

Development of Cloud Applications

Requirements

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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 <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 // * 12-Factor App methodology * Stateless vs stateful services * Horizontal scaling * REST architecture basics//	Lab 2 - Building a REST API <i>* Node.js / Express API</i> <i>* CRUD endpoints</i> <i>* Environment variables</i> <i>* Local testing with Postman</i>
L3 - Designing Cloud Applications // * Microservices vs monolith * API-first design * OpenAPI specification * Basic system design patterns//	Lab 3 - Containerization <i>* Writing Dockerfile</i> <i>* Building images</i> <i>* Running containers locally</i> <i>* Docker Compose basics</i>
L4 - Containers and Virtualization // * Containers vs VMs * Docker architecture * Images, containers, volumes, networks * Multi-stage builds//	Lab 4 - Azure Deployment (PaaS) <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 <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 <i>* Azure SQL or Azure Storage</i> <i>* Data modeling</i> <i>* Basic migrations</i>
L6 - DevOps & CI/CD Fundamentals <i>// * Git workflow</i> <i>* GitHub Actions basics</i> <i>* Build pipelines</i> <i>* Infrastructure as Code concept//</i>	Lab 6 - CI/CD <i>* GitHub Actions workflow</i> <i>* Automated build & deploy</i> <i>* Versioning strategy</i>

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 * <i>Architecture review</i> * <i>Code review</i> * <i>Deployment validation</i>
L8 - Cloud Databases & Storage // * Relational vs NoSQL * Azure SQL vs Cosmos DB * Data consistency models * Migration basics//	Lab 8 - Authentication * <i>JWT implementation</i> * <i>Role-based authorization</i> * <i>Secure endpoints</i>
L9 - Serverless Architectures // * Event-driven systems * Azure Functions * Triggers & bindings * Use cases//	Lab 9 - Serverless Extension * <i>Azure Function integration</i> * <i>Event-based processing</i>
L10 - Observability & Monitoring // * Logging principles * Metrics vs traces * Azure Monitor & Application Insights * Health checks//	Lab 10 - Monitoring & Logging * <i>Enable Application Insights</i> * <i>Logging middleware</i> * <i>Analyze telemetry</i>
L11 - Scalability & Performance // * Load balancing * Caching strategies * CDN basics * Cost optimization//	Lab 11 - Scaling & Performance * <i>Load testing (basic tools)</i> * <i>Scaling App Service</i> * <i>Caching layer (Redis concept demo)</i>
L12 - Resilience & Reliability // * Retry patterns * Circuit breaker * SLA/SLO basics * Backup strategies//	Lab 12 - Infrastructure as Code * <i>Simple Bicep template</i> * <i>Automated provisioning</i>
L13 - Cloud-Native Trends & Final Architecture Review // * Kubernetes overview * Infrastructure as Code (Bicep/Terraform intro) * Edge computing basics * Final project architectural consultation//	Lab 13 - Final Project Presentation * <i>Live deployment demo</i> * <i>Architecture explanation</i> * <i>Peer review</i>

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