

Course Code	Course Name	T P C	AKTS	Course Content	Course Book	Supplementary Books
TRD109	Turkish Language I	2 0 2	2	What is language? The place and importance of language as a social institution in national life; language-culture relationship; the place of the Turkish language among world languages, the development and historical periods of the Turkish language, the current status of the Turkish language and its areas of dissemination; sounds and classification in Turkish, sound features and rules of Turkish, rules and application related to sound information, syllable information, orthographic rules and application, punctuation marks and application.	Vahab KABAHASANOĞLU, Turkish Language in Universities, Istanbul, Der, 2000. Kavruk H., Salman R., Turkish Language (Written and Oral Expression), Üğürel Printing House, Malatya, 2003.	Yusuf ÇOTUKSÖKEN, Practical Turkish Language, Papatya Publications, 03-2002.
YDI107	English I	2 0 2	2	Simple Present Tense, Articles, Numbers, Present Progressive Tense, Possessive Adjectives, Singular and Plurals, How Many, How Much, Some, Any, A Little, A Few, Some Prepositions.	Johannsen, K. L. 2006; English for the Humanities, Thomson ELT, 25 Boston, Massachusetts.	Lecture Notes prepared and supported by the instructors.
FIZ111	Physics I	4 0 4	6	Vectors, equilibrium, moment of a force, linear motion, Newton's second law, planar motion, work and energy, impulse and momentum, rotational motion, elasticity, harmonic motions.	Fishbane, P.M., Gasiorowicz, S., & Thornton, S.T. Translation Editor: Türkçöğulları, Ü. Basic Physics. Ankara: Arkadaş Publishing, 2003.	Physics for Scientists and Engineers, Serway-Beichner, Translated by Kemal Çolakoğlu, Palme Publications, 2008.
FIZ105	Physics Lab-I	0 2 1	2	Vectors, equilibrium, moment of a force, linear motion, Newton's second law, planar motion, work and energy, impulse and momentum, rotational motion, elasticity, harmonic motions.	Fishbane, P.M., Gasiorowicz, S., & Thornton, S.T. Translation Editor: Türkçöğulları, Ü. Basic Physics. Ankara: Arkadaş Publishing, 2003.	Physics for Scientists and Engineers, Serway-Beichner, Translated by Kemal Çolakoğlu, Palme Publications, 2008.
MAT161	Mathematics I	4 0 4	6	Real and complex numbers, sentences, permutations, inversions, and combinations calculations, probability, group, ring, body, vector spaces, length, angle and isometry calculations, matrices and determinants, linear equation systems.	Edwards, C.H., Penney D.E., "Calculus and Analytic Geometry", Prentice Hall, Englewood Cliffs, New Jersey. Wylie, C.R., "Advanced Engineering Mathematics", McGraw-	Stroud, K. A., "Engineering Mathematics", Macmillan.

					Hill, Inc. Swokowski, E. W., “Calculus with Analytic Geometry”, Prindle, Weber & Schmidt.	
YMÜ111	Algorithms and Programming I	3 2 4	7	Problem-solving. Input-Output process. Algorithm design. Certainty, finality, effectiveness in algorithms, input-output. Constants, variables, and expressions. Arithmetic, relational and logical operators. Input-Output expressions. Condition and Loop statements. Vector and matrix representations. Character data processing. Subprograms and Functions. Recursion. C programming language is used to teach problem-solving and programming development in this course.	Introduction to Algorithms and Programming, Dr. Fahri Vatansever, System Publications, 2006.	Introduction to Programming and Algorithms, Soner ÇELİKKOL, Academic Book Publishing.
YMÜ115	Software Engineering Orientation	1 0 1	1	Introduction to the procedures, policies, and resources of the Software Engineering department. General information about engineering, particularly about software engineering as a profession. Fundamentals of software engineering.		
YMÜ113	Introduction to Computer Sciences	3 0 3	4	Detailed examination of the coding phase in the software development lifecycle. Program logic design. Programming languages. Introduction to object-oriented methods. Database management systems. Computer networks and communication. Internet and World Wide Web. Programming technologies for the web. Computers and security. Computers and social issues.	Parker, C. S., “Understanding Computers Today and Tomorrow”, Harcourt Inc., (2000).	
TRD110	Turkish Language II	2 0 2	2	Application of Turkish affixes and their usage, general information about composition, plans and their usage in composition writing, usage and application of Turkish nouns and verbs, expressions and their structures in composition, adverbs and prepositions in Turkish usage.	Vahab KABAHASANOĞLU, Turkish Language in Universities, Istanbul, Der, 2000. Kavruk H., Salman R., Turkish Language (Written and Oral Expression), Üğürel	Yusuf ÇOTUKSÖKEN, Practical Turkish Language, Papatya Publications, 03-2002.

					Printing House, Malatya, 2003.	
YDI108	English II	2 0 2	2	Simple Past Tense, Auxiliary Verbs (Be, Do), Must, Have to, Has to, Going to, From, Adverbs of Time, Regular and Irregular Verbs, Possessive Pronouns.	Johannsen, K. L. 2006; English for the Humanities, Thomson ELT, 25 Boston, Massachusetts.	Lecture Notes prepared and supported by the instructors.
YMÜ116	Algorithms and Programming II	3 2 4	7	Object-Oriented Programming principles and techniques using C++: core concepts (expressions, data types, variables, control structures, arrays, ...). Divide-and-Conquer approach. Modular software development (methods and classes). Class structures and local variables. Form elements. Event-Driven Programming. Dynamic Arrays. Linked Lists. Search and Sorting Algorithms. Files. Selecting appropriate structures for algorithms. Developing efficient algorithms.	Harvey & Paul Deitel & Deitel ; C++ How to Program, 6/E ISBN-10: 0136152503 , ISBN-13: 9780136152507 Publisher Prentice Hall , Copyright: 2008	Herbert Schildt, "C# : "The Complete Reference", McGraw-Hill, 2002, Turkish Edition as "Herkes İçin C#", Alfa Publications, 2002.
YMÜ120	Discrete Structures	3 0 3	3	Fundamentals of discrete mathematics. Functions. Relations. Sets and basic proof techniques. Boolean algebra. Propositional logic. Numerical logic. Elementary number theory. Basics of counting principles.	Ralph P. Grimaldi, Discrete and Combinatorial Mathematics, An Applied Introduction, 5th Edition, Addison Wesley, 2004.	
YMÜ118	Fundamentals of Software Engineering	3 0 3	3	Scope of software engineering. Software development lifecycle models. Software process. Software teams. Software tools. Software testing. Modules and objects. Reusability and portability. Planning, cost and time estimation. Requirements. Classical analysis. Object-Oriented Analysis. Types of design and object-oriented design. Implementation and Integration. Post-delivery maintenance of the software product.	Sommerville, Software Engineering, 8e, Addison-Wesley, 2007.	SWEBOK, Guide to the Software Engineering Body of Knowledge: 2004 Version, IEEE.
YMÜ116	Algorithms and Programming II	3 2 4	7	Principles and techniques of Object-Oriented Programming using C++: core concepts (expressions, data types, variables, control structures, arrays, ...). Divide-and-Conquer Method. Modular software development (methods and classes). Class Variables and	Harvey & Paul Deitel & Deitel; C++ How to Program, 6/E ISBN-10: 0136152503, ISBN-13: 9780136152507 Publisher	Herbert Schildt, 'C#: The Complete Reference,' McGraw-Hill, 2002, Turkish Edition titled 'Herkes İçin C#,' Alfa Publications, 2002.

				Local Variables. Form Elements. Introduction to Event-Driven Programming. Dynamic Arrays. Linked Lists. Search and Sorting Algorithms. Files. Selecting appropriate structures in algorithms. Developing efficient algorithms.	Prentice Hall, Copyright: 2008	
YMÜ120	Discrete Structures	3 0 3	3	Fundamentals of discrete mathematics. Functions. Relations. Sets and basic proof techniques. Boolean algebra. Propositional logic. Digital logic. Elementary number theory. Basics of counting concepts.	Ralph P. Grimaldi, Discrete and Combinatorial Mathematics, An Applied Introduction, 5th Edition, Addison Wesley, 2004.	
YMÜ118	Foundations of Software Engineering	3 0 3	3	Scope of software engineering. Software development lifecycle models. Software process. Software teams. Software tools. Software testing. Modules and objects. Reusability and portability. Planning, cost, and time estimation. Requirements. Classical analysis. Object-oriented analysis. Types of design and object-oriented design. Implementation and Integration. Post-delivery maintenance of software products.	Sommerville, Software Engineering, 8e, Addison-Wesley, 2007.	SWEBOK, Guide to the Software Engineering Body of Knowledge: 2004 Version, IEEE.
AIT209	Ataturk's Principles and History of Reforms I	2 0 2	2	The aim of studying the History of the Turkish Revolution and Ataturk's Principles; the concepts of revolution and reform, the collapse of the Ottoman Empire and the reasons leading to the Turkish Revolution, the partitioning of the Ottoman Empire, the Armistice of Mudros and subsequent events, the state of the country against occupations, the reaction of Mustafa Kemal Pasha, his journey to Samsun, the opening of the last Ottoman Parliament, the opening of the Turkish Grand National Assembly (TBMM), and the management of the national struggle.	Ataturk ve Türkiye Cumhuriyeti Tarihi, Oğuz Aytepe ve Diğ. Siyasal Kitapevi, Ankara, 2003.	
YMÜ227	Object-Oriented Programming	3 2 4	7	Introduction to object-oriented programming using C# or Java programming languages. Developing efficient and flexible object-oriented software. Object-oriented programming concepts such as inheritance,	Xiaoping Jia, 'Object-Oriented Software Development Using Java,' Addison-Wesley	James W. Cooper, 'The Design Patterns Java Companion,' Addison-Wesley Publishing Company, Inc. (1998).

				polymorphism, dynamic binding, design pattern concepts, and implementing some design patterns.	Publishing Company, Inc. (2003).	
YMÜ213	Professional English I	2 0 2	3	English equivalents of computer hardware, terminology for operating systems, classifications and explanations of microprocessors in English. Terminology for networks, cause-effect structures, adjective clauses, passive sentences, academic tenses, sentence structures, academic terminology. Translating articles and technical manuals from English.	Computing for Non-Specialists, Nanda Bandyopadhyay, Pub. Addison-Wesley; Internet Complete. New Perspectives on Computer Concepts, 10th Ed., Thomson Course Technology.	
YMÜ229	Formal Languages and Automata Theory	3 0 3	5	Basic concepts: alphabet, language concepts, basic proof methods. Recursive definitions. Regular expressions. Finite automata models. Examples of finite automata applications: communication protocol design, lexical analysis. Kleene's theorem. Non-deterministic finite automata models. Output finite automata. Regular and non-regular languages, 'pumping lemma'. Context-free grammars, parsing trees, pushdown automata models. Turing theory.	Introduction to Automata Theory, Languages and Computation 2nd Ed., Addison-Wesley, (2001)	Modern Compiler Design, D. GRUNE, John Wiley & Sons, 2000.
YMÜ225	Software Requirements and Analysis	3 0 3	4	Requirements engineering within the software lifecycle. Requirement elicitation and modeling: problems and techniques. Documentation and management of requirements. Standards and CASE tools. Cognitive and socio-organizational issues.	Requirements Engineering for Software and Systems, by Phillip A. Lapante, CRC Press, 2009 ISBN: 978-1-4200-6467-4.	KALIPSIZ, O., BUHARALI, A., BİRİCİK, G., System Analysis and Design, Papatya Publications, 2012.
MAT271	Differential Equations	4 0 4	6	Infinite series, properties, and types. Convergence and divergence tests for infinite series. Power series, Taylor and Maclaurin series expansions. Fourier series. Definitions and properties of Bessel, Gamma, and Beta special functions. Complex Functions. Complex Integrals and Residue Theorem. First-order ordinary differential equations and applications. Applications of second-order differential equations with constant coefficients. Applications of higher-order linear differential equations. Laplace	Lecture Notes	Lectures on Differential Equations (Mathematics Foundation Publications)

				transforms and their properties. Partial differential equations and applications.		
YMÜ231	Software Economics	2 0 2	3	Subject and scope of economics, basic economic concepts, fundamental economic problems, production and production factors, market, supply and demand, consumption, firm balance, national income and its formation, employment, inflation, multiplier, accelerator, money.	No specific course book provided.	No supplementary books provided.
YMÜ235	Theater	2 0 2	3	Basic concepts related to theater; acting and acting techniques; improvisation practices; observations on theatrical language; dramaturgy, interpretation, and staging; introduction to the concept and practices of creative drama; methods of using creative drama in Turkish education; dramatization techniques and teaching Turkish; game concepts; psychological foundations of theater and the relationship between theater and education.	No specific course book provided.	No supplementary books provided.
YMÜ237	Photography	2 0 2	3	The latest updates in photographic technology; basic photography techniques, cameras, films, lenses, lighting, and composition. Different types of photography applications for various purposes are introduced and practiced.	No specific course book provided.	No supplementary books provided.
YMÜ239	Diction	2 0 2	3	Practical studies on the proper articulation of Turkish. Focuses on pronunciation, stress, intonation, speech speed, voice pitch, and resonance. Includes the explanation of concepts like vowel lengths, pauses, melody, and tone, along with practical exercises using sample texts. Provides information on the correct and beautiful use of language verbally through phonetics and diction.	No specific course book provided.	No supplementary books provided.
YMÜ241	Body Language and Communication	2 0 2	3	Covers communication, types of communication, communication barriers, constructive and disruptive elements, body language, gestures, and facial expressions. Focuses on intercultural differences in body	No specific course book provided.	No supplementary books provided.

				language, communication, and listening skills during conversations.		
AIT210	Ataturk's Principles and History of Reforms II	2 0 2	2	Abolition of the caliphate, Progressive Republican Party and Takrir-i Sükun period, Educational Revolution, Cultural Revolution, Alphabet reform, Turkish history reform, Turkish language reform, Izmir Economic Congress, Transition to multi-party life, Reforms in women's rights, Hat, dress reforms, Turkey's foreign policy, Ataturk's principles, Political events, Relations between the Grand National Assembly government and the Istanbul government, Military developments, Kars Treaty, Ankara Agreement, Great Offensive, Mudanya Armistice, Abolition of the Ottoman Sultanate, Lausanne Peace Treaty.	Atatürk ve Türkiye Cumhuriyeti Tarihi, Oğuz AYTEPE et al., Siyasal Kitapevi, Ankara, 2003.	N/A
YMÜ218	Data Structures	3 2 4	6	Introduction to Data Structures. Introduction to Java Programming Language. Recursion. Stacks, Queues, and Lists. Trees. Binary Trees and Balanced Trees. Operations on Trees. Comparison of Algorithms. Time and Space Complexities. Sorting and Searching. Graphs.	Lafare, R., 'Data Structures & Algorithms in Java', 2nd Edition, SAMS Publishing, 2003. 776p.	N/A
YMÜ214	Technical English II	2 0 2	3	Translation of technical articles in computer science, translation techniques, rules for writing technical articles, and attempts at writing English articles.	Computing for Non-Specialists, Nanda Bandyopadhyay, Pub. Addison-Wesley; Internet Complete.	N/A
YMÜ230	Web Design and Programming	3 2 4	6	Internet, Intranet, Internet services and protocols. Image, graphic, animation, sound, and video development software. Hierarchical organization of web pages, layout, page transitions, target audience, scope, quality, color harmony, placement, interaction, document preparation, animated text and images. Web editor, frames, tables, lists, forms, placement of visual elements, placement of scripts and applets, links, text and line styles, buttons and menus. Choosing a web domain; domain name, quality, capacity, Internet service providers, database and web	Learning Web Design: A Beginner's Guide to (X)HTML, StyleSheets, and Web Graphics, Jennifer Niederst Robbins, O'Reilly Media, 2007.	N/A

				programming support, email limits, and costs. File transfer protocols and software, connection to Internet service providers, uploading and updating web pages.		
YMÜ232	Database Management Systems	3 0 3	4	Database processing, fundamentals of relational implementation, query languages, data modeling, normalization, databases and Internet technology, managing multi-user databases.	Kroenke, D. M., 'Database Processing: Fundamentals, Design and Implementation', Prentice Hall.	Halpin, T., Evans, K., Hallock, P., Maclean, B., 'Database Modeling with Microsoft Visio for Enterprise', Morgan Kaufmann Publishers, (2003).
İST234	Statistics and Probability	3 0 3	4	Definition of variables, types of data, numerical and graphical presentation techniques suitable for data types, population and sample, point and interval estimation, hypothesis testing.	Introduction to Statistics, Prof. Dr. Fikret İDİZ, Barış Y., İzmir, 2000.	Statistics, Murat Açıköğretim Publications, Ankara, 2001.
MAT204	Linear Algebra	2 0 2	3	Vectors. Vector addition and scalar-vector multiplication, vector spaces, scalar product, length of a vector and angle between two vectors, linear combination, linearly dependent and independent vectors, basis and dimension, orthogonal and orthonormal vectors, dual basis and dual space, subspace. Matrices and matrix operations, vectors and matrices, invertible matrices, elementary row operations and echelon form, determinants and properties, determinant expansions, linear transformations and properties, representation of transformations with matrices and basis transformations, rank of a linear transformation, linear equation systems and solution spaces, Cramer system, rank rule and geometric interpretation, convex sets, eigenvalues and eigenvectors, diagonalization of symmetric matrices, quadratic forms, inner product and inner product spaces, vector and scalar products, area and volume.	Linear Algebra (H Hilmi Hacisalihoğlu)	Solved Linear Algebra (H Hilmi Hacisalihoğlu)
YMÜ301	Mobile Software Development	3 2 4	6	Features of mobile applications, state machine diagrams, performance and memory management, multitasking, XML, graphics,	Reza B'Far and Roy T. Fielding, 2004, Mobile Computing Principles:	

				and user interface performance, packaging, and distribution of mobile applications.	Designing and Developing Mobile Applications with UML and XML, Cambridge University Press	
YMÜ315	Operating Systems	3 0 3	4	Introduction to Operating Systems, Computer System Structure, Operating System Structure, Processes, Threads, CPU Scheduling, Process Synchronization, Deadlocks, Memory Management, Virtual Memory, File System Interface, File System Implementation, I/O Systems, Mass Storage Structures, Introduction to C Language, comparison of different operating systems, system structures.	Operating System Concepts, Siberschatz, Galvin, and Gagne, Wiley, 2003	Operating Systems, İbrahim Türkoğlu lecture notes, Fırat University, 2006.
YMÜ303	Numerical Methods	3 0 3	4	Mathematical modeling and solving engineering problems. Programming and software, error analysis. Solution of linear equations, solution of nonlinear equations. Optimization, curve fitting. Numerical differentiation, numerical integration. Solution of ordinary differential equations, partial differential equations. Fourier series.	Numerical Methods for Engineers with Software and Programming Applications, Steven C. Chapra, Raymond P. Canale, Literatür Yayıncılık, 2003.	
YMÜ319	Programming Languages	3 0 3	4	Basic concepts and paradigms of programming languages, examples of introduced concepts, structures provided by various programming languages such as Pascal, C, C++, and Java.	Sebesta, R., 'Concepts of Programming Languages', Addison-Wesley Publishing, 2002.	Pratt, T.W., Zelkowitz, M.V., 'Programming Languages - Design and Implementation', Prentice Hall, 1996.
YMÜ323	Professional Practice I	0 2 1	2	Professional Practice-I course is conducted weekly in accordance with the principles specified in the 'Engineering Faculty Practical Training (Internship) Directive' and 'Intra-Department Student Internships Directive'. Includes evaluation of student presentations and documents related to their internships by a jury.	Students will procure resources related to their internship topics from their workplaces.	
YMÜ325	Logic Circuits	3 0 3	4	Digital Systems, Combinational Logic, Sequential Logic, Registers, and Counters.	Logic and Computer Design Fundamentals & XILINX 6.3 Student Edition, 3/E, M. Morris Mano, California State University, Los Angeles,	

					Charles R. Kime, University of Wisconsin, 1999.	
YMÜ327	Software Design and Architecture	3 2 4	6	Architectural concepts, observer patterns, decorator patterns, factory patterns, singleton patterns. Group projects, the importance of requirements studies, software system design, schematic and graphical approaches, specification evaluation techniques, specification and design tools, and alternative design approaches for developing system tests.	Introduction to Design Patterns in C++ with Qt 4, An:1/e for (Bruce Perens' Open Source Series), 2007 Prentice Hall Paper; 656, ISBN-10: 0131879057 ISBN-13: 9780131879058, Alan Ezust Paul Ezust.	Software Engineering 8, Ian Sommerville, 8th Ed., Addison Wesley, 2007, ISBN 0-321-31379-8.
YMÜ340	Data Mining	3 2 4	6	Knowledge extraction process. Data warehouse concepts. Data preprocessing. Data mining functions. Data mining algorithms. Web mining concepts. Web mining applications.	Jiawei Han and Micheline Kamber, Data Mining Concepts and Techniques, Morgan Kaufman, 2001.	Margareth H. Dunham, Data Mining Introductory and Advanced Topics, Prentice Hall, Pearson Education.
YMÜ314	Information Systems and Security	3 0 3	4	Classification of Computer Networks. History of Computer Networks. Network Topologies. Protocol Concept and Layering of Protocols. 'Open Systems Interconnections' Computer Networks Reference Model. Switching Methods in Computer Networks. Internet Concepts, Architecture, and Internet Protocol. 'Transmission Control Protocol'. 'Internet Control Message Protocol'. 'Domain Naming Systems'. 'File Transfer Protocol'.	Computer Networks, Andrew S. Tanenbaum, Fourth Edition, Pearson Education Inc., 2003, ISBN: 0-13-038488-7.	
YMÜ316	Algorithm Analysis	3 0 3	5	Algorithm design and analysis. Importance of optimal algorithm design, data processing, development of optimal and fast algorithms. Mathematical foundations, counting theory, functions, asymptotic notation, master theorem, sorting theory and comparative sorting algorithms, worst-case time analysis of sorting algorithms, linear time sorting, fundamental data structures, hash tables, binary trees, red-black trees, B-trees, dynamic data structures, average runtime analysis, binary heaps, binomial heaps, and Fibonacci heaps.	Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein. Publisher: The MIT Press, September 2001 Second Edition.	

YMÜ318	Labor Law	2 0 2	3	Introduction to law, introduction to labor law, general concepts, rights and obligations imposed on parties, protection of workers, termination of labor law, collective labor agreements.	Tuncomağ, Kenan., Principles of Labor Law Centel, Tankut., Labor Law	Tuncomağ, Kenan., Principles of Labor Law
YMÜ320	Optimization Techniques	3 2 4	6	Introduction and basic concepts; unconstrained optimization; analytical solutions, numerical methods, and algorithms for 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 computer-based solutions.	M.A. Bhatti, Practical Optimization Methods, with Mathematica Applications, Springer-Verlag New York, Inc., 2000.	
YMÜ322	Computer Graphics and Animation	3 2 4	6	Basic concepts of computer graphics, scan graphics, line and curve drawing, 2D basic drawing algorithms, polygons, basic shape filling, clipping, graphic devices, 2D and 3D geometry, transformations, 3D view coordinate transformations, visible surface determination, lighting, polygon rendering, texture mapping, OpenGL graphic library.	Computer Graphics with OpenGL (3rd Edition) by Donald Hearn and M. Pauline Baker.	Angel, E., 2000, Interactive Computer Graphics, A Top-Down Approach with OpenGL, Addison-Wesley, 613 p.
YMÜ326	Multimedia Software Development	3 2 4	6	The framework of multimedia software engineering. Perspectives in multimedia software engineering. Visual languages. Multimedia languages. Active indicator. Tele-action objects. Multimedia development tools. Prototyping in multimedia applications. Designing multimedia languages. Designing distributed multimedia systems. Features of multimedia applications.	David Gries, Paul Gries, 2004, Multimedia Introduction to Programming Using Java, Springer	
YMÜ328	Bioinformatics	3 2 4	6	The use of computers in molecular biology and accessing biological information over the internet. Gene and protein databases, genome databases, and access to other databases. Sequence comparison, homology search in gene and protein sequences, phylogenetic analyses, restriction mapping, computer-aided PCR primer design.	1. Introduction to Bioinformatics: a Theoretical and Practical Approach. Krawetz, S.A. and Womble, D.D. (ed.). Humana Press, Totowa, New Jersey, 2003. 2. Introduction to Bioinformatics. Lesk,	3. Bioinformatics: Genes, Proteins and Computers. Orengo, C., Jones, D. and Thornton, J. (eds.). Garland Science/BIOS Scientific Publishers, New York, 2003. 4. Bioinformatics: Methods and Protocols. Misener, S. And Krawetz, S.A. (ed.).

					A.M. (ed.). Oxford University Press, 2002.	Humana Press, Totowa, New Jersey, 2000.
YMÜ330	Database Design and Management	3 2 4	6	Components of database systems, database management system (DBMS) functions, architecture, data independence, data models, conceptual models, object-oriented models, and relational data models. Converting conceptual schemas to relational schemas, relational algebra, relational calculus, keys, functional dependency, normal forms, multi-valued dependency, and database design. SQL: data definition, relational query, data manipulation, application of SQL in applications, and updating designed databases. Creating transactions using SQL, efficiency characteristics, identifying possibilities, reliability levels, concurrency, errors and solutions, protection levels, distributed data storage, distributed data processing, distributed transaction models, concurrency control, homogeneous and heterogeneous solutions. File structures, index files, hash files, signature files, binary trees, multi-index files, variable-adaptive recorded files.	J. D. Ullman and J. Widom, A First Course In Database Systems, 2nd Ed., Prentice-Hall, 2002 (ISBN: 0-13-122520-0)	
YMÜ332	Advanced Visual Programming	3 2 4	6	Revisiting object-oriented programming. Fundamentals of visual programming: value types, operator overloading, exception, and event handling. Utilizing graphical user interface frameworks. Working with file and XML-based data.	Microsoft® Visual C++ .NET Step by Step by Julian Templeman, Andy Olsen, Microsoft Press, 2002, ISBN: 0-7356-1907-7	Ivor Horton's Beginning Visual C++ 2005, ISBN: 0-7645-7197-4 Programming Windows®, Fifth Edition, Charles Petzold, ISB: 1-57231-995-X Microsoft Visual C++, .NET Deluxe Learning Edition, Microsoft Corporation, ISB: 0-7356-1908-5
YMÜ334	Service-Oriented Architecture	3 2 4	6	Web services, service-oriented architecture, service composition, business process management.	Gustavo Alonso, Fabio Casati, Harumi Kuno, Vijay Machiraju, "Web Services" Springer 2004 (ISBN: 3540440089)	

					Papazoglou, M. P., “Web Services: Principles and Technology”, Prentice Hall, 2007, ISBN: 0-321-15555-6 Graham, S., Davis, D., Simeonov, S., Daniels, G., Brittenham, P., Nakamura, Y., Fremantle, P., Koenig, D., Zentner, C., “Building Web Services with Java”, Sams Publishing, Second Edition, 2005, ISBN: 0-672-32641-8 Understanding Web Services: XML, WSDL, SOAP, and UDDI”, Addison-Wesley, 2002, ISBN: 0-201-75081-3 Zimmermann, O., Tomlinson, M. R., Peuser, S., “Perspectives on Web Services: Applying SOAP, WSDL, and UDDI to Real-World Projects”, Springer, Second Edition, 2005, ISBN: 3-540-00914-0	
YMÜ336	Natural Language Processing	3 2 4	6	Morphological analysis, syntactic analysis, language and linguistic structures, regular languages, word processing algorithms, machine learning, text classification, information extraction, information retrieval, question-answering systems, collocations.	Natural Language Understanding, J.Allen, Benjamin-Cummings Speech and Language Processing, Jurafsky and Martin, Prentice Hall Foundations of Statistical Natural Language Processing, C. D. Manning, H. Schütze, MIT Handbook of Natural	

					Language Processing, R. Dale, H. Moisl, H.Somers, Marcel Dekker	
YMÜ338	Microprocessors and Programming	3 2 4	6	Computers and microprocessors. Microprocessor architecture and operation. Microprocessor programming. Addressing modes. Data transfer instructions, arithmetic and logical instructions, program control instructions. Memory interface and memory organization. Basic Input/Output interface. Programmable parallel interface. Interrupts. Programmable interrupt control. Timers, counters. Programmable timers and counters (8254). Digital-to-Analog and Analog-to-Digital converters. Serial data communication.	Microprocessors, Microcomputers and Assembly Programming 2, Turhan ÖZKAN, Beta Publications, 2003.	Microcomputer Architecture and Programming, Lecture Notes by İbrahim Türkoğlu, Fırat University, 2006. Microprocessors and Microcomputers, Eşref Adalı, Birsen Publications, 2004.
YMÜ401	Graduation Project I	0 2 1	4	Literature research, problem definition, detailed analysis, and design for a software engineering problem. Design, project reports, and seminar presentations.		
YMÜ415	Software Verification and Testing	3 2 4	6	Introduction to software verification and validation, introduction to software testing, fundamentals of software security, software testing tools, black-box unit testing, white-box unit testing and control-flow testing, data-flow testing, website testing, usability testing, genetic algorithms, testing and code reviews for security, software testing criteria.	Software Testing 2nd edition, by Ron Patton, Sams Publishing, 2006 (ISBN 0-672-32798-8)	Foundations of Software Testing: ISTQB Certification, Dorothy Graham, Erik Van Veenendaal, Isabel Evans, and Rex Black, Thomson Learning, 2008.
YMÜ417	Professional Practice II	0 2 1	2	Professional Practice-2 course is conducted within the framework of the principles specified in the 'Engineering Faculty Practical Work (Internship) Directive' and the 'Intra-Departmental Student Internships Directive.' It includes presentations prepared by students regarding their internships and evaluations by juries based on questions asked. Midterm grades are assigned based on workplace performance evaluations and related documents.	Students will obtain resources related to their work topics during their summer internship.	
YMÜ403	Software Project Management	2 0 2	3	Introduction to software project management. Overview of project planning. Selection of	Software Project Management (Fourth	Effective Project Management 2nd edition,

				appropriate project approach. Effort estimation. Activity planning. Risk analysis and management. Resource allocation. Monitoring and control. Contract management. Managing people and organizing teams. Software quality assurance. Configuration management. Various tools related to software project management.	Edition) By Bob Hughes & Mike Cotterell, McGraw-Hill Publication, 2006 (ISBN :-10 0077109899)	R.Wysocki, R. Beck,. Crane, ISBN: 9971-51-402-8, Wiley, 2000.
YMÜ338	Microprocessors and Programming	3 2 4	6	Computers and microprocessors. Microprocessor architecture and operation. Microprocessor programming. Addressing modes. Data transfer instructions, arithmetic and logical instructions, program control instructions. Memory interface and memory organization. Basic Input/Output interface. Programmable parallel interface. Interrupts. Programmable interrupt control. Timers, counters. Programmable timers and counters (8254). Digital-to-Analog and Analog-to-Digital converters. Serial data communication.	Microprocessors, Microcomputers and Assembly Programming 2, Turhan ÖZKAN, Beta Publications, 2003.	Microcomputer Architecture and Programming, Lecture Notes by İbrahim Türkoğlu, Fırat University, 2006. Microprocessors and Microcomputers, Eşref Adalı, Birsen Publications, 2004.
YMÜ401	Graduation Project I	0 2 1	4	Literature research, problem definition, detailed analysis, and design for a software engineering problem. Design, project reports, and seminar presentations.		
YMÜ415	Software Verification and Testing	3 2 4	6	Introduction to software verification and validation, introduction to software testing, fundamentals of software security, software testing tools, black-box unit testing, white-box unit testing and control-flow testing, data-flow testing, website testing, usability testing, genetic algorithms, testing and code reviews for security, software testing criteria.	Software Testing 2nd edition, by Ron Patton, Sams Publishing, 2006 (ISBN 0-672-32798-8)	Foundations of Software Testing: ISTQB Certification, Dorothy Graham, Erik Van Veenendaal, Isabel Evans, and Rex Black, Thomson Learning, 2008.
YMÜ417	Professional Practice II	0 2 1	2	Professional Practice-2 course is conducted within the framework of the principles specified in the 'Engineering Faculty Practical Work (Internship) Directive' and the 'Intra-Departmental Student Internships Directive.' It includes presentations prepared by students regarding their internships and evaluations by juries based on questions asked. Midterm	Students will obtain resources related to their work topics during their summer internship.	

				grades are assigned based on workplace performance evaluations and related documents.		
YMÜ403	Software Project Management	2 0 2	3	Introduction to software project management. Overview of project planning. Selection of appropriate project approach. Effort estimation. Activity planning. Risk analysis and management. Resource allocation. Monitoring and control. Contract management. Managing people and organizing teams. Software quality assurance. Configuration management. Various tools related to software project management.	Software Project Management (Fourth Edition) By Bob Hughes & Mike Cotterell, McGraw-Hill Publication, 2006 (ISBN :-10 0077109899)	Effective Project Management 2nd edition, R.Wysocki, R. Beck,. Crane, ISBN: 9971-51-402-8, Wiley, 2000.
YMÜ419	Agile Methods in Software Development	3 0 3	6	Introduction to Agile Methods. Extreme Programming (XP), Lean, Scrum, Crystal, Feature-driven Development (FDD), Kanban. Dynamic Systems Development Method (DSDM). Architectural and design issues in Agile software methods.	Mike Cohn, Succeeding with Agile: Software Development Using Scrum, Addison-Wesley Professional; 1 edition (November 5, 2009), ISBN-10: 0321579364	James Shore and Shane Warden, The Art of Agile Development, O'Reilly Media; 1 edition (November 2, 2007)- ISBN-10: 0596527675. T. Dingsøyr, Agile Software Development: Current Research and Future Directions, Springer, 2010.
YMÜ423	System Modeling and Simulation	3 0 3	6	Dynamic Simulation. Data types, operators, and control structures in simulation. Model Generators. Simulation Programming. Simulation Problems.	Petrone, G., Cammarata, G. 2008. Modelling and Simulation. InTech. ISBN-13: 9783902613257.	Banks, Carson, Nelson, and Nicol, Discrete-Event System Simulation (Fourth Edition), Prentice-Hall, 2005. Law and Kelton, Simulation Modeling and Analysis (Third Edition), McGraw Hill, 2000.
YMÜ425	Applied Neural Networks	3 0 3	6	Introduction to neural networks. Perceptron learning rules. Backpropagation algorithms. Generalization and overtraining. Adaptive linear filters. Radial basis networks. Self-organizing maps. Learning vector quantization. Feedback networks.	Haykin (1999). Neural Networks: A Comprehensive Foundation (2nd Edition) Macmillan.	
YMÜ427	Soft Computing	3 0 3	6	Overview of intelligent system structures. Data mining. Decision trees. Neural computing, biological neural networks and learning	Neuro-Fuzzy and Soft Computing, J. S. R. JANG, C. T. SUN, and E.	Fusion of Neural Networks, Fuzzy Systems and Genetic Algorithms: Industrial

				algorithms. Applications of Artificial Neural Networks (ANNs). Classification and regression problems as learning tasks. Error computations. Single Layer Perceptrons (SLPs). Perceptron learning rule. Incremental learning algorithm for perceptrons, error correction learning. Delta rule, incremental gradient descent algorithm. Sigmoidal perceptrons. Design of fuzzy systems and neural networks using a software tool. Fuzzy inference. Genetic Algorithms (GAs) and their applications.	MIZUTANI Prentice Hall, 1997.	Applications, Lakhmi C. JAIN and N. M. MARTIN, CRC Press, 1998.
YMÜ429	Distributed Software Engineering	3 0 3	6	Programming interfaces for distributed software engineering. Network protocols. Using network protocol services for distributed and concurrent software. Applications of Internet and network-based software.	Distributed Systems: Principles and Paradigms (2nd edition), Andrew S. Tanenbaum, Maarten Van Steen, 2007, ISBN 0-13-239227-5.	
YMÜ431	Grid Programming	3 0 3	6	Introduction to Grid Computing; Virtualization of Computing Resources, Example Grids, OGSA, WSRF, Web Services, and Grid. Grid Architecture; Virtual Organizations, Resource Sharing, Web Services: Advantages, Disadvantages, Architectures, Web Service Standards: WSDL, SOAP, UDDI. Parallel Computing; Peer-to-Peer Computing, Grid Applications.	Dünnweber, Jan, Gorlatch, Sergei, Higher-Order Components for Grid Programming, Springer, 2009.	
YMÜ433	Biomedical Engineering	3 0 3	6	Image Formation in Computerized Tomography, Multislice Tomography, Flat Detector Technology, Positron Emission Technology, Magnetic Resonance Imaging, Image Processing in Nuclear Medicine, Noise Reduction in Nuclear Medicine Images, Color Flow Imaging, Clinical Tomography, Medical Image Archiving: PACS and DICOM Standards, WEB-based Image Transmission, Compression of Medical Images.	Lecture Notes	E. Yazgan, M. Korürek, Medical Electronics, ITU Publications
YMÜ435	Software Quality Assurance	3 0 3	6	Quality; how it is ensured and achieved and the need for quality in culture. Avoiding errors and other quality issues. Inspection and review.	Jeff Tian, 2005, Software Quality Engineering: Testing, Quality	

				Validation testing and verification techniques. Quality process standards. Product and process assurance. Problem analysis and reporting. Statistical approaches to quality control.	Assurance, and Quantifiable, Wiley-IEEE Computer Society.	
YMÜ439	Digital Image Processing Methods	3 0 3	6	Fundamentals of digital image, properties of light, color information, human vision 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, gray level slicing, brightness adjustment, contrast enhancement, and computer applications. Image filtering systems. Two-dimensional transformations of images; two-dimensional Fourier transform and fast Fourier transform applied to images.	Digital Image Processing, Rafael C. Gonzalez, Richard E. Woods, Prentice Hall; 2nd edition (January 15, 2002)	
YMÜ441	Game Design and Programming	3 0 3	6	Programming-focused, intermediate-level game programming techniques, game development using the DirectX library. Direct3D, understanding and using the Direct3D API. Various graphics techniques, lighting and particle effects, vertex and pixel shading programs with programmable graphics pipelines in modern graphics cards and 3D libraries.	Introduction to 3D Game Programming with DirectX 9.0, Frank Luna, Publisher: Jones & Bartlett Publishers; 1 edition (June 9, 2003), ISBN-10: 1556229135, ISBN-13: 978-1556229138	
YMÜ413	Data Communication and Computer Networks	3 0 3	6	Basics of data communication, multiplexing, analog and digital data communication, physical data communication media, computer network architectures, ISO OSI reference model, switching techniques, local area network protocols, media access control (MAC) protocols, data link layer, framing, error control, sliding window protocol, routing layer, network layer addressing, application layer. TCP/IP suite, IP Routing protocol, TCP and UDP protocols. Application development with Java and term project.	Computer Networking, By J. F. Kurose & K.W. Ross (6th Edition); Computer Networks, By Andrew S. Tanenbaum (5th Edition)	

YMÜ443	Occupational Health and Safety	3 0 3	3	Professional principles and regulations determined by professional chambers and laws are conveyed to students in a discussion environment. Students prepare and present research assignments and projects related to the definitions provided in the course.		
YMÜ445	Ethics and Social Responsibility	3 0 3	3	Concept of Social Responsibility, Approaches to Social Responsibility, Concept of Ethics, Ethical Approaches, Business Ethics, Problems Related to Ethics in Businesses, National and International Professional Ethics, Ethical Principles of Engineers and Technicians.		
YMÜ447	Entrepreneurship	3 0 3	3	Covers topics such as how the innovation process works, innovation management and organization in existing firms, and the creation of entrepreneurial companies. Pre-establishment research, how to set up a business, post-establishment decisions, and achieving a corporate structure in business management are explained.	N/A	N/A
YMÜ449	Intellectual and Industrial Property	3 0 3	3	Intellectual property rights, industrial property in the global economy, industrial property rights in Turkey, and the Turkish Patent Institute. Sources and principles of international intellectual property law, branding, geographical indication, introduction to the patent system, national and international patent protection, Patent Cooperation Treaty (PCT) and European Patent Convention (EPC), preparation of patent descriptions, patentability criteria, patent research and examination reports, patent research systems, and patent databases.	N/A	N/A
YMÜ451	Total Quality Management	3 0 3	3	Chronological events directly or indirectly affecting Total Quality Management (TQM), elements of TQM: Customer focus, cooperation with suppliers, principles of learning organizations, the attitude of the institution towards learning, continuous learning process, benchmarking, social	N/A	N/A

				responsibility, TQM in education, modern teaching-effective learning, project-based learning, cooperative learning model, advanced learning strategies and thinking skills, learning to learn, learning to think, lifelong learning, quality board, quality improvement teams, teamwork, strategic plan, self-assessment, and creating data collection methods and tools.		
YMÜ414	Graduation Project II	0 2 1	4	Graduation Project studies are conducted in accordance with the principles determined in the 'Faculty of Engineering Graduation Project Directive' and the 'Intra-Departmental Graduation Project Operation Directive.' Project studies are reviewed and developed under the supervision of the Project Manager. The student's performance is evaluated, and midterm grades are assigned. The project is written in thesis format and prepared for submission.	Recommended by the instructor for each student's project.	N/A
YMÜ410	Artificial Intelligence	3 0 3	6	Designing computers by modeling the learning mechanism of the human brain is gaining importance day by day. This course aims to provide the knowledge and skills necessary for designing intelligent systems by explaining learning techniques. Topics include introduction to artificial intelligence, basic concepts, problem-solving, search methods, learning, AI methods, artificial neural networks, expert systems, fuzzy logic, intelligent agents, and applications.	Russell, Stuart J.; Norvig, Peter, 2003, Artificial Intelligence: A Modern Approach (2nd ed.).	Turban, E., Aronson, J.E., Decision Support Systems and Intelligent Systems, Sixth Edition, Prentice Hall Int. Inc., 2001.
YMÜ432	Machine Learning	3 0 3	6	Paradigms of automatic learning. Learning. Observation-based, hypothesis-based, and abductive reasoning forms of learning. Factors related to learning ability. Connection model. Programming environments for learning programs.	Introduction to Machine Learning, Ethem Alpaydın, The MIT Press, 2004.	Pattern Recognition and Machine Learning, Christopher M. Bishop, 2006.
YMÜ426	Robot Programming	3 0 3	6	General information about robots, classification of robots by axes, types of robots, sensors and their areas of use, motion control systems and robot motor selection, position	L. Saciavicco, B. Siciliano, Modeling and Control of Robot	Varol, A., Robotics, Ministry of National Education, Istanbul, 2000.

				measurement and sensor selection, robot programming, work-time diagram analysis, SCORBOT-ER robot programming, robot assembly applications using LEGO parts.	Manipulators, Springer, London, 2000.	
YMÜ428	E-Commerce	3 0 3	6	The importance and technological infrastructure of electronic commerce in the business world, internet, intranet, extranet, business models, security, authentication, privacy, electronic payment systems, e-commerce services, and other related e-commerce topics and technologies. Developing appropriate business models, organizational challenges, and possible solutions.	Reports and articles provided by the instructor.	N/A
YMÜ430	Human-Computer Interaction	3 0 3	6	Psychological principles in human-machine interaction. Evaluation of user interfaces. Usability engineering. Task analysis. User-centered design and prototyping. Conceptual models and metaphors. Logical foundations of software design. Menu and command key design. Audio and natural language input/output. Response time and feedback. Color, object, and audio properties. Concepts of internationalization and localization. User interface architectures and applications. Project and case studies.	Alan Dix, Janet E. Finlay, Gregory D. Abowd, Russell Beale, 2003, Human-Computer Interaction, Prentice Hall.	
YMÜ434	Distance Education and E-Learning	3 0 3	6	Definitions, history, and theories of distance education and e-learning. Instructional design. Tools and technologies used in distance education. Multimedia learning. Computer-supported collaborative learning. Learning management systems. New developments and trends.	Distance Education : A Systems View, by Michael G. Moore, Greg Kearsley. Wadsworth, 2004	e-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning (2nd edition), by Ruth Colvin Clark, Richard E. Mayer. John Wiley & Sons, 2008. Teaching and Learning at a Distance: Foundations of Distance Education (4th edition), by Michael Simonson, Sharon E. Smaldino, Michael Albright, Susan Zvacek. Pearson,

						2006. Reusing online resources: a sustainable approach to e-learning, Allison Littlejohn, Routledge, 2003. Advances in E-Learning: Experiences and Methodologies, by Francisco J. Garcia Penalvo. Idea Group Inc, 2008.
YMÜ436	Advanced Web Programming	3 0 3	6	Understand the differences between static and dynamic (user-interactive) web pages. Knowledge of the basic components of dynamic web pages and the latest web technologies in this context. Programming dynamic web pages in HTML, PHP, MySQL, C#, and ASP.NET environments.	Simon Stobart, David Parsons, "Dynamic Web Application Development", Gaynor Redvers Press, London, UK.	
YMÜ438	Big Data	3 0 3	6	Advancements in web technologies and the increase in data creation, collection, and usage have led to an incredible rise in the size and complexity of data in many data-centric applications. Big data is difficult to manage due to three main reasons: larger data volumes, more complex data, and faster changes in data. This course focuses on text processing algorithms and programming using big data frameworks and technologies. Programming models will be developed to distribute operations across distributed computing clusters to achieve better computational power and faster operations, or existing technologies related to the topic will be used.	N/A	
YMÜ440	Cloud Computing and Virtualization	3 0 3	6	The course covers new programming paradigms in cloud programming, virtualization environments, and large-scale scientific data analysis. In addition, students will study, present, and discuss a wide range of research papers in cloud computing.	N/A	
YMÜ442	Compiler Design	3 0 3	6	The course aims to teach the fundamentals of programming languages and compiler	N/A	

				functions and phases. The interaction between compilers, programming languages, and programs will be comprehended. Topics include Compilation Phases, Lexical Analysis, Syntax Analysis, Semantic Analysis, Intermediate Code Generation, Target Code Generation, and Code Optimization.		
YMÜ444	Logical Programming	3 0 3	6	The course aims to teach programming concepts belonging to different logical programming languages by using various logical programming and functional programming languages. By the end of the course, students will understand and compare various concepts of different programming languages. Students will complete assignments to apply the content they have learned.	Seibel, P., “Practical Common LISP”, 2005, Springer.	
YMÜ446	Unix Programming	3 0 3	6	This course is an undergraduate course in Computer Science on the UNIX/Linux operating system. While presenting a broad view of the operating system, the main topics the course focuses on are Bash programming and system management. Students will practically learn command and script programming and use in the operating system and become familiar with the UNIX environment. The course requires practical skills about modern operating systems knowledge and programming basics. A script programming project aimed at developing proper technical coding skills will be requested within the scope of the term project.	N/A	
YMÜ450	Public Relations	2 0 2	2	The aim of the course is to draw the basic conceptual framework of public relations, preparing students for theoretical and applied courses they will take in the future. Concepts such as public and relations, definitions of public relations, advertising, propaganda, promotion, announcement, proactive and reactive public relations, development of public relations in the world and Turkey,	N/A	

				qualifications and duties of public relations personnel, public relations techniques constitute the course content.		
YMÜ452	Marketing	2 0 2	2	This course covers the definition and development process of the concept of marketing, addressing marketing objectives and management. It examines the elements of the marketing mix, including product, price, distribution, and promotion efforts, in detail. Globalization, global competition, and new marketing approaches are explored with examples. Additionally, the place of public relations and advertising within integrated marketing communication is highlighted.		
YMÜ454	Career Planning	2 0 2	2	The concept of career, career planning, and its stages; individual career development; forming career strategies; career planning models; career options in related teaching fields; resume preparation and types; CV formats and examples; points to consider in preparing a CV; cover letters, introduction letters; job interviews, purposes, methods, and types; preparation for and stages of interviews; scenarios encountered during interviews; question types, body language, and physical signals.		
YMÜ456	Management Sociology	2 0 2	2	Organization, coordination, bureaucracy, and a systems approach to human relations. Managerial effectiveness, the human factor in management, organizational effectiveness, renewal, revitalization, productivity, and health of the organization. Utilization of human resources, motivation in management, and its social dimensions. Vertical, horizontal, and cross interactions in management.		
YMÜ458	Software Ethics	2 0 2	2	Ethical evaluation principles and models in information technology, malicious software research, Windows hacking, password hacking, mail hacking, web application hacking, domain name hacking, other hacking types,		

				cybercrimes on portable computers, VoIP connection hacking, vulnerability testing, advanced hacking with Metasploit, firewalls, IDS systems, unauthorized access, ways to detect attacks (Honeypot), and system network security.		
YMÜ460	Applied Engineering Education	8 14 15	26	To be conducted in accordance with the Faculty of Engineering's "Applied Engineering Education" directive.		