Course Syllabus

Code - Course Title	**AYG220 - Go Programming and Microservices Architecture**
Course Type	IV. SEMESTER
Laboratory + Practice	2+3
ECTS	**5.0**
Language of Instruction	Türkçe
Course Type	Area Elective Courses
Course Instructor(s)	ÖĞR. GÖR. AHMET MÜCAHİD ARVASİ

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		Go Language Fundamentals 1: Environment Setup, Syntax Structures, Data Types, and Variables	
Week - 2		Go Language Fundamentals 2: Functions, Structs, Interfaces, and Package Management	
Week - 3		Concurrent Programming 1: Goroutine Concept and Differences from Threads	
Week - 4		Concurrent Programming 2: Communication via Channels, WaitGroup, and Synchronization Mechanisms	
Week - 5		Web Server Development: HTTP Module, Request/Response Management, and Routing Operations	
Week - 6		Advanced Web Operations: Middlewares and Basic API Security	
Week - 7		Introduction to Microservices Architecture: Comparison of Monolithic and Distributed Systems, Service Independence	
Week - 8		Midterm Exam	
Week - 9		Inter-Service Communication 1: RESTful API Design and JSON Data Serialization	
Week - 10		Inter-Service Communication 2: gRPC Protocol, Protocol Buffers (Protobuf), and High-Performance Communication	
Week - 11		Error Management and Isolation: Circuit Breaker Pattern and Resilience in Distributed Systems	
Week - 12		Database Integration: Relational Database Connections (PostgreSQL/MySQL), GORM (Object-Relational Mapping), and Data Management	
Week - 13		Deployment Processes 1: Container Architecture (Docker) and Containerizing Go Applications	
Week - 14		Deployment Processes 2: Service Orchestration (Kubernetes), Distributed Tracing, Performance Analysis, and Project Presentations	

Learning Outcomes

#	Learning Outcome
1	Upon successful completion of this course, students will reach the competence to develop high-performance concurrent applications via goroutines and channels by grasping the fundamental structures of the Go programming language such as syntax, data types, and package management; design web servers with HTTP modules and middlewares to apply transition principles from monolithic systems to microservices architectures; execute database integration (ORM) operations via GORM by using RESTful API and gRPC protocols in inter-service communication; and simultaneously include their distributed services in deployment processes with container (Docker) and orchestration (Kubernetes) architectures while professionally managing error isolation and performance monitoring mechanisms.

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.