



**2024-2025 Academic Year**  
**List of Courses Offered in Foreign Language**  
**2024-2025 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	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 101T	4	Computer Programming I	Güz <i>Fall</i>	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 program using the datatypes and control structures available in the Java programming language.	Dr.Öğr.Üyesi JOSEPH WILLIAM LEDET	No
2	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 101L	4	Computer Programming I Laboratory	Güz <i>Fall</i>	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 program using the datatypes and control structures available in the Java programming language.	Dr.Öğr.Üyesi JOSEPH WILLIAM LEDET	No
3	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 105	2	Introduction to Computer Science	Güz <i>Fall</i>	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	Doç.Dr. TANER DANIŞMAN	No
4	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 181	6	Natural Sciences	Güz <i>Fall</i>	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. MELİH GÜNAY	No
5	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 201	6	Data Structures	Güz <i>Fall</i>	Detail analysis of data structures such as stack, queue, list, tree and graph.	Prof.Dr. ÜMİT DENİZ ULUŞAR	No
6	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 203	6	Object-Oriented Analysis and Design	Güz <i>Fall</i>	Problem determination, Marketing research design, Data gathering process, Data analysis, Reporting	Prof.Dr. ÜMİT DENİZ ULUŞAR	No
7	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 211	5	Digital Design	Güz <i>Fall</i>	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.	Doç.Dr. TANER DANIŞMAN	No
8	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 213	5	Microcontroller Programming	Güz <i>Fall</i>	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.	Doç.Dr. ALPER BİLGE	No
9	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 221	6	Discrete Mathematics I	Güz <i>Fall</i>	Combinations, permutations, logic, mathematical induction, pigeonhole principle, inclusion-exclusion, generating functions, graphs and graph theory	Dr.Öğr.Üyesi MURAT AK	No
10	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 301	6	Algorithms	Güz <i>Fall</i>	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.	Dr.Öğr.Üyesi HÜSEYİN GÖKHAN AKÇAY	No

11	Bilgisayar Mühendisliği <i>Computer Engineering</i>	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.	Doç.Dr. TANER DANIŞMAN	No
12	Bilgisayar Mühendisliği <i>Computer Engineering</i>	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.	Doç.Dr. ALPER BİLGE	No
13	Bilgisayar Mühendisliği <i>Computer Engineering</i>	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.	Dr.Öğr.Üyesi JOSEPH WILLIAM LEDET	No
14	Bilgisayar Mühendisliği <i>Computer Engineering</i>	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.	Doç.Dr. ALPER BİLGE	No
15	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 377	6	Game Programming	Güz Fall	Game Design. Unity. Multiplayer Gaming. AI in Gaming. Audio. Building and Deployment.	Doç.Dr. ALPER ÖZCAN	No
16	Bilgisayar Mühendisliği <i>Computer Engineering</i>	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.	Dr.Öğr.Üyesi MUSTAFA BERKAY YILMAZ	No
17	Bilgisayar Mühendisliği <i>Computer Engineering</i>	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.	Dr.Öğr.Üyesi MURAT AK	No
18	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 409	6	Introduction to Natural Language Proces	Güz Fall	Learn to use Machine Learning, Spacy, NLTK, SciKit-Learn, Deep Learning, and more to conduct Natural Language Processing	Prof.Dr. MELİH GÜNAY	No
19	Bilgisayar Mühendisliği <i>Computer Engineering</i>	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.	Doç.Dr. ALPER ÖZCAN	No
20	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 425	6	Network Security	Güz Fall	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	Dr.Öğr.Üyesi MURAT AK	No
21	Bilgisayar Mühendisliği <i>Computer Engineering</i>	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	Dr.Öğr.Üyesi MUSTAFA BERKAY YILMAZ	No

22	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 445	6	Introduction to Machine Learning	Güz <i>Fall</i>	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.	Dr.Öğr.Üyesi HÜSEYİN GÖKHAN AKÇAY	No
23	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 469	6	Virtual Reality and Metaverse	Güz <i>Fall</i>	Fundamentals of virtual reality systems, geometric modeling, transformations, graphical rendering, haptic rendering, evaluation of virtual reality systems.	Doç.Dr. ALPER ÖZCAN	No
24	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 102T	4	Computer Programming II	Bahar <i>Spring</i>	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.	Dr.Öğr.Üyesi JOSEPH WILLIAM LEDET	No
25	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 102L	4	Computer Programming II Laboratory	Bahar <i>Spring</i>	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. MELİH GÜNAY	No
26	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 122	6	Descriptive Statistics and Probability	Bahar <i>Spring</i>	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.	Doç.Dr. ALPER BİLGE	No
27	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 206	5	Computer Organization	Bahar <i>Spring</i>	Histor of Computers, cache memory, computer arithmetic, integer representation, FP representation, Instruction sets, addressing modes, processor structure and functions, Assembly Language, and Pipelining.	Doç.Dr. TANER DANIŞMAN	No
28	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 208	6	Database Systems	Bahar <i>Spring</i>	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.	Dr.Öğr.Üyesi JOSEPH WILLIAM LEDET	No
29	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 222	6	Discrete Mathematics II	Bahar <i>Spring</i>	Combinations, permutations, logic, mathematical induction, pigeonhole principle, inclusion-exclusion, generating functions, graphs and graph theory	Dr.Öğr.Üyesi MURAT AK	No
30	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 320	6	Computer Networks	Bahar <i>Spring</i>	Introduction to networks, protocols, packages, IP, NAT, DNS, routing, BGP, virtual circuits, TCP, Web, p2p, video, QoS, security, cryptology, physical layer, data link layer.	Dr.Öğr.Üyesi MUSTAFA BERKAY YILMAZ	No
31	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 332	6	Software Engineering	Bahar <i>Spring</i>	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. ÜMİT DENİZ ULUŞAR	No
32	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 328	6	Internet of Things	Bahar <i>Spring</i>	Internet communication methods and protocols. Data Transmission Mechanisms. Sensors and Mini Computers as Raspberry Pi and Arduino.	Doç.Dr. TANER DANIŞMAN	No
33	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 334	6	Mobile Programming	Bahar <i>Spring</i>	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.	Dr.Öğr.Üyesi MUSTAFA BERKAY YILMAZ	No
34	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 336	6	Advanced Web Programming	Bahar <i>Spring</i>	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. MELİH GÜNAY	No
35	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 348	6	Introduction to Image Processing	Bahar <i>Spring</i>	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.	Dr.Öğr.Üyesi MUSTAFA BERKAY YILMAZ	No
36	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 358	6	Introduction to Artificial Intelligence	Bahar <i>Spring</i>	Intelligent Agents, Solving Problems by Uninformed and Informed Search Methods, Constraint Satisfaction Problems, Adversarial Search, Markov Decision Process, Reinforcement Learning	Doç.Dr. ALPER BİLGE	No
37	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 364	6	Computer Graphics	Bahar <i>Spring</i>	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.	Dr.Öğr.Üyesi HÜSEYİN GÖKHAN AKÇAY	No
38	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 378	6	Advanced Game Programming	Bahar <i>Spring</i>	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.	Doç.Dr. ALPER ÖZCAN	No

39	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 408	6	Scientific Programming	Bahar <i>Spring</i>	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.	Dr.Öğr.Üyesi HÜSEYİN GÖKHAN AKÇAY	No
40	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 424	6	Introduction to Blockchain	Bahar <i>Spring</i>	How blockchain is used in cryptocurrencies, supply-chain management, e-voting, healthcare systems and necessary cryptography background.	Dr.Öğr.Üyesi MURAT AK	No
41	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 434	6	Programming Languages	Bahar <i>Spring</i>	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.	Dr.Öğr.Üyesi MURAT AK	No
42	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 440	6	Parallel Computing	Bahar <i>Spring</i>	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.	Doç.Dr. TANER DANIŞMAN	No
43	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 444	6	Introduction to Data Mining	Bahar <i>Spring</i>	Learn how to use NumPy, Pandas, Seaborn , Matplotlib , Plotly , Scikit-Learn , Machine Learning, Tensorflow , and more	Prof.Dr. MELİH GÜNAY	No
44	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 472	6	Information Systems Security	Bahar <i>Spring</i>	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	Dr.Öğr.Üyesi MURAT AK	No
45	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 476	6	Large Language Models	Bahar <i>Spring</i>	Large Language Models Methods and Applications aims to provide a holistic view of the current state of large language models. This course starts with the basic of language models, including network architectures, training, inference, and evaluation. Then it discusses the interpretation (or attempts of), alignments, and emergent capabilities of large language models, followed by its popular applications in language tasks and new utilizations beyond texts. This course presents the techniques of scaling up language model pretraining and recent approaches in making the pretraining of large models and their deployment more efficient. It then discusses various concerns surrounding the deployment of large language models and wraps up with the challenges and frontiers of LLM developments.  This course is designed to give students an overview of the techniques behind LLMs and a thorough grounding on the fundamentals and cutting-edge developments of LLMs, to prepare them for further research or applied endeavors in this new AI era.	Doç.Dr. ALPER ÖZCAN	No
46	Bilgisayar Mühendisliği <i>Computer Engineering</i>	CSE 478	6	Introduction to Bioinformatics	Bahar <i>Spring</i>	This course includes the calculation techniques that need to be learned to process the large amount of information produced from the latest developments such as genome sequence in biology through data mining.	Doç.Dr. ALPER ÖZCAN	No