Program: Bachelor of Science (Computer Science)		Semester: V	
Course: Web Services		Course Code: USMACS505	
Teaching Scheme		**Evaluation Scheme**	
Lecture (Hours per week)	**Credit**	**Continuous Assessment (CA)**	**Semester End Examinations (TEE)**
04	4	25%	75%

Learning Objectives:

- To be acquainted with details of web services technologies like SOAP, WSDL, and UDDI and to learn how to implement and deploy web service client and server, also comprehend the design principles and application of SOAP and REST based web services (JAX-Ws and JAX-RS), WCF service. & Graphql

Course Outcomes:

After completion of the course, learners would be able to:

CO1: Explored to the fundamentals of Web services using SOAP.

CO2: Apply and develop Service-Oriented Applications with WCF and get familiarize with latest web service platforms

CO3: Implement Web service using Restful and node.js.

CO4: Create open source GraphQL API.

Outline of Syllabus: (per session plan)

Module	Description	No of hours
1	Introduction to Web Services using SOAP	15
2	RESTFUL Web Services	15
3	GraphQL	15
4	Apply and develop Service-Oriented Applications with WCF and get familiarize with latest web service platforms	15
	Total	**60**

Module	Web Services	No. of Hours/Credits 60/4
1	**Introduction to Web Services using SOAP**	**15**
	Web services basics: What Are Web Services. Types of Web Services, software as a service, Characteristics of Web services, Service Oriented Architecture.	**5**
	Distributed computing infrastructure: Distributed computing and Internet protocols, client-server model, characteristics of overview of XML, SOAP.	**5**
	Building Web Services with JAX-WS, Registering and Discovering Web Services, Web Services Development Life Cycle, Developing and consuming simple Web Services across platform.	**5**
2	**RESTFUL Web Services**	**15**
	The REST Architectural style: Introducing HTTP, The core architectural elements of a RESTful system, Description and discovery of RESTful web services	**5**
	Java tools and frameworks for building RESTful web services, JSON message format and tools and frameworks around JSON, Build RESTful web services with JAX-RS APIs, The Description and Discovery of RESTful Web Services, Design guidelines for building RESTful web services, Secure RESTful web services.	**5**
	Introduction to Node.js, Features of Node.js, applications of Node.js, Environment Setup, Creating Node.js Application, Callback, Node Package Manager (NPM), Event-Driven Programming, Creating Web server, Express Overview.	**5**
3	**GraphQL**	**15**
	GraphQL: Introduction, GraphQL is the better REST, Core Concepts, Apollo client, the Schema Definition Language (SDL)	**5**
	Queries & amp; Mutations, Schemas and Types, Refetching queries in Apollo Client, Subscriptions	**5**
	GraphQL client and server, Connecting with Database via Prisma, GraphQL Tools and Ecosystem, Security.	**5**
4	**Apply and develop Service-Oriented Applications with WCF and get familiarize with latest web service platforms**	**15**
	What Is Windows Communication Foundation, Fundamental Windows Communication Foundation Concepts.	**5**
	Windows Communication Foundation Architecture, WCF and .NET Framework Client Profile, Basic WCF Programming	**5**

	WCF Feature Details. Web Service QoS, Introduction Latest web services platforms.	**5**

RECOMMENDED READING:
ESSENTIAL READING:

1. Web Services: Principles and Technology, Michael P. Papazoglou, Pearson Education Limited, 2008
2. RESTful Java Web Services, Jobinesh Purushothaman, PACKT Publishing, 2nd Edition, 2015
3. Developing Service-Oriented Applications with WCF, Microsoft and https://docs.microsoft.com/en-us/dotnet/framework/wcf/index
4. https://graphql.org/leam/ and https://www.howtographql.com

SUPPLEMENTARY READING:

1. Leonard Richardson and Sam Ruby, RESTful Web Services, O'Reilly, 2007
2. The java EE 6Tutorial, Oracle, 2013