

Development of Cloud Applications

Requirements

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LECTURES

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

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L8 - Cloud Databases & Storage <ul style="list-style-type: none">* <i>Relational vs NoSQL</i>* <i>Azure SQL vs Cosmos DB</i>* <i>Data consistency models</i>* <i>Migration basics</i>	Lab 8 - Authentication <ul style="list-style-type: none">* <i>JWT implementation</i>* <i>Role-based authorization</i>* <i>Secure endpoints</i>
L9 - Serverless Architectures <ul style="list-style-type: none">* <i>Event-driven systems</i>* <i>Azure Functions</i>* <i>Triggers & bindings</i>* <i>Use cases</i>	Lab 9 - Serverless Extension <ul style="list-style-type: none">* <i>Azure Function integration</i>* <i>Event-based processing</i>
L10 - Observability & Monitoring <ul style="list-style-type: none">* <i>Logging principles</i>* <i>Metrics vs traces</i>* <i>Azure Monitor & Application Insights</i>* <i>Health checks</i>	Lab 10 - Monitoring & Logging <ul style="list-style-type: none">* <i>Enable Application Insights</i>* <i>Logging middleware</i>* <i>Analyze telemetry</i>
L11 - Scalability & Performance <ul style="list-style-type: none">* <i>Load balancing</i>* <i>Caching strategies</i>* <i>CDN basics</i>* <i>Cost optimization</i>	Lab 11 - Scaling & Performance <ul style="list-style-type: none">* <i>Load testing (basic tools)</i>* <i>Scaling App Service</i>* <i>Caching layer (Redis concept demo)</i>
L12 - Resilience & Reliability <ul style="list-style-type: none">* <i>Retry patterns</i>* <i>Circuit breaker</i>* <i>SLA/SLO basics</i>* <i>Backup strategies</i>	Lab 12 - Infrastructure as Code <ul style="list-style-type: none">* <i>Simple Bicep template</i>* <i>Automated provisioning</i>
L13 - Cloud-Native Trends & Final Architecture Review <ul style="list-style-type: none">* <i>Kubernetes overview</i>* <i>Infrastructure as Code (Bicep/Terraform intro)</i>* <i>Edge computing basics</i>* <i>Final project architectural consultation</i>	Lab 13 - Final Project Presentation <ul style="list-style-type: none">* <i>Live deployment demo</i>* <i>Architecture explanation</i>* <i>Peer review</i>

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