

# Development of Cloud Applications

## Requirements

later

## LECTURES

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

LECTURE STRUCTURE	LAB STRUCTURE
<b>L8 - Cloud Databases &amp; Storage</b> <ul style="list-style-type: none"><li>* <i>Relational vs NoSQL</i></li><li>* <i>Azure SQL vs Cosmos DB</i></li><li>* <i>Data consistency models</i></li><li>* <i>Migration basics</i></li></ul>	<b>Lab 8 - Authentication</b> <ul style="list-style-type: none"><li>* <i>JWT implementation</i></li><li>* <i>Role-based authorization</i></li><li>* <i>Secure endpoints</i></li></ul>
<b>L9 - Serverless Architectures</b> <ul style="list-style-type: none"><li>* <i>Event-driven systems</i></li><li>* <i>Azure Functions</i></li><li>* <i>Triggers &amp; bindings</i></li><li>* <i>Use cases</i></li></ul>	<b>Lab 9 - Serverless Extension</b> <ul style="list-style-type: none"><li>* <i>Azure Function integration</i></li><li>* <i>Event-based processing</i></li></ul>
<b>L10 - Observability &amp; Monitoring</b> <ul style="list-style-type: none"><li>* <i>Logging principles</i></li><li>* <i>Metrics vs traces</i></li><li>* <i>Azure Monitor &amp; Application Insights</i></li><li>* <i>Health checks</i></li></ul>	<b>Lab 10 - Monitoring &amp; Logging</b> <ul style="list-style-type: none"><li>* <i>Enable Application Insights</i></li><li>* <i>Logging middleware</i></li><li>* <i>Analyze telemetry</i></li></ul>

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