Faculty Of Engineering

Department Of Computer Engineering

Course Contents

1st Semester

Compulsory Courses: (Theory Practice Credit ECTS Group)

LNG115 General English 1 (2 0 2 2 G)

Personal Pronouns, Possessive Adjectives, Days of the Week, Numbers, Articles, Plural Nouns, Demonstrative Adjectives, Colors, Imperatives, Suggestions, Present Simple, Question Forms, Question Words, General Revision of Present Simple. Verb Conjugations, Question Forms, Telling the Time, Whose…?, Question Words. Prepositions related to time. Expressing Ability, Present Continuous, Weather Conditions, Seasons, Comparison between Present Simple and Present Continuous.

GNL105 Turkish Language 1 (2 0 2 2 G)

Current issues of the Turkish language, language-culture, language-thought, language-communication, importance of Turkish among world languages, history of the Turkish language, scripts used by Turks, Spelling and Punctuation Rules, Expression rules and types, Paragraph knowledge and types of paragraphs, Problems of Turkish and language disorders, Language mistakes, Foreign words in Turkish, Composition writing rules, Expression disorders.

FEF111 Physics 1 (3 0 3 4 TB)

SI unit system and unit analysis, Vector operations, Motion, Newton's Laws and Applications, Static Equilibrium Applications, Work and Energy, Power, Momentum and Types of Collisions, Rotational Dynamics, Angular Momentum, Waves, Oscillations and Wave Dynamics, Measurement and Uncertainty, Unit and Dimension Analysis, SI unit system, Length, Mass, Time Standards, Error Analysis, Graphical Analysis and Data Interpretation. Basic measurement tools and usage, Light and Electromagnetic Waves, Mechanics, Dynamics and Optics experiments.

FEF121 Physics Lab. 1 (0 2 1 3 TB)

Measurement and unit systems, unit and dimension analysis, physical quantities and basic measuring tools, Graphical methods and data analysis, Error analysis and uncertainty, Caliper, micrometer and similar measurement tools, Vectors and operations, Experiment 1: Determining the components of a vector, Torque and Parallel forces, Kinematics, basic motion experiments, Newton's principles and circular motion experiment, Energy Conservation, Basic Optics experiments, Diffraction and Interference, Simple Pendulum,

Hooke's Law and Spring Pendulum, Radioactivity simulation, Determination of viscosity coefficient.

MAT121 Mathematical Analysis 1 (4 0 4 7 TB)

Functions, Specially defined functions, Limit, Continuity, Derivative, Differentiation rules, Applications of Derivative. Differentials, Curve sketching, Integral, Definite integrals and properties, Applications of Integrals. Surface areas of revolution, Moment and Center of Mass.

BIL101 Introduction to Computer Engineering (2 0 2 4 M)

Introduction to Computer Engineering, Boolean Algebra, Algorithms and Flowcharts. Software Engineering, Operating Systems, Microprocessors, Computer Networks, Number Systems, Data Compression, System and Software, Data/Data Structures. Database Management Systems, Query Language (SQL), Hardware.

BIL121 Programming 1 (3 1 3.5 6 M)

C environment, Source and object programs, Preprocessor, Compiler, Assembler, Linker, and Builder, structure of C program blocks, Loops: for, while, do-while, Decision-making structures: if, else-if, switch, Conditional and comparison operations, Preprocessor directives. Arrays, Strings, Pointers. Function communication, pointers and arrays, Structures, Unions and ROM BIOS, Memory and addressing. File structures. Design-based programming, C++ and object-oriented programming.

University Elective 1 (3 0 3 2 G)

2nd Semester

Compulsory Courses: (Theory Practice Credit ECTS Group). Semester

LNG116 General English 2 (2 0 2 2 G)

Demonstrative pronouns, telephone conversations, dates, past tense, past tense expressions, regular verbs, past tense, irregular verbs, expressions such as “there is” and “there isn't” for indicating presence in a place, past tense forms. Countable and uncountable nouns, articles. Comparison of adjectives and degrees of superiority. Future tense expressions, plans and predictions, adverbs of manner, frequently used adverbs, phrasal verbs with TO. Articles, Present Perfect Tense and Simple Past Tense, irregular verbs.

GNL106 Turkish Language 2 (2 0 2 2 G)

Oral expression, definition and scope of speaking, importance of speaking, features of oral and written expression, Principles of beautiful, effective and correct speaking, common speaking mistakes, and features of Turkish speech. Types of speech, types of oral expression, types of written expression, official correspondence, scientific research methods, preparation of scientific reports, citation, bibliography and footnote rules.

FEF112 Physics 2 (3 0 3 4 TB)

Coulomb’s Law, Concepts and Applications of Electric Field and Potential, Gauss's Law, Capacitors and Technical Application Areas, DC Circuit Analysis Concepts and Applications, Basic concepts and technical applications of magnetism. Charge-Current-Magnetic Field Interactions; Induction Currents and technical application areas: Basic concepts and applications of AC circuit elements: Series-Parallel RLC Circuit Analysis, Phasor Diagrams; Introduction to Maxwell's Equations and Wave Equations. Basic concepts of electricity and magnetism, ammeter, voltmeter, ohmmeter measuring tools, measurements with multimeter. Electric circuit elements, basic electric circuits and circuit analysis. Electricity and magnetism experiments, electromagnetic induction and applications, Maxwell’s equations.

FEF122 Physics Lab. 2 (0 2 1 3 TB)

SI unit system, Basic concepts of electricity and magnetism, Units and calculations. Introduction of multimeter, ammeter, voltmeter, ohmmeter, Taking sample measurements. Reading resistor color codes, Series and parallel connected circuits, DC and AC circuit analyses. Determining the internal resistance of a battery. Ohm’s Law, materials that conform and do not conform to Ohm’s Law, Kirchhoff’s Law and applications. Current balance. (Measuring the magnetic force on a current-carrying wire). RC circuits, analysis of capacitors. AC circuit elements, RLC circuit analyses, Transformers. Electromagnetic induction. Maxwell’s Equations.

MAT122 Mathematical Analysis 2 (4 0 4 7 TB)

Sequences and Series, Power series, Function expansions into series. Vectors. Matrices and Determinants, Vector-valued functions, Multivariable functions, Partial derivatives, Double

and triple integrals, Line integrals, Green's Theorem. Surface integrals, Stokes' Theorem, Divergence Theorem.

BIL122 Data Structures (2 1 2.5 5 M)

Basic data types and concepts. Pointers and their use, One-dimensional and multi-dimensional arrays, Pointers and addressing, Pointer and function concepts, Linked list, Use of Struct and Union, Linked list implementations, Stack structures, Basic stack operations, Queue and queue applications, Tree data structures and data structures, Tree applications, Data compression.

BIL152 Logic System Design (3 0 3 5 C)

Number systems, fixed and floating-point numbers. Boolean algebra and Boolean operations. Simplification of Boolean functions: Karnaugh and McCluskey simplification methods. Implementation of Boolean functions: Logic gates, multiplexers, ROM memory, implementation using PLA and PAL. Sequential circuit elements: Flip-flops, monostable multivibrators, astable multivibrators. Analysis and synthesis of clocked circuits. State diagrams and state tables. State reduction. State assignments and transition lists. Moore and Mealy machines. Counters. Analysis and synthesis of level-mode circuits. Master-mode circuits. Primitive flow table and state reduction. Determination of equivalent states using implication charts. Implementation of feedback logic circuits using logic gates. Race conditions and hazards.

University Elective 2 (3 0 3 2 E)

3rd Semester

Compulsory Courses: (Theory Practice Credit ECTS Group)

ENG126 Engineering Mathematics 1 (3 0 3 5 C)

With engineering applications: systems of linear equations, matrices and matrix operations, solution of linear systems. Determinants and their properties, real vector spaces, linear independence, homogeneous systems. Eigenvalues and eigenvectors, various engineering applications.

ENG211 Numerical Analysis (3 0 3 5 C)

Introduction to MATLAB. Matrix operations, introduction to numerical analysis. Error definition. Absolute and relative error, solution of linear systems, indirect methods, solution of nonlinear equations, interpolation polynomials. Numerical differentiation: Taylor series, numerical differentiation formulas. Numerical integration, solution of differential equations, solution of higher-order and partial differential equations, classification of differential equations.

BIL223 Electronic Circuits (3 0 3 5 C)

Introduction to the application areas of Electrical and Electronics Engineering, semiconductor properties and related circuit elements, DC and AC concepts, rectifiers and voltage regulators, characteristics of RC filter circuits in time and frequency domains, decibel and frequency characteristics. OPAMP circuit structures and features, linear and nonlinear applications, differentiation and integration circuits, comparators, Schmitt trigger and oscillator circuits, analog modulation. AM and FM definitions and circuits. Pulse modulation circuits, PWM circuits and applications.

BIL225 Logic Design Lab (0 2 1 3 C)

Logic circuits, Boolean algebra, basic logic gates, combinational logic circuits, decoder, multiplexer, demultiplexer, adders and subtractors, sequential circuits, flip-flops, counters, registers, digital measurement systems, DAC, ADC, EPROM applications and related experiments.

BIL231 Algorithms (2 1 2.5 5 C)

Introduction to algorithms and programming logic, Pseudo code and flowcharts, Basic loop and programming concepts, recursive functions, Clustering algorithms, Number Theory and algorithms with numbers, Golden Ratio and Fibonacci series, Sorting algorithms, Graph Theory, Maze algorithms, Search algorithms, Travelling Salesman Problem, Eulerian Paths and optimization problems. Mathematical algorithms in engineering.

BIL233 Object-Oriented Programming (3 1 3.5 7 M)

Classes and Objects, Fundamentals of programming with JAVA, Data Types, Methods, Data Abstraction and Encapsulation, String, Arrays. Classes and Inheritance Concept, Subclass,

Abstract Classes and Methods, Code Reusability, OOP Thinking, Polymorphic Variables, Garbage Collection, Types of Polymorphism, Overriding, Overloading, Abstract Methods, Interfaces, AWT/Swing Applet (error catching/handling graphics), AWT/Swing Applet (collection classes, generic classes), AWT/Swing Applet (event-driven programming), Working with Collections, Reflection, Object-Oriented Design with Reflection.

4th Semester

Compulsory Courses: (Theory Practice Credit ECTS Group)

ENG227 Engineering Mathematics II (3 0 3 5 TB)

With engineering applications: First-order differential equations, differential equations and mathematical models, general and specific solutions through integrals. Mathematical models and numerical methods. Higher-order linear equations, mechanical vibrations, non-homogeneous equations and equations with uncertain coefficients. Introduction to systems of differential equations: First-order systems and applications, Linear Differential Equation Systems, Laplace Transform Methods.

ENG232 Probability and Statistics (3 0 3 5 TB)

Introduction to Statistics. Data Arrangement, Simple Series, Frequency Series. Grouped Series and Total Values, Cumulative Frequencies Increasing and Decreasing, Relative Frequencies and Operations. Arithmetic Mean, Weighted Arithmetic Mean, Root Mean Square, Geometric Mean, Mode, Median. Divisors, Coefficient of Variation, Standard Deviation, Variance, Skewness Measures, Indexes. Set Operations. Probability Definitions, Introduction to Random Variables, Conditional Expected Values and Variance Concept, Discrete and Continuous Probability Distributions.

BIL226 Electronics Lab. (0 2 1 3 M)

Introduction to Laboratory and Electronic Workbench software (EWB), EWB rectifier circuits, EWB regulator circuits. OPAMP-based summing circuit with EWB, EWB comparator circuits. OPAMP-based summing circuits. OPAMP DAC circuits. OPAMP filter circuits. OPAMP comparator circuits, OPAMP Schmitt Trigger. OPAMP Oscillator circuits.

BIL234 Programming Languages (2 1 2.5 5 M)

Language Paradigms, Program Syntax. Syntax and Semantics, Language Systems, First Look at a Programming Language, Types. Second Look at a Programming Language, Polymorphism and Scope, Third Look at a Programming Language, Variables and Memory Spaces, Fourth Look at a Programming Language, Memory Management and Object Orientation, Parameters.

BIL242 Database Systems (3 1 3.5 6 M)

Information Systems General Concepts, Setup Architectures, Reasons for using DBMS, Data Modeling/Requirements, Conceptual Modeling/Object-Oriented Conceptual Modeling/Unified Modeling UML, Logical Modeling, Physical Modeling. Relational Algebra, Case Studies, Functional Dependencies, Normalization, Structured Query Language DDL, DML, DCL, Basic Data Query Commands and Sorting, Joining, Single-row Functions, Multi-row Grouping, Viewing (View).

EEE214 Signals and Systems (3 0 3 6 C)

Signals and their properties; signal processing; sampling; power and energy in signals, convolution; systems and their properties; time and frequency analysis of continuous-time periodic signals, Fourier series and Fourier transforms; time and frequency analysis of discrete-time signals, Fourier series and Fourier transforms; Laplace transform and Inverse Laplace transform; system frequency response, Z-transform.

5th Semester

Compulsory Courses: (Theory Practice Credit ECTS Group)

GNL101 Atatürk's Principles and History of the Turkish Revolution I (2 0 2 2 C)

An overview of the emergence, rise, stagnation, decline, disintegration, and collapse of the Ottoman Empire, and the causes of the Turkish Revolution. Events during the disintegration of the Ottoman Empire, World War I, occupations, societies. After the Armistice of Mudros, Mustafa Kemal Pasha’s activities and his journey to Anatolia, the opening of the Turkish Grand National Assembly, the Treaty of Sèvres, establishment of the regular army, Greek offensive and Western Front battles, Mustafa Kemal Pasha's leadership, the Battle of Sakarya, the Great Offensive, the signing of the Armistice of Mudanya, and the Treaty of Lausanne.

BIL317 Discrete Mathematics (3 0 3 4 E)

Propositional logic, types of proofs, basic principles of counting, permutations, combinations, Pigeonhole Principle, sequences and summations, binomial coefficients, applications, recursive definitions and algorithms, advanced counting techniques, introduction to recurrence relations, types and solutions of recurrence relations, applications. Generating functions: definitions and examples. Computation and applications of generating functions, graphs: definitions and examples, trees.

BIL321 Data Communication (3 0 3 4 C)

Covers the general structure of data communication, digital and analog data transmission techniques, data coding mechanisms, data sampling techniques. Includes the five-layer protocol structure of computer networks, focusing on the lower two layers.

BIL331 Microprocessor Systems (3 0 3 5 C)

Central Processing Unit (CPU): CPU registers, arithmetic and logic unit, status flags, execution of microinstructions, microprogramming and control unit, CPU pins. Memories: ROM, RAM, PROM, EPROM, E2PROM. Memory decoders and memory connections to the CPU, parallel I/O: programmed I/O, interrupt-driven I/O, direct memory access, serial I/O. Programming of microcomputers: source and target programs, assembly language and assembler directives, memory addressing methods, CPU instruction set, real CPUs, microcomputer system design, applications.

BIL333 Computer Graphics (3 0 3 5 E,C)

Display devices, hard-copy devices, user-interactive input devices, points and lines, 2D coordinate systems, homogeneous coordinates, 3D transformations and projections: scaling, clipping, translation, rotation, perspective transformations, plane curves, space curves: cubic, parabolic, Bézier curves, B-spline curves, surface representation: surface patches, ruled surfaces, Bézier and B-spline surfaces, raster scan method, scan-line algorithms, Bresenham's algorithm, area filling.

Departmental Elective 1 (3 0 3 5 ECTS)

Departmental Elective 2 (3 0 3 5 ECTS)

Departmental Elective Courses

MEE322 Control System Design (3 0 3 5 ECTS)

Explanation of control terms; Modeling the system in the frequency domain. Modeling the system in the time domain, Time response; Steady-state error; Stability; Root locus technique; Frequency response techniques: Bode diagram, Nyquist diagram; Design using state space, Explanation of control terms.

EEE328 Digital Signal Processing (3 0 3 5 ECTS)

Introduction to digital signal processing and its applications, principles of analog-digital signal Input/Output interfaces for real-time digital systems; discrete Fourier transform; fast Fourier transform. Z-transform and its applications in signal processing, convolution and correlation operations, digital filter design principles, finite impulse response (FIR) filter design, window-based FIR filter design, frequency-sampling FIR filter design, recursive (IIR) digital filters, recursive (IIR) digital filter design and adaptive digital filters.

BIL327 Web Programming (3 0 3 5 ECTS)

Introduction to C# and .Net Framework, Web Form fundamentals, Web Controls, Validations and Rich Controls. State Management, Master Page, WebSite Navigation, AJAX, ADO.NET Data Binding Data Controls, XML, Web Security, Web Services, MVC design.

BIL351 Database Management (3 0 3 5 ECTS)

Introduction to Database Management Systems, Data Storage and Indexing, Storing Data on Disk and in Files, File Organization and Indexes, Tree-Structured Indexes, Hash-Based Indexes, Query Optimization, External Sorting, Evaluation of Relational Operations, Query Optimization, Query Optimizer, Transaction Management, Concurrency Control, Crash Recovery, Parallel and Distributed Systems, Data Mining.

BIL455 Automata Theory (3 0 3 5 ECTS)

Introduction to computation theory, Basic concepts and proof methods, Regular expressions, Finite automata, Regular languages and regular grammars, Properties of regular languages, Context-free languages, Pushdown automata, Turing machines.

6th Semester

Compulsory Courses: (Theory Practice Credit ECTS Group) Semester

GNL102 Principles of Atatürk and History of Turkish Revolution 2 (2 0 2 2 G)

Reforms in the political field. Attempts at transition to a multi-party system. Developments in the field of law. Developments in the fields of education, culture, and health. Economic policy in the early years of the Republic. Turkish foreign policy during the Atatürk era, Atatürk's Thought System and Basic Principles, World War II and Turkey, Political developments in Turkey (1945-1980), Domestic political developments in Turkey from 1980 to present, Turkish foreign policy from 1960 to present, Turkey's geopolitical position.

BIL342 Operating Systems (3 0 3 6 ECTS)

Role of the Operating System, Operating System Architecture, Process Concept, Thread Mechanism, CPU Scheduling, Process Synchronization, Deadlock, Memory Management, Virtual Memory Management, File System, File System Implementation, Storage Mechanisms, I/O Systems.

BIL352 Computer Architecture (4 0 4 8 ECTS)

Computer systems: Microprocessor systems, architectural developments, cache organizations, read/write mechanisms, memory management, virtual memory systems, segmentation. Serial I/O method, parallel I/O; interrupts and direct memory access controllers. Magnetic storage devices, magnetic recording techniques, optical storage devices, CRT and LCD displays. CRT and LCD controllers, text and graphic memories, pipelined processor design. Shared memory multiprocessor systems, multiprocessor programming, error detection and correction techniques.

BIL382 Microprocessor-Based System Lab (0 2 1 4 ECTS)

Design of a basic microcomputer system, microprocessor functional generator, interrupt-driven I/O, serial I/O. Direct memory access, CRT controller design. Stepper motors, software implementation of arithmetic operations. Single-chip computers, secondary storage devices.

Departmental Elective 3 (3 0 3 5 ECTS)

Departmental Elective 4 (3 0 3 5 ECTS)

Departmental Elective Courses

ENM335 Operations Research (3 0 3 5 ECTS)

History and development of Operations Research, deterministic and probabilistic models, the art of model building and problem-solving, role of linear programming in mathematical programming, linear decision models, formulation of linear decision models, solution of linear programming models, graphical, algebraic, simplex methods, revised simplex method,

use of software for solving programming models, duality and dual simplex method, sensitivity analysis, transportation and assignment models, network models.

BIL334 Microcomputer-Based System Design (3 0 3 5 ECTS)

Real CPUs and microcontrollers. Microcomputer architecture. Adding memory to a computer. Interfacing and programming of I/O units to the computer, serial I/O device interfacing and programming, use of computers for control, testing devices and identifying hardware faults, programming microcomputers: source and target programs. Software development tools. Industrial applications.

BIL336 Mobile Programming (3 0 3 5 ECTS)

Android Fundamentals, GUI, Android Operating System GUI, Android OS GUI (Data), Android OS GUI (List), Android OS GUI (MAP), Android OS GUI (FORM), Android Service Applications, Android Sensor Applications, Android Native Development Kit (NDK), Mobile Web Development, Publishing on Market.

BIL344 Optimization (3 0 3 5 ECTS)

Concept of Optimization. Classification of Optimization Problems, Nonlinear Models and Solution Techniques, Substitution and Elimination Methods, Gradient Method, Lagrange Multipliers, Karush-Kuhn-Tucker Conditions, Introduction to Linear Models, Production Planning Problems, Transportation Problems, Minimum Covering Problems, Discrete Planning Problems, Resource Allocation Problems.

BIL346 Image Processing (3 0 3 5 M)

Introduction to image processing, general concepts in image processing, linear systems, probability, random variables, estimation, sampling, spectral overlap, quantization, representation of images with unitary transforms. Point operations for image enhancement, histogram operations, spatial filtering, frequency domain filtering, restoration, reconstruction, Radon transform, filtered back projection, modeling of degradations and imaging functions, inversion, image segmentation, image compression, pattern recognition.

BIL354 Data Security (3 0 3 5 M)

Classical encryption techniques and algorithms: DES, Block Ciphers, Blowfish, RCS, CAST-128. Confidentiality: Key distribution, random number generation; Public key cryptography, Number Theory. Message authentication and hash functions. Hash and MAC algorithms, Digital signature and verification protocols. Authentication applications. Elliptic curve cryptography, Chaotic encryption. Discrete logarithms, Information theory. Error correction codes. Intrusion and malware threats, Firewalls.

BIL356 Software Engineering (3 0 3 5 M)

Introduction to Software Engineering. Concept of Ethics and IEEE Code of Ethics. Socio-Technical System Structure, Software Development Life Cycle, Agile Systems, Extreme

Programming. Verification and Validation. Software Testing, Project Management, Requirements Analysis, Cost Analysis, Service-Oriented Architectures, Event-Driven Architectures.

7th Semester

Compulsory Courses: (Theory Practice Credit ECTS Group)

BIL441 Computer Networks (3 0 3 5 M)

Basic principles of computer networks, concept of protocol, TCP/IP protocol stack, Network Layer Protocols, Transport Layer Protocols, Data Link Layer Protocols. These protocols are studied layer by layer from the application layer down to the network layer.

BIL451 Informatics Design Project (0 4 2 7 M)

Determining project topics. Analyzing the project topic. Resource research and evaluation. Identifying solution methods, acquiring and utilizing solution tools, interim project reporting, implementing solution tools, testing developed hardware or software systems, fixing deficiencies in developed systems. Preparing reports and presentation slides.

BIL453 Computer Systems Lab. (0 2 1 3 M)

Experiments, transputers, dynamic web programming, distributed programming in Java. Programmable logic controller (PLC). Process monitoring in Unix systems, distributed programming in Unix systems, Windows programming and multi-user operation, rough surface generation, reverse perspective transformation, area filling.

Department Elective 5 (3 0 3 5 ECTS)

Department Elective 6 (3 0 3 5 ECTS)

Department Elective 7 (3 0 3 5 ECTS)

Department Elective Courses

BIL423 Biomedical Instrumentation (3 0 3 5 ECTS)

Measurement of medical and physiological parameters, Transducers, sensor characteristics and measurement techniques. Sensor circuits, Analog measurement circuits. Properties of electrical signals beneficial for human health, Defibrillator circuits, their characteristics and design. Measurable physical values and measurement methods of the circulatory system, Processing of ECG signals, analog and digital measurement and display systems, Measurable physical values and measurement methods of the respiratory system, Measurement of gas and liquid flow rates/quantities, Stimulators, circuit structures and design methods, Current biomedical signal processing techniques.

BIL443 Windows Programming (3 0 3 5 ECTS)

Introduction to Java language. Defining objects in Java, Events and event functions. Windows objects and API functions. Windows drawing operations. Basic menu operations, Memory operations with events and functions. Using graphics interface in Java programming. Writing 3 different types of events, Action, Event object, Anonymous Events. Java and Database

JDBC, drivers and patterns, Data transfer between applications. File operations and sequential files. Direct access files.

BIL457 RFID Technology (3 0 3 5 ECTS)

Automatic Identification Systems, Image Processing, Biometric Systems, IRDA, Barcode Applications. Frequency and Wave Theory, RFID Frequencies and Applications, Tag Types, Tag Selection, Reader and Antenna Technologies, RFID Applications. Application Planning and Solution Matrix, Application and Environmental Testing, Standards, Security and Risk Management.

BIL460 Data Mining (3 0 3 5 ECTS)

Introduction to Data Mining, Data Input: Concepts, Examples, Attributes. Data Output: Information Presentation. Algorithms: Basic Methods, Statistical Model, Decision Tree Algorithms: Basic Methods, Construction rules, Association rule Algorithms: Basic Methods, Linear Model, Instance-based learning Algorithms: Basic Methods. Clustering, Weka application, Classification rules with decision trees, Extended association rules, Bayesian Networks, Clustering and Data Transformation.

BIL461 Parallel Computers (3 0 3 5 ECTS)

Classification of parallel computer systems, Petri nets, Concept of parallel processing. SISD computers and multiprocessor CPUs. Pipeline computers; MISD computers, linear and nonlinear computers. Asynchronous parallelism, Structure of MIMD systems, synchronization, MIMD programming languages and coarse grain parallel algorithms, Structure of SIMD systems. Communication in SIMD systems. SIMD programming languages and MasPar algorithms, Parallel programming languages, Parallelism status; parallelization and vectorization.

BIL463 Fuzzy Logic (3 0 3 5 ECTS)

Basic Definitions, Set Operations, Inter-set Operations, Control Definitions and Application of Fuzziness. Automatic control system applications. Maximum Minimum operations. Optimum selection, Optimum selection applications, Establishing Fuzzy Database System. Applications of the Fuzzy Database System. Fuzzy Derivative, Fuzzy Integral, Graphs and Fuzzy Graph Concept.

BIL465 Cloud Computing (3 0 3 5 M)

Definitions of Cloud Computing, Grid Computing. Network Operating Systems, Virtualization, Service-based systems. X as a service. Model Selection, Cloud Computing Models, Cloud Computing Protocols, Open Source Applications, Microsoft Azure Services, Amazon Cloud Services.

BIL469 System Programming (3 0 3 5 M)

Introduction to Linux Kernel architecture, layers and programming between computer hardware architecture and user interface. Use of system calls, security perspective on Kernel structures, device driver programming, memory management, parallel port programming.

8th Semester

Compulsory Courses: (Theory Practice Credit ECTS Group)

BIL452 Artificial Intelligence (3 0 3 6 M)

Intelligence, Rule and Decision Systems, Heuristic Problem Solving, Information Modeling. Graphs, Trees and Search Algorithms, Game Theory and Minimax, Optimization and Simplex, Genetic Algorithms, Ant Colony Algorithm, Fuzzy Logic, Artificial Neural Networks, Particle Swarm Optimization, Artificial Intelligence Programming – Prolog.

ENG402 Graduation Project (0 4 2 9 M)

Determination of project topics. Analysis of the project subject. Literature review, evaluation of sources, determining the solution method, identifying and obtaining solution tools. Use of solution tools, interim project report, implementation of solution tools, development and testing of hardware or software systems, fixing deficiencies in the system, thesis writing, thesis printing.

GNL450 Career Planning (2 0 2 0 G)

Department Elective 8 (3 0 3 5 M)

Department Elective 9 (3 0 3 5 M)

Department Elective 10 (3 0 3 5 M)

Department Elective Courses

BIL444 Digital Audio (3 0 3 5 M)

Physics of sound. Basics of digital audio: sampling theorem, aliasing, quantization, dither. Digital audio recording: pulse code modulation, dither generator, low-pass filters. A/D converters, various encodings. Digital audio playback: D/A converters, digital filters, timebase correction. Error correction methods. Magnetic recording. Digital audio tape. Optical disk storage. Perceptual coding. PC audio. Internet and network audio. Digital signal processing. Digital radio and television broadcasting.

BIL446 E-Commerce System Design (3 0 3 5 M)

Introduction to E-Commerce, E-Commerce Business Models and Concepts. E-Commerce Infrastructure: Internet, Web, Mobile Platform. Creating the E-Commerce Interface: Websites and Mobile Sites. E-Commerce Security and Payment Systems, E-Commerce Marketing Concepts: social, mobile, local. E-Commerce Marketing Communication, Ethical, Social, and Political Issues in E-Commerce. Project Submission.

BIL454 Test Engineering (3 0 3 5 ECTS)

Management issues. Feature-based test techniques. Structure-based test techniques. Fault-based test techniques. Experience-based test techniques. Analysis techniques. Software

characteristics testing, Functional and usability testing. Efficiency testing. Security testing. Reliability testing. Sustainability testing. Testing in different environments.

BIL456 Logical Programming (3 0 3 5 ECTS)

Automated theorem proving. Logical inference, Predicate logic, Classical logic, First-order theories, interpretations and models, unification, fixed points, declarative meaning, finite failure, declarative error detection, deductive databases, query evaluation, soundness constraints, full Herbrand interpretations, meaning of continuous processes, Prolog. List processing, atoms, Prolog examples, Lisp.

BIL458 Bioinformatics (3 0 3 5 ECTS)

Bioinformatics and Mathematical Genetic Codes, Matrix and Symmetry Techniques, Biological sequences, sequence alignment and statistics, DNA and Knot theory, Protein structure, Geometry and Topology, Biological networks and Graph Theory, Biological Systems, Fractals, Sparse Matrices and Biological Algebra, Evolutionary Trends and the central dogma of Informatics, Affective Informatics, Computational approaches to Bioinformatics. Construction of biological databases. Visualization and Data Mining. Bioinformatics tools.

BIL462 Artificial Neural Networks (3 0 3 5 ECTS)

Artificial neural systems: Neural computation, history of ANNs, fundamental concepts and models of ANNs: Biological neurons, ANN models. Neural processing, learning and adaptation, neural network learning rules. Single-layer neural classifiers, Multi-layer feedforward networks, Single-layer recurrent networks. Associative memories, Self-organizing and competitive networks, Implementation of neural algorithms and systems. Realization of neural networks.

BIL467 Compiler Design (3 0 3 5 ECTS)

Lexical analysis. Parsing. Abstract syntax tree, Semantic analysis, Activation records, Intermediate code generation. Basic blocks and control flow, Instruction selection, Liveness analysis, Register allocation, Code generation. Integration of all modules.

BIL468 Network Security (3 0 3 5 ECTS)

Cryptographic knowledge required for network security. Basic algorithms and encryption mechanisms in cryptology. Functioning and types of symmetric key algorithms, Asymmetric key algorithms. Security challenges in computer networks and their corresponding solutions. Wireless network security. Optical network security. Additionally, each student presents an individual presentation on a specific topic.

BIL470 Computer Interface Techniques (3 0 3 5 ECTS)

Connecting I/O devices to a PC, Establishing the connection, Device enumeration. Selection of USB I/O devices. I/O device development environment, PC host software, Design

example: Buttons and LEDs. Completing basic design. Extending the design, Setting up I/O bridges, High-volume data transfer, Audio device interfacing, Digital video applications, Hubs, Designing portable and handheld systems.