2025-2026 Academic Year
List of Courses Offered in Foreign Language
2025-2026 Akademik Yılı
Yabancı Dilde Açılacak Dersler Listesi

Institute of Natural and Applied Sciences
Fen Bilimleri Enstitüsü

	Department *Bölüm*	Course Code *Ders Kodu*	ECTS *AKTS*	Course Title *Dersin Adı*	Semester *Dönem*	Course Content *Dersin İçeriği*	Academic Staff *Dersi Veren Öğretim Elemanı*	Online Available *Çevrimiçi*
1	Computer Engineering	CSE 5003	8	Analysis of Algorithms	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
2	Computer Engineering	CSE 5018	8	Game Theory	Fall	Game types and computing Nash and other equilibria in different type of games.	Asst. Prof. Dr. Murat Ak	No
3	Computer Engineering	CSE 5021	8	Operating Systems	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 Danışman	No
4	Computer Engineering	CSE 5041	8	System Administration	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
5	Computer Engineering	CSE 5045	8	Machine Learning	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
6	Computer Engineering	CSE 5051	8	Design Patterns	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
7	Computer Engineering	CSE 5071	8	Progress of Natural Science	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
8	Computer Engineering	CSE 5008	8	Scientific Programming	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 Phyton.	Asst. Prof. Dr. Hüseyin Gökhan Akçay	No
9	Computer Engineering	CSE 5044	8	Data Mining	Spring	The course is teaches basic concepts in data mining. Clustering/Classification and Association Analysis are main subjects. Data curation is the also included.	Prof. Dr. Melih Günay	No
10	Computer Engineering	CSE 5012	8	Bioinformatics	Spring	You'll master computer science and data science concepts applicable to the fields of genomics, microbiology, biotechnology, and biochemistry, including software and research methodologies.	Assoc. Prof. Dr. Alper Özcan	No
11	Computer Engineering	CSE 5028	8	Internet of Things	Spring	Internet communication methods and protocols. Data Transmission Mechanisms. Sensors and Mini Computers as Rasperberry PI and Ardinuo.	Assoc. Prof. Dr. Taner Danışman	No
12	Computer Engineering	CSE 5040	8	Distributed and Parallel Computing	Spring	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
13	Computer Engineering	CSE 5048	8	Image Processing	Spring	This course provides an intermediate level background to image analysis and computer vision for graduates. We will start with low-level vision (early processing) techniques such as binary image analysis, filtering, edge detection and texture analysis. Then, we will cover mid-level vision topics such as image segmentation and feature extraction in detail. Finally, we will do case studies on several applications such as image classification, object recognition, and deep learning.	Asst. Prof. Dr. Mustafa Berkay Yılmaz	No

14	Computer Engineering	CSE 5050	8	Cyber Security	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
15	Computer Engineering	CSE 5058	8	Artificial Intelligence	Spring	Intelligent Agents, Solving Problems by Uninformed and Informed Search Methods, Constraint Satisfaction Problems, Adverserial Search, Markov Decission Process, Reinforcement Learning	Prof. Dr. Alper Bilge	No
16	Computer Engineering	CSE 7009	10	Natural Language Processing	Fall	Learn to use Machine Learning, Spacy, NLTK, SciKit-Learn, Deep Learning, and more to conduct Natural Language Processing	Prof. Dr. Melih Günay	No
17	Computer Engineering	CSE 7011	10	Theory of Computation	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
18	Computer Engineering	CSE 7056	10	Reinforcement Learning	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
19	Computer Engineering	CSE 7069	10	Virtual and Augmented Reality	Fall	Fundamentals of virtual reality systems, geometric modeling, transformations, graphical rendering, haptic rendering, evaluation of virtual reality systems.	Assoc. Prof. Dr. Alper Özcan	No
20	Computer Engineering	CSE 7024	10	Blockchain And Its Applications	Spring	How blockchain is used in cryptocurrencies, supply-chain management, e-voting, healthcare systems.	Asst. Prof. Dr. Murat Ak	No
21	Computer Engineering	CSE 7052	10	Graph Theory	Spring	This course provides a complete introduction to Graph Theory algorithms in computer science. Topics covered include: how to store and represent graphs on a computer; common graph theory problems seen in the wild; famous graph traversal algorithms (DFS & BFS); Dijkstra's shortest path algorithm (both the lazy and eager version); what a topological sort is, how to find one, and places it's used; learning about detecting negative cycles and finding shortest paths with the Bellman-Ford and Floyd-Warshall algorithms; discovering bridges and articulation points in graphs; understanding and detecting strongly connected components with Tarjan's algorithm, and finally solving the traveling salesman problem with dynamic programming.	Prof. Dr. Ümit Deniz Uluşar	No
22	Computer Engineering	CSE 7054	10	Deep Learning	Spring	History and therotical advanteges of the deep learning, basic learning algorithms and architectures for deep learning, regularization of distributed models, optimization techniques for training deep networks, convolutional networks, bacpropogating and recurrent networks, autoencoders and linear factor models, learning by demonstration, deep generative networks - Boltzman machines	Asst. Prof. Dr. Hüseyin Gökhan Akçay	No
23	Computer Engineering	CSE 7068	10	Recommender Systems	Spring	Recommendation systems is a very active field in terms of both research and implementation. This course covers the basic principles of recommendation systems, with a particular focus on collaborative filtering (suggestions based on human behavior) and practical experience (a project).	Prof. Dr. Alper Bilge	No