

**UNIVERSITY OF MADRAS**  
**MASTER OF COMPUTER APPLICATIONS (MCA) DEGREE PROGRAMME**  
**SYLLABUS WITH EFFECT FROM 2023-2024**

Title of the Paper	<b>Software Development Technologies</b>		
Elective - V Theory	II Year & III Semester	Credit:3	535E3A

**Course Objectives**

- To learn and Implementing Micro services
- To analysing the Azure Kubernetes Service
- To learn and anlyse .NET DevOps for Azure and its applications
- To building code for .NET core applications
- To get familiarized with Azure pipelines

**Unit I:** Implementing Micro services: Client to microservices communication, Interservice communication, data considerations, security, monitoring, microservices hosting platform options. Azure Service Fabric: Introduction, core concepts, supported programming models, service fabric clusters, develop and deploy applications of service fabric. Monitoring Azure Service Fabric Clusters: Azure application, resource manager template, Adding Application Monitoring to a Stateless Service Using Application Insights, Cluster monitoring, Infrastructure monitoring.

**Unit II:** Azure Kubernetes Service (AKS): Introduction to kubernetes and AKS, AKS development tools, Deploy applications on AKS. Monitoring AKS: Monitoring, Azure monitor and analytics, monitoring AKS clusters, native kubernetes dashboard, Prometheus and Grafana. Securing Microservices: Authentication in microservices, Implenting security using API gateway pattern, Creating application using Ocrlot and securing APIs with Azure AD. Database Design for Microservices: Data stores, monolithic approach, Microservices approach, harnessing cloud computing, database options on MS Azure, overcoming application development challenges. Building Microservices on Azure Stack: Azure stack, Offering IaaS, PaaS on-premises simplified, SaaS on Azure stack.

**Unit III :** .NET DevOps for Azure: DevOps introduction, Problem and solution. Professional Grade DevOps Environment: The state of DevOps, professional grade DevOps vision, DevOps architecture, tools for professional DevOps environment, DevOps centered application. Tracking work: Process template, Types of work items, Customizing the process, Working with the process. Tracking code: Number of repositories, Git repository, structure, branching pattern, Azure repos configuration, Git and Azure.

# UNIVERSITY OF MADRAS

## MASTER OF COMPUTER APPLICATIONS (MCA) DEGREE PROGRAMME SYLLABUS WITH EFFECT FROM 2023-2024

**Unit IV:** Building the code: Structure of build, using builds with .NET core and Azure pipelines, Validating the code: Strategy for defect detection, Implementing defect detection. Release candidate creation: Designing release candidate architecture, Azure artifacts workflow for release candidates, Deploying the release: Designing deployment pipeline, Implementing deployment in Azure pipelines. Operating and monitoring release: Principles, Architectures for observability, Jumpstarting observability.

**Unit V:** Introduction to APIs: Introduction, API economy, APIs in public sector. API Strategy and Architecture: API Strategy, API value chain, API architecture, API management. API Development: Considerations, Standards, kick-start API development, team orientation. API Gateways: API Gateways in public cloud, Azure API management, AWS API gateway. API Security: Request-based security, Authentication and authorization.

### **Text Book**

1. Harsh Chawla and Hemant Kathuria, Building Microservices Applications on Microsoft Azure- Designing, Developing, Deploying, and Monitoring, Apress, 2019.
2. Jeffrey Palermo , NET DevOps for Azure A Developer's Guide to DevOps Architecture the Right Way, Apress, 2019.
3. Thurupathan and Vijayakumar, Practical API Architecture and Development with Azure and AWS - Design and Implementation of APIs for the Cloud, Apress, 2018.

### **Reference Books**

1. Karl Matthias and Sean P. Kane, Docker: Up and Running, O'Reilly Publication, Second Edition 2018.
2. Len Bass,IngoWeber,LimingZhu,"DevOps, A Software Architects Perspective", AddisonWesley-Pearson Publication, First Ediiton 2015.
3. John Ferguson Smart,"Jenkins, The Definitive Guide", O'Reilly Publication, First Ediiton 2011.

**UNIVERSITY OF MADRAS**  
**MASTER OF COMPUTER APPLICATIONS (MCA) DEGREE PROGRAMME**  
**SYLLABUS WITH EFFECT FROM 2023-2024**

**Course Outcomes**

On the successful completion of the course, students will be able to

CO1	To understand, apply and summarize the basic concepts of Micro services communication Microsoft Azure and Dev Ops for software development life cycle.	K1-K6
CO2	To illustrate, and implement Azure Kubernetes Service tools for software development life cycle.	K1-K6
CO3	To recognize, analyse and summarize the functionalities of .NET Dev Ops for Azure applications.	K1-K6
CO4	To understand, design and evaluate the principles and architecture service tools for software development life cycle.	K1-K6
CO5	To comprehend, implement and review the functionalities of API and API gateways for cloud and Azure applications.	K1-K6

K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5 Evaluate, K6- Create

**Mapping with Programme Outcomes:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	-	M	-	-	-	S	-
CO2	S	S	M	-	M	-	-	-	S	-
CO3	S	S	S	-	S	-	-	-	S	S
CO4	S	S	M	-	M	-	-	-	S	-
CO5	S	S	M	-	M	-	-	-	S	-

S- Strong; M-Medium; L-Low