Effective from Academic Batch: 2022-23

Programme: **Bachelor of Technology (Information Technology)**

Semester: **VIII**

Course Code: **202047810**

Course Title: **Service Oriented Computing**

Course Group: **Professional Elective Course - VI**

Course Objectives: This course describes the foundation of Service Oriented Architecture with its characteristics and advantages. It strongly describes distinction between client-server, two-tier, three-tier and Enterprise architectures. Course continuous with Basic of web services and Introduction to SOAP, REST, WSDL and UDDI. It also highlights the SOAP and REST architecture along with its importance and standards. At the end, WS-BPEL specifies the framework for Web services.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Theory		J/V/P*		Total
Lecture	Tutorial	Practical		Internal	External	Internal	External	
3	0	2	4	50/18	50/17	25/9	25/9	150/53

* **J**: Jury; **V**: Viva; **P**: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	**Introduction:** Concepts of Distributed Computing, XML, Fundamental of SOA, evolution of SOA	5
2	**Web Services Fundamental and Standard:** Web Services, Architectures and Standards. Directory services, SOAP, REST WSDL, UDDI.	5
3	**Principles of Service-Oriented Architecture:** Service orientation and object- orientation, SOA Standards Stack, SOA with Web Services, Key Principles of SOA	5
4	**SOA and WS-* Extension:** Message Exchange Pattern, Coordination, Atomic Transactions, Business Activities, Orchestration, Choreography, WS-Addressing, Reliable Messaging, WS-Policy (including WS-Policy Attachments and WS-Policy Assertions), WS-Metadata Exchange, WS-Security (including XML-Encryption, XML Signature, and SAML)	10

5	**Principles of Service-Oriented Computing:** RPC versus Document Orientation, Service Life Cycle, Service Creation, Service Design and Build, Service Deployment, Publish, Web service using UDDI, Service Discovery, Service Selection, Service Composition, Service Execution and Monitoring, Service Termination, Service Composition and Modeling Business Processes with Business Process Execution Language (BPEL)	10
6	**SOA Platforms:** SOA support in J2EE – Java API for XML based web services (JAX-WS) - Java architecture for XML binding (JAXB) – Java API for XML Registries (JAXR) - Java API for XML based RPC (JAX-RPC)- SOA support in .NET	5
	Total	**40**

List of Practicals / Tutorials:

1	Introduction of XML language.
2	Develop Mark sheet XML Document and display Mark sheet based on CSS presentation Format.
3	Develop Mark sheet XML Document and display Mark sheet based on XSL presentation Format.
4	Create DTD file for student information and create a valid well-formed XML document to store student information against this DTD file.
5	Develop DTD and XSD for University Information System having Exam Enrolment 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
6	Create web calculator service in .NET and Experiment.
7	Developed JAXB application.
8	Create web calculator service in .NET Beans and create Java client to consume this web service.
9	Develop web calculator service using JX-WS.
10	Create JAX-RS example using jersey implementation.
11	Analyze and implement SOAP based web service to create to-do list application in XML language.
12	Consider library management system for your college and create REST based web service for it to manage all the functionalities of your college library.

Reference Books:

1	Thomas Erl, "Service Oriented Architecture: Concepts, Technology, and Design", Pearson education.
2	Munindar P. Singh and Michael N. Huhns, "Service-Oriented Computing: Semantics, Processes, Agents", John Wiley & Sons, Ltd.
3	Mark D. Hansen, "SOA Using Java Web Services", Prentice Hall
4	Thomas Erl, "SOA Design Pattern", PHI
5	Thomas Erl, "Web service contract Design & Versioning for SOA", PHI
6	Raj Balasubhramaniam, "SOA with .NET", Prentice Hall

Supplementary learning Material:	
1	NPTEL - Swayam Courses

Pedagogy:
- Direct classroom teaching   - Audio Visual presentations/demonstrations   - Assignments/Quiz   - Continuous assessment   - Interactive methods   - Seminar/Poster Presentation   - Industrial/ Field visits   - Course Projects

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying;
R	**U**	**A**	**N**	**E**	**C**	N: Analyzing; E: Evaluating; C: Creating
15%	25%	25%	15%	20%	---	

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

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	To understand principles & technologies of service-oriented architecture.	**20**
CO-2	To analyze the appropriate framework components and market leading tools to create, implement and consume web services.	**35**
CO-3	To apply object-oriented programming principles for the creation of web service solutions.	**30**
CO-4	To identify the requirements of a medium-difficulty programming task and create software that meets the requirements.	**15**

Curriculum Revision:	
Version:	2.0
Drafted on (Month-Year):	June-2022
Last Reviewed on (Month-Year):	-
Next Review on (Month-Year):	June-2025