Course Syllabus

Code - Course Title	**AYG105 - Data Structures and Algorithms**
Course Type	I. SEMESTER
Laboratory + Practice	3+2
ECTS	**6.0**
Language of Instruction	Türkçe
Course Type	Required Courses
Course Instructor(s)	ÖĞR. GÖR. DR. NEŞE AGUN

Mode of Delivery	Face to face
Prerequisites	There are no prerequisites or corequisites for this course.

Course Syllabus

Weeks	Learning Outcomes	Topics	Teaching Methods
Week - 1		Basic Concepts: Data Types, Algorithm Design, and Pseudocode Fundamentals	
Week - 2		Complexity Analysis: Time and Space Complexity, Asymptotic Notations (Big O, Omega, Theta)	
Week - 3		Linear Data Structures 1: Arrays and Memory Management in Dynamic Arrays	
Week - 4		Linear Data Structures 2: Singly and Doubly Linked Lists	
Week - 5		Linear Data Structures 3: Stacks and Queues Applications	
Week - 6		Searching and Basic Sorting Algorithms: Linear/Binary Search, Bubble, Insertion, and Selection Sort	
Week - 7		Advanced Sorting Algorithms: Quick Sort and Merge Sort	
Week - 8		Midterm Exam	
Week - 9		Introduction to Hierarchical Data Structures: Tree Concept and Binary Trees	
Week - 10		Binary Search Trees (BST) and Balancing Methods (AVL and Red-Black Trees)	
Week - 11		Back-End Applications and Database Fundamentals: Hash Tables and Database Indexing Logic	
Week - 12		Introduction to Graph Algorithms: Nodes, Edges, and Network Modeling	
Week - 13		Advanced Graph Algorithms: Depth-First (DFS) and Breadth-First Search (BFS), Shortest Path Algorithms (Dijkstra)	
Week - 14		Advanced Performance Optimization, Algorithmic Problem Solving Applications, and End-of-Term Project Presentations	

Learning Outcomes

#	Learning Outcome
1	Upon successful completion of this course, students will reach the competence to code linear data structures such as arrays, linked lists, stacks, and queues by understanding basic concepts like data types, algorithm design, and complexity analysis with Big-O notation; solve network optimization and shortest path problems by modeling trees (especially binary search and balanced trees) and graph algorithms; use fundamental searching and sorting algorithms like quick sort and binary search in data manipulation; and simultaneously produce high-performance, optimized algorithmic solutions in back-end applications by grasping memory management and database indexing logic.

Sustainable Development Goals

No content has been provided.

Course Theme

No content has been provided.

AKTS Workload

Activity	Duration (Hour)	Count	Workload
Teorik Derse Katılım	0	0	0
Sınıf Dışı Çalışma (Ön Hazırlık & Pekiştirme Amaçlı)	0	0	0
Ödevler	0	0	0
Proje - Rapor - Sunum Hazırlama	0	0	0
Ara Sınav Hazırlığı (sınav süresi dahil)	0	0	0
Final Sınavı Hazırlığı (sınav süresi dahil)	0	0	0
Uygulama (Laboratuvar, Müzik/Enstrüman Uygulaması, Atölye/Saha Çalışması vb.)	0	0	0
Staj Uygulaması	0	0	0
		Calculated ECTS	**0**

Assessment Method and Passing Requirements

No content has been provided.