

Development of Cloud Applications

Requirements

later

LECTURES

LECTURE STRUCTURE	LAB STRUCTURE
L1 - Introduction to Cloud Computing <ul style="list-style-type: none"> * Cloud service models (IaaS, PaaS, SaaS) * Deployment models (public, private, hybrid) * Shared responsibility model * Overview of Azure ecosystem 	Lab 1 - Environment Setup <ul style="list-style-type: none"> * Azure student subscription activation * Install Azure CLI * GitHub repo creation * CodeSandbox project setup
L2 - Cloud Architecture Principles <ul style="list-style-type: none"> * 12-Factor App methodology * Stateless vs stateful services * Horizontal scaling * REST architecture basics 	Lab 2 - Building a REST API <ul style="list-style-type: none"> * Node.js / Express API * CRUD endpoints * Environment variables * Local testing with Postman
L3 - Designing Cloud Applications <ul style="list-style-type: none"> * Microservices vs monolith * API-first design * OpenAPI specification * Basic system design patterns 	Lab 3 - Containerization <ul style="list-style-type: none"> * Writing Dockerfile * Building images * Running containers locally * Docker Compose basics
L4 - Containers and Virtualization <ul style="list-style-type: none"> * Containers vs VMs * Docker architecture * Images, containers, volumes, networks * Multi-stage builds 	Lab 4 - Azure Deployment (PaaS) <ul style="list-style-type: none"> * Deploy to Azure App Service * Configure environment variables * Connect to Azure SQL (free tier)
L5 - Cloud Deployment Models in Azure <ul style="list-style-type: none"> * Azure App Service * Azure Container Apps * Azure Storage (Blob, Table) * Azure SQL Database 	Lab 5 - Persistent Storage <ul style="list-style-type: none"> * Azure SQL or Azure Storage * Data modeling * Basic migrations
L6 - DevOps & CI/CD Fundamentals <ul style="list-style-type: none"> * Git workflow * GitHub Actions basics * Build pipelines * Infrastructure as Code concept 	Lab 6 - CI/CD <ul style="list-style-type: none"> * GitHub Actions workflow * Automated build & deploy * Versioning strategy
L7 - Security & Identity in Cloud <ul style="list-style-type: none"> * Authentication vs Authorization * OAuth2 / JWT basics * Azure Active Directory fundamentals * Secret management 	Lab 7 - Midterm Project Checkpoint <ul style="list-style-type: none"> * Architecture review * Code review * Deployment validation
L8 - Cloud Databases & Storage <ul style="list-style-type: none"> * Relational vs NoSQL * Azure SQL vs Cosmos DB * Data consistency models * Migration basics 	Lab 8 - Authentication <ul style="list-style-type: none"> * JWT implementation * Role-based authorization * Secure endpoints

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L9 - Serverless Architectures <ul style="list-style-type: none">* Event-driven systems* Azure Functions* Triggers & bindings* Use cases	Lab 9 - Serverless Extension <ul style="list-style-type: none">* Azure Function integration* Event-based processing
L10 - Observability & Monitoring <ul style="list-style-type: none">* Logging principles* Metrics vs traces* Azure Monitor & Application Insights* Health checks	Lab 10 - Monitoring & Logging <ul style="list-style-type: none">* Enable Application Insights* Logging middleware* Analyze telemetry
L11 - Scalability & Performance <ul style="list-style-type: none">* Load balancing* Caching strategies* CDN basics* Cost optimization	Lab 11 - Scaling & Performance <ul style="list-style-type: none">* Load testing (basic tools)* Scaling App Service* Caching layer (Redis concept demo)
L12 - Resilience & Reliability <ul style="list-style-type: none">* Retry patterns* Circuit breaker* SLA/SLO basics* Backup strategies	Lab 12 - Infrastructure as Code <ul style="list-style-type: none">* Simple Bicep template* Automated provisioning
L13 - Cloud-Native Trends & Final Architecture Review <ul style="list-style-type: none">* Kubernetes overview* Infrastructure as Code (Bicep/Terraform intro)* Edge computing basics* Final project architectural consultation	Lab 13 - Final Project Presentation <ul style="list-style-type: none">* Live deployment demo* Architecture explanation* Peer review

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