



2026-2027 Academic Year
List of Courses Offered in Foreign Language
2026-2027 Akademik Yılı
Yabancı Dilde Açılacak Dersler Listesi

Faculty of Engineering
Mühendislik Fakültesi

	Department <i>Bölüm</i>	Course Code <i>Ders Kodu</i>	ECTS <i>AKTS</i>	Course Title <i>Dersin Adı</i>	Semester <i>Dönem</i>	Course Content <i>Dersin İçeriği</i>	Academic Staff <i>Dersi Veren Öğretim Elemanı</i>	Online Available <i>Çevrimiçi</i>
1	Computer Engineering	CSE 101T	4	Computer Programming I	Güz / Fall	This course will begin with an introduction to computing and solving problems in a programmatic way. The discussion will then focus on the development of a prgorams using the datatypes and control structures available in the Java programming language.	Asst. Prof. Dr. Joseph William Ledet	No
2	Computer Engineering	CSE 101L	4	Computer Programming I Laboratory	Güz / Fall	This course will begin with an introduction to computing and solving problems in a programmatic way. The discussion will then focus on the development of a prgorams using the datatypes and control structures available in the Java programming language.	Asst. Prof. Dr. Joseph William Ledet	No
3	Computer Engineering	CSE 105	2	Introduction to Computer Science	Güz / Fall	This course will begin with a short introduction by giving information about the history of computer science. The following topics will be presented from slides in this course during the semester: The Role of Algorithms, The History of Computing, Theory of Computation, Computer Graphics, Image Processing, Digital Design, Operating Systems, Data Structures, Software Engineering, Database Systems, Networks and the Internet, Artificial Intelligence	Asst. Prof. Dr. Mustafa Berkay Yılmaz	No
4	Computer Engineering	CSE 181	6	Natural Sciences	Güz / Fall	Outline the history of science from Aristotle to the Present while reviewing the basic principles of fundamental physics, chemistry, biology, mathematics and geometry.	Prof. Dr. Melih Günay	No
5	Computer Engineering	CSE 201	6	Data Structures	Güz / Fall	Detail analysis of data structures such as stack, queue, list, tree and graph.	Prof. Dr. Ümit Deniz Uluşar	No
6	Computer Engineering	CSE 203	6	Object-Oriented Analysis and Design	Güz / Fall	Problem determination, Marketing research design, Data gathering process, Data analysis, Reporting	Prof. Dr. Ümit Deniz Uluşar	No
7	Computer Engineering	CSE 211	5	Digital Design	Güz / Fall	It starts with a discussion of combinational logic: logic gates, minimization techniques, arithmetic circuits, and modern logic devices such as field programmable logic gates. The second part of the course deals with sequential circuits: flip-flops, synthesis of sequential circuits, and case studies, including counters, registers, and random access memories. State machines will then be discussed and illustrated through case studies of more complex systems using programmable logic devices. Different representations including truth table, logic gate, timing diagram, switch representation, and state diagram will be discussed.	Assoc. Prof. Dr. Taner Danışman	No
8	Computer Engineering	CSE 213	5	Microcontroller Programming	Güz / Fall	To introduce students to the architecture and operation of typical microprocessors and microcontrollers. To familiarize the students with the programming and interfacing of microprocessors and microcontrollers. To provide a strong foundation for designing real-world applications using microprocessors and microcontrollers.	Prof. Dr. Alper Bilge	No
9	Computer Engineering	CSE 221	6	Discrete Mathematics I	Güz / Fall	Combinations, permutations, logic, mathematical induction, pigeonhole principle, inclusion-exclusion, generating functions, graphs and graph theory	Asst. Prof. Dr. Murat Ak	No
10	Computer Engineering	CSE 301	6	Algorithms	Güz / Fall	Asymptotic notation. Divide and conquer approach. Solving recurrences. Analysis of randomized quicksort. Medians and order statistics. Heaps: heapsort, priority queues. Sorting in linear time. Dynamic programming. Greedy algorithms. Amortized analysis and dynamic tables.	Asst. Prof. Dr. Hüseyin Gökhan Akçay	No

11	Computer Engineering	CSE 303	6	Fundamentals of Operating Systems	Güz / Fall	The course will start with a brief historical perspective of the evolution of operating systems over the last fifty years and then cover the major components of most operating systems. This discussion will cover the tradeoffs that can be made between performance and functionality during the design and implementation of an operating system. Particular emphasis will be given to two major OS subsystems: process management (processes, threads, CPU scheduling, synchronization, and deadlock), memory management (segmentation, paging, swapping), and file systems; and on operating system support for distributed systems.	Assoc. Prof. Dr. Taner Danişman	No
12	Computer Engineering	CSE 321	6	Statistical Inference and Computation	Güz / Fall	Axiomatic probability theory, independence, conditional probability, discrete and continuous random variables, special distributions of importance to Computer Science, and expectation, jointly distributed random variables and distributions, limit theorems.	Prof. Dr. Alper Bilge	No
13	Computer Engineering	CSE 335	6	Web Programming	Güz / Fall	Fundamentals of web programming. Client-side technologies (HTML, CSS, JavaScript), server-side programming, the HTTP protocol, dynamic pages, form handling, sessions, and database-backed web applications. Introduction to modern web frameworks and the development of interactive, responsive web sites.	Prof. Dr. Melih Günay	No
14	Computer Engineering	CSE 341	6	Fundamentals of System Administration	Güz / Fall	The objective of this course is to provide enough knowledge to install a Server operating system, understand the functionality of the different system components and be able to critically evaluate different server technologies.	Asst. Prof. Dr. Joseph William Ledet	No
15	Computer Engineering	CSE 351	6	Design Patterns	Güz / Fall	This course covers the principles behind the software design patterns and their application in constructing software components. The students who succeeded in this course; - Be able to state the intention of the pattern and show in UML notation, - Be able to identify the participants and their responsibilities, - Be able to contrast the difference in intentions between structurally similar patterns, - Be able to apply several appropriate patterns in the design of small programming assignments, - Be able to select appropriate design patterns to improve an existing design.	Prof. Dr. Alper Bilge	No
16	Computer Engineering	CSE 377	6	Game Programming	Güz / Fall	Game Design. Unity. Multiplayer Gaming. AI in Gaming. Audio. Building and Deployment.	Assoc. Prof. Dr. Alper Özcan	No
17	Computer Engineering	CSE 381	6	Principles of User Interface Design	Güz / Fall	Introduction, history of interfaces, usability, learnability, visibility, efficiency, user error control, user-centered design, user and task analysis, generating designs, software architecture, layout, output, input, test, experimentation, web, prototyping, graphic design, visualization, color, accessibility, internationalization, heuristic evaluation, animation, input-output technologies.	Asst. Prof. Dr. Mustafa Berkay Yılmaz	No
18	Computer Engineering	CSE 409	6	Introduction to Natural Language Processing	Güz / Fall	Learn to use Machine Learning, Spacy, NLTK, SciKit-Learn, Deep Learning, and more to conduct Natural Language Processing	Prof. Dr. Melih Günay	No
19	Computer Engineering	CSE 413	6	Optimization Theory and Applications	Güz / Fall	Fundamentals of optimization theory and its applications. Linear and nonlinear programming, convex optimization, unconstrained and constrained optimization, gradient-based methods, and applications of optimization techniques to engineering and machine-learning problems.	Research Asst. Dr. Taha Yiğit Alkan	No
20	Computer Engineering	CSE 415	6	Fundamentals of Cloud Computing	Güz / Fall	Cloud computing is a scalable services consumption and delivery platform that provides on-demand computing service for shared pool of resources, namely servers, storage, networking, software, database, applications etc., over the Internet. It is a model for enabling ubiquitous, on-demand access to a shared pool of configurable computing resources, which can be rapidly provisioned and released with minimal management effort. This course will introduce various aspects of cloud computing, including fundamentals, management issues, security challenges and future research trends.	Assoc. Prof. Dr. Alper Özcan	No
21	Computer Engineering	CSE 425	6	Network Security	Güz / Fall	Principles and practice of network security. Cryptographic foundations, authentication and key management, secure protocols, firewalls, intrusion detection, virtual private networks, common attacks and countermeasures, and the design of secure networked systems.	Research Asst. Dr. Manolya Atalay	No
22	Computer Engineering	CSE 427	6	Wireless Sensor Networks	Güz / Fall	Architecture and protocols of wireless sensor networks. Sensor node hardware, energy-efficient communication, medium-access and routing protocols, localization, time synchronization, data aggregation, and applications in environmental monitoring and the Internet of Things.	Research Asst. Dr. Manolya Atalay	No

23	Computer Engineering	CSE 433	6	Advanced Mobile Programming	Güz / Fall	External Resources User Interfaces Location Based Services & working with MapViews Services & Broadcast Receivers Notifications & Intent Filters Telephony & SMS Sensörler Touch & Gestures SQLite Bluetooth Communication Newtork Connectivity & WiFi	Asst. Prof. Dr. Mustafa Berkay Yılmaz	No
24	Computer Engineering	CSE 435	6	Formal Languages and Automata	Güz / Fall	Finite automata, regular expressions, regular languages and their properties, the pumping lemma. Context free grammars and languages, normal forms, pushdown automata, the pumping lemma for the CFLs. Turing machines and their properties. Decidability and undecidable languages. Complexity theory, NP-completeness.	Asst. Prof. Dr. Murat Ak	No
25	Computer Engineering	CSE 439	6	Distributed and Parallel Computing	Güz / Fall	Analysis of parallel algorithms. Real and apparent parallelism. Parallel programming and parallel programming compilers. Message Passing Interface. Scheduling and performance analysis. Parallel computer topologies and applications with the hypercube architecture.	Assoc. Prof. Dr. Taner Danışman	No
26	Computer Engineering	CSE 445	6	Deep Learning	Güz / Fall	This course has two parts. The first part includes an introduction to the basic machine learning concepts and algorithms, which will also provide the basis for the second part of the course. The second part covers selected recent topics in machine learning. Topics include: (i) Supervised learning (parametric/non-parametric algorithms, support vector machines, kernels, neural networks). (ii) Unsupervised learning (clustering, dimensionality reduction, recommender systems, deep learning). (iii) Best practices in machine learning.	Asst. Prof. Dr. Hüseyin Gökhan Akçay	No
27	Computer Engineering	CSE 102T	4	Computer Programming II	Bahar / Spring	This course will begin with an introduction to object oriented programming and its differences from traditional sequential programming. The discussion will then focus on the particulars of how to design programs in the object oriented paradigm.	Asst. Prof. Dr. Joseph William Ledet	No
28	Computer Engineering	CSE 102L	4	Computer Programming II Laboratory	Bahar / Spring	This course will begin with an introduction to object oriented programming and its differences from traditional sequential programming. The discussion will then focus on the particulars of how to design programs in the object oriented paradigm.	Prof. Dr. Melih Günay	No
29	Computer Engineering	CSE 122	6	Descriptive Statistics and Probability	Bahar / Spring	Definition, history, advancement and basic principles of statistics and probability. Statistical methods. Students will be able to analyze the data obtained in their own fields and to obtain correct and meaningful results.	Prof. Dr. Alper Bilge	No
30	Computer Engineering	CSE 204	5	Database Systems	Bahar / Spring	This course will begin with an introduction to historical methods for data storage and manipulation. The discussion will then focus on the development of a relational database model for use in a software system. The methodology for developing a database from conceptual to logical to physical database will be discussed by using tools such as E-R modeling and normalization.	Asst. Prof. Dr. Joseph William Ledet	No
31	Computer Engineering	CSE 206	6	Computer Organization	Bahar / Spring	Histor of Computers, cache memory, computer arithmetic, integer representation, FP representation, Instruction sets, addressing modes, processor structure and functions, Assembly Language, and Pipelining.	Assoc. Prof. Dr. Taner Danışman	No
32	Computer Engineering	CSE 214	6	Advanced Application Development	Bahar / Spring	Advanced application development covering modern software frameworks, layered application architectures, dependency management, data access, and building maintainable applications. Students design, implement, test and deploy applications through hands-on projects using contemporary development tools and practices.	Assoc. Prof. Dr. Alper Özcan	No
33	Computer Engineering	CSE 222	6	Discrete Mathematics II	Bahar / Spring	Combinations, permutations, logic, mathematical induction, pigeonhole principle, inclusion-exclusion, generating functions, graphs and graph theory	Asst. Prof. Dr. Murat Ak	No
34	Computer Engineering	CSE 308	6	Mobile Programming	Bahar / Spring	This course aims to provide programming skills for mobile environments. Knowledge on Java and Kotlin, which are the most used programming languages for this purpose, will be given as well with project examples.	Asst. Prof. Dr. Mustafa Berkay Yılmaz	No
35	Computer Engineering	CSE 320	6	Computer Networks	Bahar / Spring	Introduction to networks, protocols, packages, IP, NAT, DNS, routing, BGP, virtual circuits, TCP, Web, p2p, video, QoS, security, cryptology, physical layer, data link layer.	Asst. Prof. Dr. Mustafa Berkay Yılmaz	No
36	Computer Engineering	CSE 328	6	Internet of Things	Bahar / Spring	Internet communication methods and protocols. Data Transmission Mechanisms. Sensors and Mini Computers as Rasperberry PI and Arduino.	Assoc. Prof. Dr. Taner Danışman	No

37	Computer Engineering	CSE 332	6	Software Engineering	Bahar / Spring	This course gives students experience designing, implementing, testing, and debugging large programs. Students will also get advanced Java programming experience; covering topics such as inheritance, multithreading, networking, database programming, and web development.	Prof. Dr. Ümit Deniz Uluşar	No
38	Computer Engineering	CSE 336	6	Advanced Web Programming	Bahar / Spring	Hands on learning of the most commonly used web development technologies for basic web applications including HTML, CSS, Javascript, PHP, CodeIgnator, JDBC, Client-Server Architecture.	Prof. Dr. Melih Günay	No
39	Computer Engineering	CSE 348	6	Introduction to Image Processing	Bahar / Spring	Image acquisition, sampling and quantization. Spatial domain processing. Image enhancement. Texture analysis. Edge detection. Frequency domain processing. Color image processing. Mathematical morphology. Image segmentation and region representations. Statistical and structural scene descriptions. Applications.	Asst. Prof. Dr. Mustafa Berkay Yılmaz	No
40	Computer Engineering	CSE 364	6	Computer Graphics	Bahar / Spring	This course will begin with an introduction including the human visual system and history of graphics softwares and cover the course topics presented in the syllabus. The lectures will be mainly based on presentation of lecture slides and discussions. All lecture slides will be made available on the course web page. In the lectures, programming examples will be presented using computer by projecting computer screen on the board.	Asst. Prof. Dr. Hüseyin Gökhan Akçay	No
41	Computer Engineering	CSE 367	6	Cyber Physical Systems	Bahar / Spring	Introduction to cyber-physical systems that tightly integrate computation with physical processes. Embedded platforms, sensing and actuation, real-time and control concepts, networking of physical devices, system modeling, and applications in areas such as robotics, smart environments and industrial automation.	Research Asst. Dr. Manolya Atalay	No
42	Computer Engineering	CSE 378	6	Advanced Game Programming	Bahar / Spring	Using Godot Engine. Students will learn how to create complex and dynamic game mechanics using Godot's scripting language, GDScript, and explore advanced topics such as networking, optimization, and physics simulation. Students will also have the opportunity to work on a team project, developing a complete game from start to finish.	Assoc. Prof. Dr. Alper Özcan	No
43	Computer Engineering	CSE 408	6	Scientific Programming	Bahar / Spring	The course will begin with an overview to programming techniques. Then, data analysis methods will be explained. The Matplotlib, a widely used library will be examined and data visualization methods will be explained. Programming examples and applications will be developed with Matlab and Python.	Asst. Prof. Dr. Hüseyin Gökhan Akçay	No
44	Computer Engineering	CSE 424	6	Introduction to Blockchain	Bahar / Spring	How blockchain is used in cryptocurrencies, supply-chain management, e-voting, healthcare systems and necessary cryptography background.	Asst. Prof. Dr. Murat Ak	No
45	Computer Engineering	CSE 434	6	Programming Languages	Bahar / Spring	Language evaluation criteria. Describing syntax and semantics. Tools for constructing lexical and syntactical analyzers. Names, bindings, type checking, and scopes. Data types. Expressions and the assignment statement. Statement-level control structures. Subprograms. Abstract data types. Concurrency. Exception handling. Functional programming languages. Logic programming languages.	Asst. Prof. Dr. Murat Ak	No
46	Computer Engineering	CSE 438	6	Microservice Architecture	Bahar / Spring	Design and implementation of microservice-based software systems. Service decomposition, RESTful and message-based communication, containers and orchestration, API gateways, service discovery, resilience and observability patterns, and continuous integration and deployment of distributed applications.	Research Asst. Dr. Taha Yiğit Alkan	No
47	Computer Engineering	CSE 444	6	Data Mining	Bahar / Spring	Learn how to use NumPy, Pandas, Seaborn , Matplotlib , Plotly , Scikit-Learn , Machine Learning, Tensorflow , and more	Prof. Dr. Melih Günay	No
48	Computer Engineering	CSE 472	6	Information Systems Security	Bahar / Spring	Asymmetric and symmetric encryption, stream ciphers, modes of encryption, public key cryptosystems, digital signatures, RSA, El Gamal encryption, elliptic curve cryptosystems, cryptographic hash functions, MACs, key establishment	Asst. Prof. Dr. Murat Ak	No
49	Computer Engineering	CSE 474	6	Social Network Analysis	Bahar / Spring	This course teaches students basic techniques to mine the online social networks (including social networks and social media). Detailed topics include three aspects: (1) Introduction to social network analysis and algorithms; (2) Online social network mining, and (3)Link prediction and information diffusion in social network.	Assoc. Prof. Dr. Alper Özcan	No