction, RL Circuits, Energy Stored in a Magnetic Field • Alternating Current Circuits • Alternating Current Circuits • Maxwell Equations, • Electromagnetic Waves
	1213231 1220231	English II	3+0+0	3	• Measurement 1 (Quick review of last term) • Units • Unite 5, Process 1 • Prepositions of time, missing verbs-words • Missing verbs-6, words • Food and drink • Food and drink (continue) • Measurement 2 Quantity (Section 1, how much and how many) • Measurement 2 Quantity (Section 2, enough and too much) • Measurement 2 Quantity (Section 3, too small and big enough) • Measurement 2 Quantity (Section 3, too small and big enough)-continue • Missing verbs-7, shops • The house, what's the matter (the type of illness)
	1213246 1220246	Algorithms and Programming II	3+0+2	11	• File Operations • File Operations • Bitwise Operations • Recursive functions • Pointer structures • Pointer type and parameterized functions. • Pointers and dynamic data structures. • Single, doubly, and circular linked lists. • Queues and Stacks.
	1213247 1220247			9	• File operations with linked lists, queues and stacks. • Sorting algorithms. • Sorting algorithms. • Tree Structures • Add, delete and search in binary search tree

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3. PERIOD	1213345 1220345	Discrete Mathematics	3+0+0	5	Sembolic logic and proofs Sets algebra Matrices Relations and properties of relations Equivalence and Ordered relation Functions Number theory and binary operations Boolean Algebra and Karnaugh Map Cebric algebra Cebric algebra and properties Introduction to graph theory Properties of graph theory Graph structures Trees Applications
	1213346 1220346	Lineer Algebra	2+2+0	3	The concept of matrices, addition of matrices, multiplication with scalars and the product of two matrices and their properties. Transpose, trace and properties of matrices. Some special matrices and relations between them. Elementary operations on matrices, echelon and reduced echelon matrices, equivalent matrices. Sarrus rule, determinants and properties Rank and calculation of a matrix, Concept of systems of linear equations, Systems of homogeneous linear equations and criteria for solution Systems of non-homogeneous linear equations and solution criteria, Cramer's method Gauss Elimination and Gauss Jordan method and its applications Definition and properties of vector spaces, Subvector spaces Midterm Linear dependence and linear independence, Stretching, Base and dimension concepts Inner product space, Vector norms, Distance between two vectors, Angle between two vectors, Orthogonal vectors, Gram-Schmit method Linear Transformations and its relation to matrices Finding characteristic polynomial, eigenvalues ??and eigenvectors Finding the inverse of a square matrix with the help of the Cayley-Hamilton Theorem, Diagonalization and similar matrices Diagonalization of symmetric matrices and some applications
	1213347 1220347	Logic Design	3+0+2	6	Number systems, binary arithmetic, numerical coding Logic circuits, Boolean Algebra and its theorems Logic gates. Realization of boolean functions using logic gates Simplifying boolean functions Adder and subtractor and comparators Encoders, priority encoders and decoders Multiplexers and Demultiplexers Mid-Term Exam RAM and ROM memories Latches and flip-flops. Triggering flip-flops Timer circuits. Analysis of sequential circuits Registers Working of asynchronous counters Operation and design of synchronous counters Operation and design of synchronous counters
	1213353 1220353	Data Structures	3+0+0	5	General descriptions and arras. Pointers and dynamic memory. Single linked lists data structures. Doubled linked lists data structures Stack structure,stacks with array and linked list, applications of stack structures. Queue structures, ring queues structure, queues with linked list Recursive functions and its applications. Sorting algorithm, Selection, Bubble, Insertion, Quick, Radix sorts. Algorithm complexity, algorthim efficiency. Search algorithms, sequantial search, binary search. Hashing methods and applications. Tree structures, binary trees, Binary search trees, travelling of trees, balanced trees. Gaph structure, graph algorithm

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	Course Code	Name	Theoric/ Lab./Prac.	ECTS	Course Content
3. PERIOD	1213357 1220357	Object Oriented Programming	2+0+2	5	General definitions about object-oriented programming Object-oriented analysis and design Data types, variables, arrays Operators Loops Class concept Object concept midterm Constructor methods and object references Method overriding Access levels (public, private, protected) Inheritance and super statement Error Catching Interfaces Abstract Classes
	1213358 1220358	Basic Electronics	3+0+2	6	Electrical Circuits, Electrical Current and Voltage, Resistor, structure and types Ohm's law, Kirchoff's. Laws, Resistor connections Circuit Analysis with Loop Analysis Circuit Analysis with Node Analysis Thevenin's and Norton's theorems and Superposition theorem Basis of Semiconductors, the structure of Diode, forward and reverse biasing Diodes types, rectifiers (redresors) and Clippers Transistors, transistor types and Biasing of BJT Transistors The characteristics of transistors and DC analysis Small signal amplifiers Operational Amplifiers (OPAMP), OPAMP's Features, Basic circuits with OPAMP OPAMP aplications The features of Diac,Triac, Tristor and their applications Circuit design with semiconductor devices and anlysis Solving problem

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4. PERIOD	1213435 1220435	Entrepreneurship	2+0+0	2	Entrepreneurship and definitions Who is an entrepreneur? Business idea, project and innovation Finance and financial management Setting up a business, team building Incorporation and institutionalization Team play and leadership midterm Entrepreneurship in informatics IT projects and support programs Planning, organization and management in IT projects Project planning and project writing Project presentation
	1213453 1220453	Visual Programming Languages	2+0+2	6	Structure of Java Programming Language and Basic Java Classes Introduction to Visual Programming with Java, AWT Library Structure and Applet Class Swing Library Structure and JFrame, JLabel, JButton and JTextField Classes JRadioButton, ButtonGroup, JCheckBox, JComboBox and JList Classes JProgressBar, JFormattedTextField, JPasswordField, and JTable Classes JTree, JMenuBar, JMenu, JMenuItem, JPopupMenu, and JOptionPane Classes JDialog, JColorChooser, and JFileChooser Classes File Read/Write Operations with JTextArea Class and Java Formatted Writing/Reading to/from Files with Java Java Package Structure and Usage Layouts of Visual Components Creating and Adding Dynamic Components Creating Database Connection with Java and Executing SQL Commands Providing Visual Component Values with Database Query Visual programming for the web
	1213454 1220454	Microprocessors	2+0+2	6	Historical development of computers Simple microprocessor architecture Fundamentals of microprocessor architectures (CISC, RISC and EPIC architectures) Fundamentals of microprocessor architectures (Von Neuman - Harvard Architectures) Key features of the Intel 8086 microprocessor Memory Structure (RAM and ROM Memory) Memory map and addressing modes Mid-Term Exam Introduction to assembly language, instruction structure and programming Data transfer commands Basic arithmetic and logic operations Loops and jump operations Interrupt concept and usage Basic IO interrupts and usage File operations
	1213455 1220455	Algorithms	3+0+0	6	Introduction to Algorithms, Algorithm Analysis, Algorithm complexity Sorting Algorithms-1 Sorting Algorithms-2 Search Algorithms in Graphs BFS Algorithm, DFS Algorithm Prim and Kruskal Algorithms Dijkstra's Shortest Path Algorithm and Bellman Ford Algorithm Midterm Compression Algorithms (Huffman Algorithm) Compression Algorithms (LZW Algorithm) Encryption Algorithms Binary Search Tree and AVL Tree Algorithms IPR Tree Algorithm B Tree Algorithm B + Tree Algorithm

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4. PERIOD	1213456 1220456	Diferantial Equations	2+2+0	5	Definition and classification of differential equations, initial value problems Separable differential equations, homogenous differential equations Exact differential equations, integrating factor (Euler multiplier) Linear differential equations Bernoulli and Riccati differential equations Clairaut differential equations and their forms with respect to dependent varaible Applications of differential equations arising in engineering sciences Higher order linear homogenous differential equations with constant coefficients Midterm Higher order linear nonhomogenous differential equations with constant coefficients (Lagrange rule) Cauchy-Euler differential equations Legendre differential equations Power serie solutions of differential equations, Laplace transform and its properties Laplace transform and its applications Inverse Laplace transform System of differential equations with constant and variable coefficients
	1213457 1220457	Statistics and Probability Theory	3+0+0	5	Introduction to Statistics and Basic Concepts Probability, Probability Theorem, Some Probability Rules, Conditional Probability, Independent Events, Bayes' Theorem Organization of Data and Central Tendency Measures Central Distribution Measures Discrete and Continuous Random Variables, Probability Function, Probability Density Function, Distribution Function, Two Dimensional Random Variables and Their Functions Expected Value and Expected Value Properties of Random Variables, Variance and Variance Properties of Random Variables Some Discrete Probability Distributions, Bernoulli Distribution, Binomial Distribution, Geometric Distribution, Negative Binomial Distribution, Hypergeometric Distribution, Poisson Distribution, Uniform Distribution Midterm Exam Some Continuous Probability Distributions, Normal Distribution, Standard Normal Distribution, Uniform

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5. PERIOD	1213532 1220532	Operating Systems	3+0+0	6	Introduction to operating systems and past development of tablets. Process concept. Batch units. Historical development of the concept of process. The principle of running multiple simultaneous executions with a single processor. Sequence and types of processes. FCFS,SJF,RR methods. Thread management and restrictions. Classic version issues. Producer-Consumer problem. Semaphores. The Food Philosophers problem, Baker selection and analysis of progress and retention in different process classification. Crash section and deadlock diagrams. They are for determining and using deadlock. midterm memory management. Address migration and MMU Approaches. Virtual memory approach. Paging and Page fault. disk management. Disk management speeds. File systems. Distributed Systems, socket programming tests. Operational safety. General Review, question and answer
	1213546 1220546	Vocational Internship I	0+0+0	3	• Internship is the education where students see how the knowledge they have acquired in theoretical or laboratory courses during their education period takes place in large-scale industrial productions, develop their knowledge and skills by actively participating in the studies, and take the first step into the profession.
	1213553 1220553	Computer Organization	3+0+0	4	Introduction to computer organization and architecture Computer Evolution and Performance Computer Arithmetic Memory Systems Memory Systems Input/Output Input/Output Processor- Structure, functions Processor- Structure, functions Processor- Instruction set, addressing methods Pipeline principle Superscalar Processor Parallel Processing Multicore Computers
	1213554 1220554	Database I	3+0+2	6	Introduction to Database Database Management System, File System Data Models, Business Rules Data Models, Entity, Attribute, Relationship Entity Relation Model, Entity, Relation, Relation Types Entity Relation Model, Supertype, Subtype Normalization, 1NF, 2NF, 3NF, BCNF Midterm Database Design SQL Query Language SQL, DML Commands SQL Functions, Group Functions Movement and Management PLSQL Introduction Application

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	Course Code	Name	Theoric/ Lab./Prac.	ECTS	Course Content
5. PERIOD	1213557 1220557	Automata Theory	3+0+0	5	Introduction to automata theory and Proof Approaches Basic Concepts, Recursive Definitions Regular expressions Finite automata and its applications Transition graphs, Non-deterministic finite automatons, Finite automata with output Kleene's Theorem Düzgün/Düzenli Diller, Düzenli olmayan Diller MIDTERM EXAM Decidability Context-free grammars Parse trees Pushdown automata models Regular grammars and Chomsky Normal Form Turing Theory and Turing Machines P, NP, NP-complete and NP-hard complexity concepts
	1213558 1220558	Law of Information Technology	2+0+0	2	Information in General, Computer Networks and the Internet Information, Internet and Law Informations, Human Rights and Protection of Personal Data, Question and Answer Information and Protection of Personal Data in Turkey Crimes in the field of information Crimes in the Field of Information, Question and Answer Midterm Review Midterm Exam Law No. 5651 E-Commerce E-Commerce, Q&A Intellectual and Industrial Rights in the Information Environment Developments in the Field of IT Law Developments in Informatics Law, Question and Answer
		Elective Course I	3+0+0	4	It will be selected from the 5th Term Technical Elective course pool.

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	Course Code	Name	Theoric/ Lab./Prac.	ECTS	Course Content
5. PERIOD TECHNICAL ELECTIVE COURSE POOL	1213560 1220560	Introduction to Computer Graphics	3+0+0	4	Introduction to Computer Graphics Graphics Display Principles Graphics Programming : Getting started with OpenGL 2 Dimension Modelling Input and Interaction in OpenGL Geometrical Objects and Transformations in 2D and 3D Viewing in 3D Light, Shading and Materials Concepts Texture Mapping Methods Solving Example Question and Midterm Exam Color Modelling and Applications Color Modelling and Applications Advanced Rendering Techniques Scientific Visualization
	1213562 1220562	Web Programming (Elective)	3+0+0	4	Web environment fundamentals, web servers and communication methods on the Internet HTML ve XHTML HTML ve XHTML HTML forms, data transfer, POST and GET methods HTML forms, data transfer, POST and GET methods Languages, variable definitions and basic functions Languages, conditions, loops and functions Languages, session management and cookies Languages, object-oriented programming on the web Languages, database access and operations XML, JSON, SOAP Basic javascript programming Javascript, AJAX, JQuery and Web Service Architecture
	1213563 1220563	Microprocessor Based Design (Elective)	3+0+0	4	Basic microprocessor architecture Fundamentals of microprocessor architectures. (CISC, RISC and EPIC architectures) Addressing principles in microprocessors Data transfers Processor control operations I/O interfaces Timer concept Mid-Term Exam Analog-digital, digital-analog conversion operations Parallel and serial communication I2C and SPI communication protocols PWM signals and usage Analog and digital sensors Using LCD display Integrated system design
	1213565 1220565	Artificial Intelligence (Elective)	3+0+0	4	Introduction to artificial intelligence, reasons for using artificial intelligence algorithms, what is expert software What is the feature, how is the information system represented, how is the feature reduction done. What are the learning types. What is concept learning, Find-s and candidate elimination algorithms Concept learning algorithms applications Edge extraction, derivative approaches, filtering. Problem solving, learning with decision trees Fuzzy logic theory, comparison with classical logic Midterm Fuzzy system design and implementation What is reinforcement learning, Q learning algorithm and its application What is data mining, association rules Apriori Algorithm. Data mining algorithms applications Artificial neural networks, error back propagation algorithm Artificial neural networks learning applications Solution space creation, heuristic search algorithms

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5. PERIOD TECHNICAL ELECTIVE COURSE POOL	1213566 1220566	File Structures (Elective)	3+0+0	4	Sequential access file organization, self-organizing sequential access file organization Move to Front method, Transpose method, Count method Direct access file organization Hashing Functions Collision resolution techniques Coalesced Hashing collision resolution technique Progressive Overflow çarpışma çözüm tekniği Midterm Linear Quotient collision resolution technique Brents collision resolution technique Binary Tree collision resolution technique Computed Chaining collision resolution technique Tree structures, binary search tree AVL Tree IPR Tree

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6.PERIOD	1213657 1220657	Computer Networks	3+0+1	6	Introduction to Computer Networks Physical Layer, Fundamentals of Data Transmission Physical Layer, Transmission Media, Wireless Communication Data Link Layer, Error Detection and Correction Data Link Layer, Data Link Protocols Network Layer, Routing, IP Protocol Network Layer, Routing Protocols Midterm Transmission Layer, Transmission Protocols Transport Layer, TCP and UDP Protocols Session Layer, Interdepartmental Session Presentation Layer, Data Formats and Syntax Application Layer, Network Security, DNS, SNMPUApplication Layer, Network Security, DNS, SNMP Application Layer, Network Security, DNS, SNMP IP Configuration and Subnet Configuration
	1213658 1220658	Signals and Systems	3+0+0	5	The classification of signals and systems Basic continuous and discrete time signals and time shifting and scaling, Systems features and Linear Time Invariant Systems Convolution for continuous time signal, Eigen functions Convolution for discrete time signal and system analysis Systems defined with difference equations, iterative solution, impulse response Laplace Transform, Region of Convergence, pole/zero diagram Inverse Laplace transform, Partial Fraction Expansion, Transfer Function Laplace Transform and system applications Fourier series, Fourier Transform, Relationship with Laplace Transform and Fourier Transform Fourier transform and its properties, Frequency response of continuous-time LTI systems Discrete Fourier Transform, Fast Fourier Transform, Frequency response of Discrete time LTI systems Z transform Response of systems to sampled continuous time sinusoids, simulation System Analysis by using transform methods
	1213659 1220659	Software Engineering	3+1+0	5	Intoduction Introduction to Software Engineering software development life cycle (SDLC) Planing requirements analysis software design implementation software testing Software maintenance Object oriented Analysis and Design Software architecture Quality of Software and Environment Computer Aided Software engineering Tools Design Patterns Human-Computer Interaction Information security engineering

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	Course Code	Name	Theoric/ Lab./Prac.	ECTS	Course Content
6. PERIOD	1213673 1220673	Application of Information Technologies	1+2+0	6	• Grouping the knowledge learned in Theoretical and Applied courses within the framework of a certain discipline for project work • Gaining the ability to present a planned project in the form of a product / file by blending the knowledge gained from the courses she/he has taken. • Understanding that what is learned will form the basis for designs and that learning will continue throughout life.
		Elective Course II	3+0+0	4	It will be selected from the 6th Term Technical Elective course pool.
		Elective Course III	3+0+0	4	It will be selected from the 6th Term Technical Elective course pool.

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	Course Code	Name	Theoric/ Lab./Prac.	ECTS	Course Content
6. PERIOD TECHNICAL ELECTIVE COURSE POOL	1213661 1220661	Human Computer Interaction(Elective)	3+0+0	4	Definition, history, importance and main components of Human Computer Interaction (HCI) The physical and philosophical dimension of HCI Cognitive dimension of HCI HCI design fundamentals, HCI in software process Design rules in HCI Universal Design and User Support Modeling used in HCI (Conceptual models, Communication and collaboration models) midterm Modeling used in HCI (System models, Rich Interactive Modeling) Usability concept, benefits and components in HCI Usability tests Steps to follow during usability studies Eye movement tracking system (Eye Tracker) and its application examples Activity analysis for web pages general overview
	1213664 1220664	Microcontroller (Elective)	3+0+0	4	Structures of Microprocessors and Microcontrollers General characteristics of PIC microcontrollers Key features of the PIC 16F877 microcontroller Software development environment Memory organization I/O ports and registers Basic arithmetic and logic operations Conditional and loop operations Mid-Term exam Analog-digital conversion operations LCD display usage Using interrupt Timers and counters Capture and PWM modules Serial communication

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Head of Department

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	Course Code	Name	Theoric/ Lab./Prac.	ECTS	Course Content
6.PERIOD TECHNICAL ELECTIVE COURSE POOL	1213666 1220666	Introduction to Data Mining (Elective)	3+0+0	4	Introduction to Data Mining Data Mining Concepts Preparing the Data Data Reduction Statistical Classification Method (Naïve Bayes) Decision Trees and Decision Rules Clustering and Similarity Measures Midterm Clustering Methods(Hierarchical Clustering) Evaluation of Classification Methods Association Rules Classification with Artificial Neural Networks Applications Applications Applications
	1213668 1220668	Advanced Programming Languages (Elective)	3+0+0	4	Introduction to advanced programming. General information about object-oriented programming Object oriented program design; procedural, functional and data abstraction Definition of DLL, use of its features Application development using DLL, dynamic and static loading, examples Introduction to Windows messaging service, features, usage areas, sample applications Processes and threads Serialization, lock, mutex, semaphore in processes and threads Windows socket structure and its systematics Application development using Windows sockets, TCP-UDP, examples Windows services Windows services IAS, PAS, SAAS structural definitions Virtualization and container based architectures Functional design of services-microservices and their usage

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	Course Code	Name	Theoric/ Lab./Prac.	ECTS	Course Content
7. PERIOD	1213880 1220880	Computer Engineering Application I	2+4+0	15	• Direct the knowledge learned in Theoretical and Applied courses to project work. • Gaining the ability to present a planned project in the form of a product / file by blending the knowledge gained from the courses she/he has taken. • Understanding that what is learned will form the basis for designs and that learning will continue throughout life.
	1213720 1220720	Vocational Internship II	0+0+0	3	• Internship is the education where students see how the knowledge they have acquired in theoretical or laboratory courses during their education period takes place in large-scale industrial productions, develop their knowledge and skills by actively participating in the studies, and take the first step into the profession.
	1213673 1220673	Application of Information Technologies I	2+4+0	15	• Grouping the knowledge learned in Theoretical and Applied courses within the framework of a certain discipline for project work • Gaining the ability to present a planned project in the form of a product / file by blending the knowledge gained from the courses she/he has taken. • Understanding that what is learned will form the basis for designs and that learning will continue throughout life.
		Elective Course IV	3+0+0	4	It will be selected from the 7th Term Technical Elective course pool.
		Elective Course V	3+0+0	4	It will be selected from the 7th Term Technical Elective course pool.
		Elective Course VI	3+0+0	4	It will be selected from the 7th Term Technical Elective course pool.

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7. PERIOD TECHNICAL ELECTIVE COURSE POOL	1213761 1220761	Digital Image Processing(Elective)	3+0+0	4	Introduction to digital image processing Digital image fundamentals Image enhancement in spatial domain Image enhancement in spatial domain Image enhancement in the frequency domain Image enhancement in the frequency domain Image restoration Color image processing Image compression Morphological image processing Image segmentation Image segmentation Representation and description
	1213768 1220768	VLSI Circuit Design (Elective)	3+0+0	4	VLSI Design Fundamentals Design and Testability Integrated Circuit Design Techniques: Hierarchical design, design representations Integrated Circuit Design Techniques: Computer Aided Design Design Tools and Design Rules Digital IC Design Techniques Verilog HDL Midterm Verilog HDL Verilog HDL
	1213771 1220771	Expert Systems (Elective)	3+0+0	4	WHAT IS THE EXPERT SYSTEM? METHODS OF PRESENTATION OF INFORMATION INFORMATION ENGINEERING BASIC STRUCTURE OF EXPERT SYSTEMS METHODS OF DESIGNING EXPERT SYSTEMS STAGES OF DESIGNING EXPERT SYSTEMS Midterm Review Midterm Exam USING HEURISTICS IN DESIGNING EXPERT SYSTEMS EXPERT SYSTEMS: DESIGNING EXPERT SYSTEMS WITH BAYES PROBLEM, FURIOUS LOGIC AND ARTIFICIAL NEURAL NETWORKS METHOD DESIGNING EXPERT SYSTEMS WITH FUZZY LOGIC DESIGNING EXPERT SYSTEMS WITH ARTIFICIAL NEURAL NETWORKS PROLOG PROLOGUE APPLICATIONS

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	Course Code	Name	Theoric/ Lab./Prac.	ECTS	Course Content
7. PERIOD TECHNICAL ELECTIVE COURSE POOL	1213772 1220772	Introduction to Artifical Neural Networks (Elective)	3+0+0	4	Artificial intelligence and Structure of Artificial Neural Networks History and Characteristics of Artificial Neural Networks Basic Elements of Artificial Neural Networks Classification of Artificial Neural Networks Single Layer Neural Networks (Perceptron, Adaline, Madaline) Multilayer Neural Networks (Backpropagation Algorithm) Multilayer Neural Networks Example Applications Self-Organized Maps (SOM) - Linear Vector Quantization (LVQ) Adaptive Resonance Theory (ART) Recurrent Artificial Neural Network Presentation of student projects Presentation of student projects Presentation of student projects Presentation of student projects
	1213774 1220774	Object Oriented Design and Analysis (Elective)	3+0+0	4	Introductinon to Object oriented desing and analysis Object oriented software development life cycle Software requirements overview and determining requirements Determination of conceptual class and relations Introduction to UML Introduction of UML diagrams Object-oriented software development processes Design Patterns Creational Desing Patterns Structurel Desing Patterns Bhevioral Desing Patterns Software architecture overview Introducing the relationship between database model and design model Evaluation of requirements, area and design models on samples
	1213776 1220776	Database II (Elective)	3+0+0	4	Introduction to SQL server Basic SQL operations Query, sorting, filtering Basic SQL operations table joining, grouping, subquery Basic SQL operations set operations, data definition, data types Basic SQL operations constraints, case statements Views Indexes midterm Stored procedures User-defined Functions Control-of-flow statements, Cursor Handling Exceptions, Dynamic SQL Trigger SQL Server Functions Evaluation of Project assignments
	1213777 1220777	Introduction to Cloud Computing (Elective)	3+0+0	4	Introduction to Cloud Computing Features of Cloud Computing Advantages and Disadvantages of Cloud Computing Architecture of Cloud Computing Cloud Computing Usage Scenarios Cloud Computing Services Types of Cloud Computing Midterm Examination Current Cloud Computing Scenarios Google Cloud Services Amazon Cloud Services Azure Cloud Services Cloud and Virtualization Managing the Cloud System Cloud Security

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	Course Code	Name	Theoric/ Lab./Prac.	ECTS	Course Content
8. PERIOD	1213673 1220673	Application of Information Technologies II	2+4+0	18	• Direct the knowledge learned in Theoretical and Applied courses to project work. • Gaining the ability to present a planned project in the form of a product / file by blending the knowledge gained from the courses she/he has taken. • Understanding that what is learned will form the basis for designs and that learning will continue throughout life.
	1213880 1220880	Computer Engineering Application II	2+4+0	18	• Direct the knowledge learned in Theoretical and Applied courses to project work. • Gaining the ability to present a planned project in the form of a product / file by blending the knowledge gained from the courses she/he has taken. • Understanding that what is learned will form the basis for designs and that learning will continue throughout life.
		Elective Course VII	3+0+0	4	It will be selected from the 8th Term Technical Elective course pool.
		Elective Course VIII	3+0+0	4	It will be selected from the 8th Term Technical Elective course pool.
		Elective Course IX	3+0+0	4	It will be selected from the 8th Term Technical Elective course pool.

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8. PERIOD TECHNICAL ELECTIVE COURSE POOL	1213860 1220860	Introduction to Medical Informatics (Elective)	3+0+0	4	Definition of Medical Informatic Health Systems and E-Health in the World and Turkey Safety and Ethics in Medical Informatics Health Information Systems Clinical Decision Support Systems Telemedicine Data Processing and Coding Biomedical Signals Biomedical Imaging Systems Biomedical Pattern Recognition Presentation of student projects
	1213862 1220862	Introduction to Computer Vision (Elective)	3+0+0	4	Introduction to computer vision Geometric camera models Light and shading Color Binary images, topology, morphology Linear filters Local image features Local image features Texture Stereo Segmentation Motion Tracking Deep learning Project presentations
	1213864 1220864	Computer and Network Security(Elective)	3+0+0	4	Router and Routing Internal-External Gateway Protocols RIP Protocol Application EIGRP Protocol IGRP Protocol OSPF Protocol Midterm Subneting Applications VLSM and CIDR VLAN and Management STP Protocol DHCP, NAT configuration Other Topics Other Topics
	1213870 1220870	Fundamentals of Fuzzy logic(Elective)	3+0+0	4	Fuzzy Logic Concept Fuzzy sets and membership functions Fuzzy set union and intersection Components of fuzzy systems Mamdani fuzzy inference system Sugeno (TSK) fuzzy inference system Fuzzy Control Systems Fuzzy Rule-Based Classifiers Neuro Fuzzy Systems Fuzzy Clustering Methods Optimization Algorithms Parameters optimization of Fuzzy Systems Parameters optimization of Fuzzy Systems Fuzzy System Applications

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8. PERIOD TECHNICAL ELECTIVE COURSE POOL	1213872 1220872	Introduction to Information Engineering(Electivel)	3+0+0	4	Introduction The Language of First-Order Logic Expressing Knowledge Resolution Reasoning with Horn Clauses Procedural Control of Reasoning Rules in Production Systems Object Oriented Representation Structured Deions Inheritance Defaults Vagueness, Uncertainty, and Degrees of Belief Explanation and Diagnosis Actions Planning
	1213874 1220874	Algorithm Analysis (Elective)	3+0+0	4	Introduction to algorithm and analysis. Asymptotic notations Complexity of recurrence algorithms: Induction, deduction, master theorem Greedy algorithms Divide and conquer algorithms Quick sort, merge sort, heap sort. Dynamic programming Amortized analysis Hash Tables Graph algorithms Linear time sorting algorithms NP, NP Complete, NP hard problems Linear programming Parallel programming algorithms Example

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