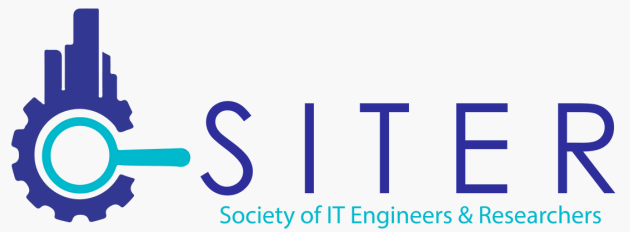


● EUROPE



ST-401

Full Stack Development & Cloud Engineering

Hybrid - Remote

Program Syllabus



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We are Microsoft's AI Cloud & CISCO Networking Academy Partner

Syllabus Plan

Fundamentals and Preparations

- Effective Use of Tools & Installations.
- Git Version Control (GitLab, GitHub).
- Foundation Video Lectures for Beginners & Non-IT Candidates.
[Operating System, Web Technologies, Software Engineering, Agile, Cloud Computing, Networking, API, Information Security, Data Structure & Algorithm, DBMS, AI Tools]

Assignment 1: Git

Backend Development

Lesson 1: C# Fundamentals

- Learn the fundamentals of C# programming and familiar with the .NET ecosystem.
- Understand variable declaration and handle various data types.
- Learn the basis and syntax of Data Structures & Control Structures.
- Learn how to write codes as modules for each unit of work.
- Implement exception handling techniques.
- Understand Visual Studio IDE and interact with the console application.

Lesson 2: Working with C# Methods & Functions

- Understand the concept of Modularization and be familiar to work with C# methods.
- Understand all about Method Signature, Access Modifier, Variable Scope & Constructors.
- Be familiar to write codes with Method overloading and Params.
- Understand C# properties and the use of Getter and Setter.
- Be familiar to work with Null Data.
- Work with Generics to handle any type of data more flexibly.
- Work with anonymous functions like Lambda along with Delegates.
- Be Familiar on the use of LINQ statements to easy query collections.

Lesson 3: Object Oriented Programming

- Learn all about Classes, Objects, Object Instantiation and Constructors.
- Learn the 4 pillars of object-oriented programming and its practical implementation.
- Learn the power of Interfaces.
- Understand enumerators and its implementation in C#.

Assignment 2: C# Object Oriented Programming

Lesson 4: Testing & Best Design Principles

- Learn the best design principles and coding practices.
- Differentiate Coupling and Cohesion; The best approaches.
- Understand SOLID and its implementation in various use cases.
- Learn other design principles like DRY, KISS, YAGNI.
- Understand design patterns for modern application development.
- Learn to work with XUnit framework for the unit tests.
- Practice the best test-driven development.
- Learn to write the tests first before writing codes.

Lesson 5: Structured Query Language

- Explore the characteristics of relational data.
- Learn the fundamentals of SQL.
- DDL, DML and DCL.
- Use SSMS & SQL Server to create and manipulate data.

Assignment 3: SQL**Lesson 6: File IO and DBMS**

- Understand file system and data storage in files.
- Access and manipulate text files and CSV files.
- Database Management System.
- Data Modeling, DFD, ERD, Normalization, Database Schema

Lesson 7: Connectivity with SQL Client

- Learn how to connect your application with database.
- Learn all about the SQL Client – core data provider in .NET.
- Learn how to demonstrate data access with Sql Client.
- Learn how to create Repository classes to handle database interaction.

Lesson 8: Entity Framework Core

- Understand what is ORM and EFCore.
- Learn two approaches Code-first & Database-first.
- Use Migrations to push changes to database.
- Work with relational modeling.
- Be proficient to perform database operations using Entity Framework Core.

Assignment 4: Web API Code First

Lesson 9: Web Server Development and API

- Learn the fundamental communication protocol - HTTP.
- Learn REST Architectural style for setting up Web Server.
- Understand Json data.
- Understand MVC (Model View Controller) architectural pattern.
- Use Asp.Net Core for modern cloud-based web application development.
- Learn all about API (Application Programming Interface) and API Controllers.

Lesson 10: Data Transfer Objects & Swagger

- Use DTO's to hide internal schema and expose only relevant fields for the client's use.
- Use AutoMapper to easily map between domain models and DTOs.
- Use Swagger API documentation tool for the API documentation.

Lesson 11: Security, Containerization & Deployment

- Learn how to run your application in isolation using Docker Containerization technology.
- Implement Authentication and Authorization security elements for your application.
- Learn all about JWT web tokens.
- Use Keycloak Identity Provider for the app security.
- Use Microsoft Identity Platform for Authentication and Authorization.
- Deploy and run your application in a cloud computing platform (Azure) – Optional.

Project 1: Backend Development with .NET + Presentations + Review**Frontend Development****Lesson 1: Introduction to Web Technologies**

- Learn all about the tools, components, protocols and services in web technologies.
- Learn the fundamentals of Hyper Text Markup Language.

Lesson 2: Figma and HTML

- Use Figma for Wireframing.
- UX/ UI Design.
- Build website using HTML.

Lesson 3: Working with CSS & Bootstrap

- Learn the basis of Cascading Style Sheet.
- Learn all about modern responsive web design.
- Understand the importance of Bootstrap and use it for the project.

Assignment 5: Responsive Web Design

Lesson 4: JavaScript Fundamentals

- Learn the fundamental concepts of JavaScript programming such as Printing String, Variables, Array collections, Operators, Conditional Statements and Loops.
- Work with Functions and Functional Constructors.
- Understand how functions are writing and executing with the help of different JavaScript methods.

Assignment 6: JavaScript App**Lesson 5: JavaScript Coding Constructs**

- Learn how to work smarter with JavaScript using Higher Order Functions.
- Learn how to work with DOM to change or remove elements from a website document.
- Learn how to extend the functionality of a web browser using Browser API.
- Learn to write Js codes through Object Oriented programming.

Lesson 6: Advanced Features of JS Application

- Learn how to improve your JavaScript code using some ES6 Features.
- Examples for Arrow Functions, Template Literals, Destructuring, Object Literals, Function Arguments and Modules.
- Develop a simple JavaScript Application and connect with backend via API.

Lesson 7: Introduction to React

- Understand the basis of Js frameworks and single page applications.
- Learn the terms components, state management, routing, virtual DOM and JSX in React development.
- Learn what is React and how to instantiate React.

Assignment 7: React App**Lesson 8: React Components, Hooks and Props**

- Learn all about React components, its naming convention, logical structure and types.
- Understand the common ways to handle user interaction.
- Learn the concepts - Hooks (useState, useEffect, useReducer), Props and Events.

Lesson 9: React ContextAPI, Router and Forms

- Be familiar with ContextAPI to understand how to share global values across the component tree.
- Understand how to link components to a path using a third-party package called 'React Router'.
- Learn how to handle forms in React application.
- Implement form validation using React Hook Form.

Lesson 10: React Redux Development

- Learn Redux for efficient state management in React Js application.
- Use Redux Toolkit and familiar with Redux Toolkit to simplify the Redux state management.
- Work with Redux Dev Tools for debugging the react redux applications.

Lesson 11: Security in React Application

- Learn how to secure the frontend react application using latest web security technologies.
- Authentication and Authorization using Keycloak.
- Authentication and Authorization using Microsoft Entra ID.
- Be familiar with both traditional login and password less login.

Project 2: Frontend Development with React Js + Presentations + Review**Cloud Development****Lesson 1: Azure Fundamentals**

- Define cloud computing, cloud models, pricing models, cloud benefits and various use cases.
- Describe Azure regions, availability zones, data centers, resource groups, subscriptions and management groups.
- Compare compute types, resources and all major components used in Azure for various services.
- Describe directory services in Azure, including Microsoft Entra ID.
- Describe various authentication methods and security features in Azure.
- Describe the purpose of Azure Policy, resource locks, service trust portal and Microsoft purview.

Lesson 2: Administer Identity, Governance and Compliance

- Understand Microsoft Entra ID
- Create, Configure, and Manage Identities.
- Core Architectural Components of Azure.
- Azure Policy Initiatives
- Azure Role-Based Access Control (Azure RBAC)

Assignment 8: Azure Administrator**Lesson 3: Administer Azure Resources**

- Configure Azure Resources with Azure Portal, PowerShell & the CLI
- Deploy Azure Resources with Templates.

Lesson 4: Administer Virtual Networking and NSGs.

- Configure Virtual Networks.
- Configure Network Security Groups (NSGs).
- Host Your Domain on Azure DNS.

Lesson 5: Administer Intersite Connectivity and Network Traffic

- Configure VNet Peering.
- Manage and Control Traffic Flow with Routes.
- Introduction to Azure Load Balancer.
- Introduction to Azure Application Gateway.
- Introduction to Network Watcher.

Lesson 6: Administer Azure Storage and Virtual Machines

- Configure Storage Accounts.
- Configure Blob Storage.
- Configure Storage Security.
- Configure Azure Files.
- Introduction to Azure Virtual Machines.
- Configure Virtual Machine Availability

Lesson 7: Administer Platform as a Service and Data Protection.

- Configure Azure App Service Plans.
- Configure Azure App Services.
- Configure Azure Container Instances Apps.
- Introduction to Azure Backup.
- Protect Your Virtual Machines by using Azure Backup.

Lesson 8: Administer Monitoring

- Introduction to Azure Monitor.
- Improve Incident Response with Alerting on Azure.
- Analyze your Infrastructure using Azure Monitor logs.

Lesson 9: Manage Identity and Access

- Manage Identities in Microsoft Entra ID.
- Manage Authentication by Using Microsoft Entra ID.
- Manage Authorization by Using Microsoft Entra ID.
- Manage Application Access in Microsoft Entra ID.

Assignment 9: Azure Security**Lesson 10: Secure Networking**

- Plan and Implement Security for Virtual Networks.
- Implement Security for Private Access to Azure Resources.
- Implement Security for Public Access to Azure Resources.

Lesson 11: Secure Compute, Storage and Databases

- Plan and Implement Advanced Security for Compute.
- Plan and Implement Security for Storage.
- Security for Azure SQL Database & Azure SQL Managed Instance.

Lesson 12: Manage Security Operations

- Plan, Implement and Manage Governance for Security.
- Manage Security Posture-Using Microsoft Defender-Cloud.
- Configure & Manage Threat Protection-Using Microsoft Defender- Cloud.
- Configure & Manage Security Monitoring & Automation.

Lesson 13: Implement App Service Web Apps and Azure Functions

- Explore Azure App Service
- Configure Web App Settings
- Scale Apps in Azure App Service
- Explore Azure App service deployment slots.
- Explore and Develop Azure Functions

Assignment 10: Azure Developer**Lesson 14: Develop Solutions using Blob Storage and Cosmos DB**

- Explore and work with Azure Blob storage.
- Manage the Azure blob storage life cycle.
- Explore and work with Azure Cosmos DB.

Lesson 15: Implement Containerized Solutions

- Manage container images in Azure Container Registry
- Run container images in Azure Container Instances.
- Implement Azure Container Apps.

Lesson 16: Implement User Authentication, Authorization and Secure Cloud Solutions.

- Explore the Microsoft identity platform.
- Implement authentication by using the Microsoft Authentication Library.
- Implement shared access signatures.
- Explore Microsoft Graph.
- Implement Azure Key Vault.
- Implement managed identities.
- Implement Azure App Configuration.

Lesson 17: Develop API, Event and Message Based Solutions

- Explore API Management.
- Explore Azure Event Grid and Event Hubs.
- Discover Azure Message Queues.

Lesson 18: Monitor and Optimize Solutions

- Monitor App Performance.
- Develop for Azure Cache for Redis
- Develop for Storage on CDNs.

Project 3: Cloud Project + Presentations + Review**e-Map – Career Guidance**

Course Code: ST-401

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