

**TRD 109 Turkish Language I (2 0 2)**

What is Language. The place and importance of language as a social institution in the life of a nation; the relationship between language and culture, the position of the Turkish language among world languages, the development and historical periods of the Turkish language, the current status and spread areas of the Turkish language, sounds in Turkish and their classification, phonetic features of Turkish and rules related to phonetics, syllable knowledge, spelling rules and their application, punctuation marks and their application.

**YDI 107 English I (2 0 2)**

Simple Present Tense, Articles, Numbers, Present Progressive Tense, Possessive Adjectives, can, Singular and Plurals, How Many, How Much, Some, Any, A Little, A Few, Some Prepositions.

**YDI 109 Advanced English I (2 0 2)**

Reading strategies, organization of discussion composition, activities for everyday language use, texts on current topics, vocabulary development exercises.

**FIZ 111 Physics I (3 2 4)**

Vectors, equilibrium, moment of a force, linear motion, Newton's second law, planar motion, work and energy, impulse and momentum, rotational motion, elasticity, harmonic motion.

**MAT 161 Mathematics I (4 0 4)**

Real and complex numbers, sentences, permutations, inversion and combination calculations, probability, group, ring, field, vector spaces, length, angle and projection calculations, matrices and determinants, linear equation systems.

**ABM101 Algorithm and Programming (3 2 4)**

Problem solving. Input-Process-Output process. Algorithm design. Certainty, finiteness, effectiveness, input-output in algorithms. Constants, variables, and expressions. Arithmetic, relational, and logical operators. Input-Output statements. Condition and loop statements. Vector and matrix representations. Character data processing. Subroutines and function subprograms. Recursion. Applications in a structural programming language. Introduction to Object-Oriented Programming and introduction to a suitable programming environment. Basic concepts in this language (expressions, data types, variables, control structures, arrays, ...). Divide and Conquer Method. Modular software development (methods and classes). Class variables and local variables. Form elements. Introduction to Event-Driven Programming. Dynamic arrays. Linked lists. Search and sorting algorithms. Files. Choosing appropriate structures in algorithms. Developing efficient algorithms.

**ABM103 Fundamentals of Digital Forensics Engineering (3 2 4)**

Introduction to cybercrimes. Digital forensic technologies. Data recovery from disks and file systems. Evidence collection, ownership verification, data validation, preservation, and storage. Recognition and identification processes. Windows, Linux, and Mac-OS architectures. Analysis of file structures, network analysis, autonomous system analysis. Digital forensic methodologies, algorithms, protocols, and tools. Recent developments in digital forensics.

**TRD 110 Turkish Language II (2 0 2)**

Turkish derivational suffixes and their applications, general information about composition, plans and applications to be used in writing compositions, noun and verb conjugations in Turkish, forms of expression in composition and their applications, usage of adverbs and prepositions in Turkish.

**YDI 108 English II (2 0 2)**

Simple Past Tense, Auxiliary Verbs (Be, Do), Must, Have to, Has to, Going to Form, Adverbs of Time, Regular and Irregular Verbs, Possessive Pronouns

**YDI 110 Advanced English II (2 0 2)****FIZ 112 Physics II (3 2 4)**

Electricity, electrostatics, Coulomb's law, electric field, potential, capacitance, properties of dielectrics, electrokinetics, current and resistance in direct current circuits, alternating currents.

**MAT162 Mathematics II (4 0 4)**

Definition and types of functions, absolute value functions, floor functions, trigonometric functions, sign functions and their graphs, exponential and logarithmic functions and their applications, sequences, continuity and limits, derivatives, differential and approximate calculation applications, integrals.

**ABM102 Programming Languages (3 2 4)**

Fundamental concepts of Programming languages and basic programming paradigms, exemplification of introduced concepts, structures provided by various programming languages such as Pascal, C, C++, and Java.

**ABM104 Computer Systems (3 2 4)**

Computer systems, computer hardware: central processing unit (CPU), motherboard, power supply unit, cooling units, external data storage devices, control units, ports, main memory units and memory types, batteries, expansion cards (PCI, AGP, network, graphics, modem, audio, optical drives, etc.), and performance factors. Software: System software, utility software, application software, conversion software, specialized commercial software, and performance factors. Peripheral Devices: Printers, plotters, cameras, scanners, keyboards, mice, monitors, graphics card drivers, multimedia devices, storage devices, network components, portable drives, plug-and-play devices, and performance factors. Computer System Design: Needs analysis for computer systems, optimal hardware assembly, determining system specifications, and performance factors. Laboratory Practices: Safety procedures in laboratory work. System installation, configuration, and testing. Software maintenance, hardware maintenance, and file management.

**AIT209 Atatürk's Principles and History of the Turkish Revolution I (2 0 2)**

The purpose of studying the course on Turkish Revolution History and Atatürkism, the concept of revolution, the collapse of the Ottoman Empire and the causes leading to the Turkish revolution, the fragmentation of the Ottoman Empire, the Mondros Armistice and subsequent events, the situation of the country in the face of occupations and Mustafa Kemal Pasha's reaction, Mustafa Kemal Pasha's arrival in Samsun and the opening of the last Ottoman Parliament, the opening of the Grand National Assembly of Turkey and its taking control of the War of Independence.

### **ABM201 Computer Networks (2 2 3)**

OSI Reference Model, standards of layers (I, V, X standards). Serial communication, types of cables, synchronous and asynchronous communication, bit, character, and frame synchronization, modem communication, connection-oriented and connectionless methods. Bus, ring, and star topologies, Ethernet frame structure, CSMA/CD working principle, ring working principle, repeaters, bridges, switches, and routers, basic industrial network types, data traffic, production techniques, simulation. Internal structure of bridges, routing methods (transparent, spanning tree, etc.), multi-route algorithms. TCP/IP layers, IP addressing classifications, subnetting, IP routing.

### **ABM203 Computer Crime Hardware (2 1 3)**

Basic computer components and terminology, data storage media (magnetic, flash, optical, RAM, etc.), input-output interfaces (integrated drive circuits, SATA, eSATA, USB 1,2,3, FireWire, SCSI, iSCSI, SAS and Fiber Channel, hard disk duplication, principles of validity tests, validity test design, embedded devices, network hardware (NIC, hub, switch, router, modems (cellular, cable, fiber)), GPS devices, network transmission media, add-on devices, portable devices (smartphones, tablets, netbooks), SIMM cards, RFID objects, smart cards, magnetic cards, methods for examining unknown or user-added devices, data extraction, capture, and protection methods.

### **ABM205 Information Security and Cryptography Techniques (3 2 4)**

Introduction to encryption, symmetric encryption methods, cryptanalysis of block encryption methods, hash functions, number theory, public key encryption (Basic and RSA), public key encryption (El-Gamal), elliptic curve-based encryption, secret sharing and threshold encryption, key distribution and management.

### **ABM207 Digital Forensic Laws (3 2 4)**

Introduction to computer crimes, electronic evidence, searching for information in electronic environments, the authorization process for electronic evidence, issues in the search process, search warrants and passwords, wireless phone tracking, seizing electronic evidence, network problems and undefined problems (outside the box), legal protections (written documents, wiretap laws, electronic surveillance, communication laws, obscenity and child pornography: distribution, possession, and monitoring; search and seizure; halting publication; sexual messaging, internet child exploitation, falsified addresses and property crimes in computing, computer fraud and abuse laws, international and national legal regulations in digital forensics, intellectual property crimes, malware and unsolicited emails, identity crimes and threats, internet harassment and defamation, special criminal law topics in cybercrimes, prominent internet security events (the Conficker worm, Stuxnet and Flame, the NSA's TSP).

### **MAT 213 Engineering Mathematics (3 0 3)**

Introduction, formulation of engineering problems, linear equations, matrices and determinants, linear systems, nonlinear equation systems. Numerical methods; ordinary differential equations: first-order, second-order, higher-order differential equations, series solutions of ordinary differential equations, Laplace transforms, systems of ordinary differential equations. Initial value problems, boundary value problems. Partial differential equations, method of characteristics, method of separation of variables, method of variable separation. Integral transformations, numerical methods.

### **IKT215 Engineering Economics (2 0 2)**

What is science? Economy and its problems, production unit and its purpose, production factors, the concept of 'period,' production function and isoquant curves, returns to scale, law of diminishing returns, long-term decision making, costs in the short and long term, revenues of the production unit, profit maximization principle and equilibrium in the production unit, the supply curve of the production unit and industry, shifts of the supply curve, supply elasticities, consumer unit and its purpose, equilibrium of the consumer unit, concept of utility, indifference curves, budget line, explaining consumer behavior with indifference curves and budget line, demand function of the consumer unit, total demand curve, demand

elasticities, price formation and markets, perfect competition market, monopoly market, imperfect competition markets, markets for production factors.

### **İŞL451 Entrepreneurship I (2 0 2)**

Testing entrepreneurial characteristics, business idea development and creativity exercises, Business plan concept and elements (market research, marketing plan, production plan, management plan, financial plan), Workshops for reinforcing business plan elements (market research, marketing plan, production plan, management plan, financial plan).

### **AIT210 Atatürk's Principles and History of the Turkish Revolution II (2 0 2)**

Abolition of the Caliphate, Progressive Republican Party and the period of Takrir-i Sükun, Educational Revolution, Cultural Revolution, Alphabet Revolution, Turkish History Revolution, Turkish Language Revolution, İzmir Economic Congress, Transition to multi-party system, Reforms in women's rights, Hat, clothing and dress reforms, Foreign policy of the Republic of Turkey, Atatürk's principles, political events, Relations between the Grand National Assembly of Turkey and the Istanbul government, Military developments, Kars Agreement, Ankara Agreement, Great Offensive, Mudanya Armistice, Abolition of the Ottoman Sultanate, Lausanne Peace Treaty.

### **ABM202 Network and System Security (2 1 3)**

Introduction to Network Security and Basic Concepts, Risk Assessment, Security Policy, Classification of Threats, Passwords, Access Permissions, Traditional Methods, Public Key Methods, Authentication, Digital Signature, Protocols, Security in TCP/IP Protocols and Services, Firewalls, Virtual Private Networks, Intrusion Detection Systems and Solutions.

### **ABM204 Internet and E-Commerce Security (3 2 4)**

Attacks and Defenses over the Internet, Security Principles, Deterrence, HTTP Servers, Incident Management, HTML Forms, SQL Injections, Java Security, Identity and Access Control, Cryptography, Certificates, SSL, Password Management, Communication Security, SSH, Firewall, VPN, Legal Issues, Contracts, Legislation and Regulations, Web Attacks, Vulnerabilities, Application Attacks, Network Security, Web Server Security, Buffer Overflow.

### **İST216 Statistics and Probability (2 0 2)**

Definition of probability. Probability actions. Application fields of probability and statistics. Discrete probability, randomness, finite probability space, probability measure, conditional probability, Bayes Theorem. Discrete random variables, binomial, Poisson, geometric distributions. Mean and variance. Integer random variables. Continuous random variables, exponential and normal distributions, probability density functions. Calculation of mean and variance, central limit theorem, compound distributions. Linear regression and correlation. Multiple linear regression. Statistical estimation theory. Chi-square test. Curve fitting. Sampling distributions, nature and method of sampling, random approaches to sampling, simple methods, stratified sampling, cluster sampling. Data analysis, graphical and numerical operations. Markov chains, queuing.

### **ABM206 Professional English (3 0 3)**

Basic features of English, grammar rules, analysis of simple and intermediate academic sources related to the profession in line with specific goals, group work to solve translation exercises, short presentations on topics selected by students, discussions in English related to daily life and professional subjects.

**ABM208 Multimedia Information Systems (3 2 4)**

Introduction to multimedia, multidimensional data structures, image databases, video databases, operating system support, system services, user interfaces and devices, multimedia file systems and information models, multimedia files over networks, presentation and ownership verification, multimedia communication systems and applications, knowledge-based multimedia systems, current trends.

**MAT214 Linear Algebra (2 0 2)**

Solution of linear equation systems (Cramer's Rule, Inverse Matrix, Methods for Reducing to Normal Form), matrix and determinant operations, eigenvalues and eigenvectors of matrices. Linear transformations in linear spaces.

**İŞL452 Entrepreneurship II (2 0 2)**

Workshops focused on reinforcing business plan elements (market research, marketing plan, production plan, management plan, financial plan). Writing and presenting a business plan, with attention to important details in the preparation and presentation process.

**ABM301 Database Management Systems (3 2 4)**

Database Processing, Fundamentals of Relational Implementation, Query Languages, Data Modeling, Normalization, Databases and Internet Technologies, Managing Multi-User Databases.

**ABM303 Electronic Evidence and Computer Crimes (3 2 4)**

Introduction to computer crimes and basic concepts. Legal issues in computer crime investigations and systematic approaches to crime investigations using scientific methods. File systems, data recovery, internet tracking, electronic evidence collection and examination procedures and tools.

**ABM305 Operating Systems (3 1 4)**

Introduction to Operating Systems, Computer System Architecture, Operating System Architecture, Processes, Threads, CPU Scheduling, Process Synchronization, Semaphores, Memory Management, Virtual Memory, File System Interface, File System Implementation, Input/Output Systems, Stack Storage Tools, Introduction to C Programming, Comparison of Different Operating Systems, System Architectures.

**ABM307 Cybercrime Investigation Software (3 2 4)**

Data Viewing and Recovery Software, Email Analysis Software, File and Data Analysis Software, Mac-OS Software, Mobile Device Software, Internet Tracking Software, Log Analysis Software, Application Analysis Software, IP Address Tracking Software, Network Monitoring Software, Chat Room Tracking Software.

**ABM309 Cybercrime Investigation Hardware (3 2 4)**

Disk Reading Tools, Signal Jamming Tools, Portable RAID Disk Tools, Imaging Duplicators, Mobile Device Tools, Tableau Forensic Tools, ICS IM Solo 102 Forensic Copier, Faraday Bag, Faraday Data Kit, RAID Devices, HD Imaging Duplicators, Tarantula Analysis Tool, Eclipse Mobile Phone Screenshot Tool.

### **File System Analysis (3 1 4)**

Binary encoding, file formats, categories of computer crimes, network monitoring and analysis, electronic evidence in traditional crimes, file systems (FAT, NTFS, UNIX), analysis of active systems, password-protected files, encrypted files, corporate data security.

### **ABM304 Identification Methods And Biometry (3 2 4)**

Biometric Features, Comparison of Biometric Features, Methods of Digital Representation of Biometric Features, Introduction to Biometric Systems, Operational Modes of Biometric Systems: Data Identification, Recognition, Verification, Monitoring, Steps in Biometric System Development, Various Algorithms for Biometric System Development, Preprocessing of Biometric Features, Feature Set Extraction of Biometric Features, Classification of Biometric Features, Comparison of Biometric Features, Decision Mechanisms in Biometric Systems, Accuracy Analysis and Performance Evaluation of Biometric Systems, Multimodal Biometric Systems, Attacks on Biometric Systems and Ensuring Their Security.

### **ABM306 Web-Based Information Access (3 1 4)**

Fundamental concepts, Zipf's laws in text processing, feedback mechanisms, query languages, operations, and structural queries, access models, Boolean model, vector space model, TF-IDF algorithms, text similarity measures, statistical language models, social network analysis, recommendation systems and data filtering, content-based filtering, user feedback, web mining (clustering, classification, sentiment analysis, log file analysis, etc.), cloud computing (MapReduce, NoSQL, Hive, Pig, etc.), next-generation search engines, advanced search, information extraction, information extraction in multiple languages.

### **ABM308 Labor Law (2 0 2)**

Introduction to law, introduction to labor law, general concepts, rights and obligations imposed on the parties, protection of employees, termination of labor law, collective labor agreements.

### **ABM310 Online Crime Tracking (3 2 4)**

Software for online crime tracking, tracking methods, online malicious software detection systems, real-time data analysis, types of cybercrimes.

### **ABM312 Optimization Techniques (3 2 4)**

Introduction and basic concepts / Unconstrained optimization / Analytical solution, numerical methods, and algorithms in unconstrained optimization / Constrained optimization: Optimization under equality constraints, optimization under equality and inequality constraints, optimization under special constraints / Application of algorithms to real-life problems and their solution using computers.

### **ABM314 Data Compression (3 2 4)**

Introduction to data compression and source coding. Block coding. Huffman and arithmetic coding. Word-based coding. Quantization of numbers. Vector quantization. Predictive coding. Transform, sub-band coding, and wavelet-based coding. In-class presentations of compression methods for image, audio, video, and computer graphics.

### **ABM316 Data Mining (3 2 4)**

Expert knowledge extraction process. Data warehousing concepts. Data preprocessing. Data mining functions. Data mining algorithms. Web mining concepts. Web mining applications.

### **ABM318 Text-Based Information Retrieval Systems (3 2 4)**

Fundamental topics in text-based information retrieval systems (information retrieval models, querying and indexing). Advanced topics include internet search engines, text querying, query expansion, query result clustering, classification, and evaluation.

### **ABM320 Bioinformatics (3 2 4)**

Use of computers in molecular biology and accessing biological information via the internet, gene and protein databases, genome databases and access to other databases, sequence alignment, homology searching in gene and protein sequences, phylogenetic analysis, restriction mapping, computer-assisted PCR primer design.

### **ABM322 Wireless/Mobile Multimedia Networks (3 2 4)**

Introduction to IP multimedia services, IMS architecture, SIP (Session Initiation Protocol), content routing, registration, identification, and sharing, application servers, server filtering criteria, and SIP inter-network communication, AAA (Authentication, Authorization, and Accounting), online payment security, content delivery service quality, presentation services and architecture, content synchronization, compatibility, and compatibility methods, content selection and broadcast protocols for point-to-point broadcast services, wireless packet-switched, wireless packet-switched multimedia broadcasting, unicast and multicast services.

### **ABM324 Security Priority Computer Systems (3 2 4)**

Definitions of security priority systems, security integrity levels, hazard analysis, risk analysis, development of security priority systems, hardware and software fault tolerance, redundant operation system security, usability, mean time to repair (MTTR), mean time to failure (MTTF), mean time between failures (MTBF), Markov diagrams, hardware and microprocessor design faults, redundant hardware topologies and examples, complete control of the effectiveness and operational states of each decision.

### **ABM326 Data Structures (3 2 4)**

Problem-solving and algorithm development: the determinism, finiteness, and effectiveness of algorithms, input/output and analysis. Data structures and models: algorithms and sparks: data, variables, assignments, arithmetic, boolean, character type statements. List, tree, and graph data models. Algorithmic program design and flowcharts: terms, conditional terms, input/output terms, iterative terms. Pseudocode, actual code, flowcharts. Operations: arithmetic and logical operations and their priorities. Elements of programming style: representations of vectors, matrices, and arrays. Program runtime and memory requirements: execution time, time complexity, space cost and complexity, algorithm analysis, complexity, memory requirements, asymptotic notations.

Sorting algorithms (shell sort, bubble sort, heap sort, quick sort, merge sort, selection sort, insertion sort).

Searching algorithms (linear search, binary search, binary tree search).

Linked lists: singly and doubly linked lists and their applications.

Stack and Queue Structures: Stack and queue design, stack and queue design with arrays and linked lists.

Tree structures: basic tree concepts, memory storage of trees, binary trees, AVL tree structures, B/B+ tree structures, tree design and applications.

Graph data model: graph concepts, storage methods of graphs in memory, adjacency matrices and lists, graph traversal, shortest path problem and algorithms, depth-first search algorithm, breadth-first search algorithm.

### **ABM328 Numerical Methods (3 2 4)**

Propositional Logic and Set Theory. Mathematical Proof Methods, Functions and Algorithms. Number Theory and Sequences. Induction and Recursion. Counting. Discrete Probability. Relations. Boolean Algebra. Graph Theory. Trees.

### **ABM402 Electronic Evidence Collection and Analysis (3 2 4)**

Analysis of system logs, program and operating system installation logs, operating system event logs, system event log analysis, firewall and intrusion detection system logs, online chat analysis, conversation logs analysis, analysis of recorded conversation residue, connection event log analysis, identification of used online chat accounts, analysis of hidden areas on hard drives and external disks, email analysis, message header analysis and detection of fake emails, distinguishing between spam and phishing emails, mobile device analysis, Windows registry analysis, determining the importance of data backups in digital forensics.

### **ABM404 Software Ethics (2 0 2)**

Ethical evaluation principles and models in information technology, research on malicious software, Windows hacking, password hacking, email hacking, web application hacking, website domain hacking, other types of hacking, information crimes in portable computers, VoIP connection hacking, security vulnerability testing, advanced hacking with Metasploit, firewalls, IDS systems, unauthorized access, methods of attack detection (Honeypot), system network security.

### **ABM406 Graduation Project (0 2 1)**

### **ABM408 Human Resources Management (2 0 2)**

The development, objectives, and principles of Human Resources Management (HRM); The scope of HRM: Planning human resources, finding and selecting human resources, recruitment and onboarding, performance evaluation, training, development, establishing and applying the disciplinary system, compensation of human resources; Career management; International human resources management; The use of technology in human resources management.

### **ABM410 Speech Recognition and Synthesis (3 2 4)**

Basic characteristics of sound; Sound signals: Short-time Fourier Transform (STFT), Linear Predictive Coding (LPC), Cepstral analysis, Formant and Pitch structures; Encoding of sound signals; Text-to-speech methods: Text preprocessing (text normalization, phonetic analysis, prosodic analysis), Speech production (concatenative methods, formant-based methods, articulatory methods); Speech-to-text conversion: Acoustic models, Language models, Language models customized for Turkish, Lexical models, Decoder.

### **ABM412 Mobile Software Development (3 2 4)**

Characteristics of mobile applications, state machine diagrams, performance and memory management, multitasking, XML, graphics and user interface performance, packaging and distribution of mobile applications.

### **ABM414 Digital Image Processing Methods (3 2 4)**

Fundamentals of digital images, properties of light, color information, human visual system, cameras, computer vision systems, black-and-white images, color images, color models (RGB, CMY, TIQ), digital images. Sampling and quantization of image signals. Image formats, image enhancement techniques; point processing methods, black-and-white images, slicing grayscale values, adjusting brightness, contrast enhancement, and computer applications. Image filtering systems.



Two-dimensional transformations of images; two-dimensional Fourier transform and the application of fast Fourier transform to images.

#### **ABM416 Decision Support Systems (3 2 4)**

Computer support in decision-making. The structure and components of decision support systems. Analysis of expert systems. Decision support system software and usage. Applications of decision support systems. Performance analysis of decision support systems.

#### **ABM418 Computer Vision (3 2 4)**

Density surfaces and gradients. Linear operators and image smoothing. Edge detection. Corner detection (Harris corner detection algorithm). Contour detection. Image formation. Establishing relationships between multiple images. Parameter estimation and the RANSAC algorithm. Stabilization and creating panoramic images from multiple images. Stereo vision. Extracting 3D structure from motion. Color and lighting. Tracking. Object recognition in images.

#### **ABM420 Human-Computer Interaction (3 2 4)**

Psychological principles in human-machine interaction. Evaluation of user interfaces. Usability engineering. Job analysis. User-centered design and early sampling. Conceptual models and metaphors. Logical foundations of software design. Design of menus and command buttons. Voice and natural language input/output. Response time and feedback. Color, object, and sound characteristics. Concepts of international agreement and local adaptation. User interface architectures and application programs. Project and case study reviews.

#### **ABM422 Machine Learning (3 2 4)**

Otomatik öğrenme paradaymları. Öğrenme. Öğrenmenin gözlem sonuç mantığı, hipotez sonuç mantığı ve abductive şekilleri. Öğrenme yeteneği ile ilgili faktörler. Bağlantı modeli. Öğrenen programlar için programlama ortamları.

#### **ABM424 Mobile Application Software Development (3 2 4)**

Introduction to XCode, iOS, and Objective-C; basic controls; IBActions and IBOutlets; MVC (Model-View-Controller) paradigms; views and view controllers; container view controllers; alerts and action sheets; table views and application lifecycle; multitouch; location-based services; persistent data; network programming; graphics; maps; history of mobile applications; Windows Phone 7; Android operating system.

#### **ABM426 Website Usability (3 2 4)**

Learnability, memorability, efficiency, reliability, user satisfaction, controllability, trust, control, ease of use, speed, understandability, usability, user-centered design principles, content and visual organization, website navigation, web design for portable devices, data visualization, color and typography selection, accessibility issues, search, and visualization.

#### **ABM428 Information Security Management (3 2 4)**

Data and information security techniques and technologies; a managerial perspective on computer security and risk management; security services; legal and ethical issues; security operations; planning and implementation of security policies; emergency, continuity, and disaster recovery scenarios; software vulnerabilities; firewalls; encryption; and other security application tools.

**ABM430 Workplace Training (5 15 3)**

**ABM432 Internship I (0 2 1)**

**ABM434 Internship II (0 2 1)**