Development of Cloud Applications

Requirements

later

LECTURES

LECTURE STRUCTURE	LAB STRUCTURE
L1 – Introduction to Cloud Computing **** Cloud service models (IaaS, PaaS, SaaS)*** **** Deployment models (public, private, hybrid)*** **** Shared responsibility model*** **** Overview of Azure ecosystem***	**Lab 1 – Environment Setup** ** Azure student subscription activation* ** Install Azure CLI* ** GitHub repo creation* ** CodeSandbox project setup*
L2 – Cloud Architecture Principles **** 12-Factor App methodology*** **** Stateless vs stateful services*** **** Horizontal scaling*** **** REST architecture basics***	**Lab 2 – Building a REST API** ** Node.js / Express API* ** CRUD endpoints* ** Environment variables* ** Local testing with Postman*
L3 – Designing Cloud Applications **** Microservices vs monolith*** **** API-first design*** **** OpenAPI specification*** **** Basic system design patterns***	**Lab 3 – Containerization** ** Writing Dockerfile* ** Building images* ** Running containers locally* ** Docker Compose basics*
L4 – Containers and Virtualization **** Containers vs VMs*** **** Docker architecture*** **** Images, containers, volumes, networks*** **** Multi-stage builds***	**Lab 4 – Azure Deployment (PaaS)** ** Deploy to Azure App Service* ** Configure environment variables* ** Connect to Azure SQL (free tier)*
L5 – Cloud Deployment Models in Azure **** Azure App Service*** **** Azure Container Apps*** **** Azure Storage (Blob, Table)*** **** Azure SQL Database***	**Lab 5 – Persistent Storage** ** Azure SQL or Azure Storage* ** Data modeling* ** Basic migrations*
L6 – DevOps & CI/CD Fundamentals **** Git workflow*** **** GitHub Actions basics*** **** Build pipelines*** **** Infrastructure as Code concept***	**Lab 6 – CI/CD** ** GitHub Actions workflow* ** Automated build & deploy* ** Versioning strategy*

LECTURE STRUCTURE	LAB STRUCTURE
L7 – Security & Identity in Cloud **** Authentication vs Authorization*** **** OAuth2 / JWT basics*** **** Azure Active Directory fundamentals*** **** Secret management***	**Lab 7 – Midterm Project Checkpoint** ** Architecture review* ** Code review* ** Deployment validation*
L8 – Cloud Databases & Storage ** Relational vs NoSQL* ** Azure SQL vs Cosmos DB* ** Data consistency models* ** Migration basics*	**Lab 8 – Authentication** ** JWT implementation* ** Role-based authorization* ** Secure endpoints*
L9 – Serverless Architectures ** Event-driven systems* ** Azure Functions* ** Triggers & bindings* ** Use cases*	**Lab 9 – Serverless Extension** ** Azure Function integration* ** Event-based processing*
L10 – Observability & Monitoring ** Logging principles* ** Metrics vs traces* ** Azure Monitor & Application Insights* ** Health checks*	**Lab 10 – Monitoring & Logging** ** Enable Application Insights* ** Logging middleware* ** Analyze telemetry*