Name of Faculty	:	Faculty of Engineering & Technology
Name of Program	:	Master of Engineering (M. Tech)
Course Code	:	1MSE04
Course Title	:	Service Oriented Architecture (PE - I)
Type of Course	:	Professional Elective (PE)
Year of Introduction	:	2023-24

Prerequisite	:	Distributed System
Course Objective	:	Understating the Fundamentals of SOA, Component and Technology, explore design and Development, Explore-Analyse- Develop SOA.
Course Outcomes	:	At the end of this course, students will be able to:
	CO1	Comprehend the need for SOA and its systematic evolution.
	CO2	Apply SOA technologies to enterprise domain.
	CO3	Design and analyse various SOA patterns and techniques
	CO4	Compare and evaluate best strategies and practices of SOA
	CO5	Analyse requirements towards the creation of a service
	CO6	Apply major standards in WSDL-*, together with SOAP and REST concepts

Teaching and Examination Scheme

Teaching Scheme (Contact Hours)			Credits	Examination Marks				
				Theory Marks		Practical Marks		Total Marks
L	**T**	**P**	**C**	**SEE**	**CIA**	**SEE**	**CIA**	
3	0	2	4	70	30	30	20	150

*Legends: **L**-Lecture; **T**–Tutorial/Teacher Guided Theory Practice; **P** – Practical, **C** – Credit, **SEE** – Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.))*

Course Content

Unit No.	Topics	Teaching Hours	Weightage	Mapping with CO
1	**Overview of SOA** Concepts; Service governance, characteristics; Business and technical benefits.	02	5%	CO1
2	**SOA Fundamentals** Defining SOA, Business Value of SOA, Evolution of SOA, SOA characteristics, concept of a service in SOA, misperceptions about SOA, Basic SOA architecture, infrastructure services, Enterprise Service Bus (ESB),	05	11%	CO1

	SOA Enterprise Software models, IBM On Demand operating environment.			
3	**SOA Planning and Analysis** Stages of the SOA lifecycle, SOA Delivery Strategies, service- oriented analysis, Capture and assess business and IT issues and drivers, determining non-functional requirements (e.g., technical constraints, business constraints, runtime qualities, non-runtime qualities), business centric SOA and its benefits, Service modelling, Basic modelling building blocks, service models for legacy application integration and enterprise integration, Enterprise solution Assets (ESA).	08	18%	CO2
4	**SOA Design and implementation** Service-oriented design process, design activities, determine services and tasks based on business process model, choosing appropriate standards, articulate architecture, mapping business processes to technology, designing service integration environment (e.g., ESB, registry), Tools available for appropriate designing, implementing SOA, security implementation, implementation of integration patterns, services enablement, quality assurance.	08	18%	CO3
5	**Managing SOA Environment** Distributing service management and monitoring concepts, operational management challenges, Service-level agreement considerations, SOA governance (SLA, roles and responsibilities, policies, critical success factors, and metrices), QoS compliance in SOA governance, role of ESB in SOA governance, impact of changes to services in the SOA lifecycle.	05	11%	CO4
6	**SOA and WS** The WS platform (XML, SOAP, WSDL, UDDI); Service contracts; Service-level data model, security and interaction patterns; Business process Maturity models Principles of Service-Oriented Architecture- Service-orientation and object orientation, SOA Standards Stack, SOA with Services, Key Principles of SOA, WS-* Specifications: Message Exchange Pattern, Coordination, Atomic Transactions, Business Activities, Orchestration, Choreography, WS- Addressing, WS Reliable Messaging, WS-Policy (including WS- Policy Attachments and WS Policy Assertions), WS- Metadata Exchange, WS-Security (including XML Encryption, XML-Signature, and SAML), WS-Notification Framework (including WS-Base Notification, WS-Topics, and WS- Brokered Notification), WS-Evening.	10	23%	CO5
7	**Implementation of SOA and WS**	07	14%	CO6
	Frameworks; Building contract-first web services based on framework; Building code-first web services.			

Suggested Distribution of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyse	Evaluate	Create
Weightage	**40**	**20**	**20**	**10**	**-**	**10**

NOTE: This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Suggested List of Experiments/Tutorials

Sr. No.	Name of Experiment/Tutorial	Teaching Hours
1	Develop DTD and XSD for University Information System having Exam Enrollment from beginning of Semester, along with Exam Registration and Marks submission by Teachers to University from Various Colleges and Results Sheets Generation by University on Online Report.	2
2	Develop Mark sheet XML Document and display Mark sheet based on CSS and XSL presentation Format.	2
3	Develop Java Based Program using JAXP or XML API in reading XML file for Students Information and Display HTML Table.	2
4	Develop Java Based Web Service using REST and SOAP Based web service in NetBeans for University Course List and Search Course based Course Title and Course ID.	2
5	Create DTD file for student information and create a valid well-formed XML document to store student information against this DTD file.	2
6	Create XMS schema file for student information and create a valid well-formed XML document to store student information against this DTD file.	2
7	Create web calculator service in .NET Beans and create Java client to consume this web service.	2
8	Develop same web service using JX-WS.	2
9	Create web calculator service in .NET and Experiment. 9 Create java client to consume web service developed using Apache AXIS.	2
10	Using WS –GEN and WS-Import develop the java web service & call it by Java Client.	2

Reference Books

Sr. No.	Name of Reference Books
1	GRAHAM, S.; Building Web services with Java : making sense of XML, SOAP, WSDL and UDDI; Sams, 2001, ISBN: 0672321815.
2	"Eric Newcomer, Greg Lomow, "Understanding SOA with Web Services", Addison Wesley Publication, 2004