

Course Title:	Service oriented engineering
Course Code:	CSE561/1
Program:	Computer science Engineering
Department:	Computer Engineering
Course coordinator:	Dr. Thouraya GOUASMI
Institution:	Private Higher School of Engineers of Gafsa (ESIP)

A. Course Identification

1. Credit hours: 3 (1.5-1.5-0)
2. Course type
a. University College Department Others
b. Required Elective
3. Level/year at which this course is offered: 3.1/3
4. Pre-requisites for this course (if any): Software architecture, Databases, Object-oriented
design
1. Mode of Instruction (mark all that apply)

1. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Self- study	Total workload
1	Traditional classroom			
2	Blended	30		
3	E-learning		22	52
4	Distance learning			
5	Other ()			

2. Contact Hours (based on academic semester)

No	Activity	Contact Hours
	Lecture Duperieure u III	
2	Laboratory/Studio	15
3	Tutorial Privon de Catego	-
4	Others (specify)	<u> </u>
	Total	30



B. Course Objectives and Learning Outcomes

Course Description

This course provides a comprehensive introduction to service-oriented engineering, a key architectural pattern for building distributed applications. It focuses on breaking down business activities into modular services that can be combined with loose coupling to create flexible and scalable systems.

Students will explore different architectural styles (N-tier, middleware) before diving into XML technologies and the challenges of integrating peer-to-peer (P2P) applications. The course covers both generations of web services:

- ✓ Web Services 1.0 UDDI, WSDL, and SOAP
- ✓ Web Services 2.0 REST (Representational State Transfer)

Through hands-on implementation, students will learn to develop web services on both provider and client sides, preparing them for real-world service-oriented applications.

Course Main Objective

By the end of this course, students will be able to:

- ✓ Understand and analyze different architectural styles, including N-tier, middleware, and service-oriented architecture (SOA), to build scalable and modular applications.
- ✓ Master XML technologies (XML, DTD, XML Schema) and apply them to data exchange and integration in service-oriented environments.
- ✓ Develop and deploy web services, including SOAP-based (UDDI, WSDL, SOAP) and RESTful (Web Services 2.0) architectures, using industry-standard tools.
- ✓ Design and implement service-oriented applications, ensuring interoperability, security, and scalability across distributed systems.
- ✓ Apply SOA concepts to real-world domains, including Artificial Intelligence, Data Science, IT Security, and Computer Networks, enhancing problem-solving skills.

	CLOs	Aligned PLOs
1	Knowledge and Understanding	
2.1	 Acquire prior knowledge of architectural styles (N-tiers, middlewares, etc.). Discovery the principles of service oriented architecture. Master XML technologies (XML, DTD, XML schema). Discovery the service web 1.0 technology architecture and the associated technologies. Discovery the service web 2.0 technology architecture RESTful. 	PLO.K2
3.1	✓ Explore case studies and industrial scenarios to develop an in-depth understanding of service-oriented engineering applications in specialized areas such as artificial intelligence, data science, IT security or computer networks	PLO.K3
2	Skills	
2.1	 ✓ Formalize with web service development and deployment platforms and tools. 	PLO.S2

1. Course Learning Outcomes



	CLOs	Aligned PLOs
3.1	 ✓ Acquire skills in service-oriented engineering project planning, including identifying needs, setting objectives, establishing schedules and managing resources 	PLO.S3
4.1	✓ Encourage students to expand their professional network by participating in social and cultural events related to their field of study	PLO.S4
6.1	✓ Apply specialized knowledge to identify and resolve complex issues related to service integration, API management, service security and interoperability.	PLO.S6
7.1	✓ Using effectively the basics, principles, and theories to test and proof the complex problems	PLO.S7

C.1. Course Content

No	List of Topics	Contact Hours
1	 Part 1: Fundamentals of Service-Oriented Architecture (SOA) SOA - Principle and basic concepts 1 Evolution of information systems (programming model, architecture, web) 2 Architecture of SOA 3 Challenge and implementation of SOA 	2
2	Part 2: XML & Data Representation in SOAXML- eXtensible Markup LanguageXML Language definition and structureDTD - Document Type DefinitionXML- Schema	3
3	Part 3: Web Services & Integration Web Services Web service 1.0 and these technologies web service 2.0/ REST type	2
R	SOAP- Simple Object Access Protocol WSDL- Web Service Description Language UDDI - Universal Description, Discovery and Integration REST - REpresentational State Transfert	$\begin{array}{c} 2 \\ 2 \\ 2 \\ \hline 2 \\ \hline 2 \\ \hline 2 \\ \hline \end{array}$
	Total	15

C.2. Practical Work Content

No	List of Topics	Contact Hours
1	Lab 1 : Introduction to XML	1.5
2	Lab 2 : XML & DTD	2
3	Lab 3 : XML-schema	2.5
4	Lab 4 : Create a client-side web service	3
5	Lab 5 : Create a provider-side web service	3
6	Lab 6 : Create a Rest web service	3



Total

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and Understanding		
PLO.K2	 Acquire prior knowledge of architectural styles (N-tiers, middlewares, etc.). Discovery the principles of service oriented architecture. Discovery the service web 1.0 technology architecture and the associated technologies. 	 Lecturing Hands-On Labs and Coding 	Assignments
PLO.K3	 Discovery the service web 2.0 technology architecture RESTful. Explore case studies and industrial scenarios to develop an in-depth understanding of service-oriented engineering applications in specialized areas such as artificial intelligence, data 	Exercises - Project-Based Learning	Quizzes , Exams
	science, IT security or computer networks		
2.0	Skills		
PLO.S2	Formalize with web service development and deployment platforms and tools.		
PLO.S3	 ✓ Acquire skills in service-oriented engineering project planning, including identifying needs, setting objectives, establishing schedules and managing resources 	Lab demonstration	
PLO.S4	✓ Encourage students to expand their professional network by participating in social and cultural events related to their field of study	 Lecturing Hands-On Labs and Coding Exercises 	Assignments, Quizzes , Exams,
PLO.S6	 Apply specialized knowledge to identify and resolve complex issues related to service integration, API management, service security and interoperability. 	Project-Based Learning	
PLO.S7	 ✓ Using effectively the basics, principles, and theories to test and proof the complex problems 		



2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Practical Work (written or oral)	Weekly	00%
2	Quizzes, Homework assignments	Random	00%
3	First mid Term	-	-
5	Final Exam	11	100%

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

- 1- Office hours
- 2- Blackboard interface

F. Learning Resources and Facilities

1. Learning Resources

	1 Thomas Erl – Service-Oriented Architecture: Concepts,	
	Technology, and Design, Pearson Education, 2005	
	2 Eric Newcomer – Understanding Web Services: XML, WSDL,	
	SOAP, and UDDI, Addison-Wesley, 2002.	
Required Textbooks	3 Jean-Marie Chauvet – Services Web avec SOAP, WSDL, UDDI,	
Required Textbooks	<i>ebXML</i> , 2002.	
	4 Cesare Pautasso, Olaf Zimmermann – Software Architecture for the	
	Cloud and Web: Architectural Styles, Patterns, and Technologies,	
	Springer, 2022	
Essential References - Computer		
Materials	- Network	
Foolo Si	1 W3C Web Services Standards – SOAP, WSDL, XML Schema	
Ecole Si	 W3C Web Services Standards – SOAP, WSDL, XML Schema (www.w3.org/TR/wsdl/) Microsoft Learn: Azure API Management & SOA Integration 	
Ecole St Electronic Materials	 W3C Web Services Standards – SOAP, WSDL, XML Schema (<u>www.w3.org/TR/wsdl/</u>) Microsoft Learn: Azure API Management & SOA Integration – (learn microsoft com) 	
Ecole St Electronic Materials	 W3C Web Services Standards – SOAP, WSDL, XML Schema (www.w3.org/TR/wsdl/) Microsoft Learn: Azure API Management & SOA Integration – (learn.microsoft.com) YouTube Channels: TechWorld with Nana. The Pragmatic 	
Ecole S Electronic Materials	 W3C Web Services Standards – SOAP, WSDL, XML Schema (www.w3.org/TR/wsdl/) Microsoft Learn: Azure API Management & SOA Integration – (learn.microsoft.com) YouTube Channels: TechWorld with Nana, The Pragmatic Engineer, IBM Cloud Learning 	
Ecole S Electronic Materials	 W3C Web Services Standards – SOAP, WSDL, XML Schema (www.w3.org/TR/wsdl/) Microsoft Learn: Azure API Management & SOA Integration – (learn.microsoft.com) YouTube Channels: TechWorld with Nana, The Pragmatic Engineer, IBM Cloud Learning Université de Paris – Cours Web Services – http://www-inf.int- 	
Ecole Si Electronic Materials Other Learning	 W3C Web Services Standards – SOAP, WSDL, XML Schema (www.w3.org/TR/wsdl/) Microsoft Learn: Azure API Management & SOA Integration – (learn.microsoft.com) YouTube Channels: TechWorld with Nana, The Pragmatic Engineer, IBM Cloud Learning Université de Paris – <i>Cours Web Services</i> – <u>http://www-inf.int- evry.fr/cours/WebServices</u> 	
Electronic Materials Other Learning Materials	 W3C Web Services Standards – SOAP, WSDL, XML Schema (www.w3.org/TR/wsdl/) Microsoft Learn: Azure API Management & SOA Integration – (learn.microsoft.com) YouTube Channels: TechWorld with Nana, The Pragmatic Engineer, IBM Cloud Learning Université de Paris – Cours Web Services – http://www-inf.int- evry.fr/cours/WebServices Postman & SoapUI – Testing SOAP & REST APIs. 	

2. Facilities Required

Item	Resources
Accommodation	classroom board software



Item	Resources	
(Classrooms, laboratories, demonstration		
rooms/labs, etc.)		
Technology Resources	data show;	
(AV, data show, Smart Board, software, etc.)		

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment.	Students, course coordinator, Alumni, Employers	Direct/Indirect
Extent of achievement of course learning outcomes.	Faculty, Program Leaders, quality department	Direct
Quality of Learning resources	Faculty, Program Leaders,	Direct, Indirect
Teaching and learning quality and effectiveness.	Students, Faculty Program Leaders,	Direct, Indirect

H. Specification Approval Data

Council / Committee	Computer Engineering Council
Date	11/09/2023

Ecole Supérieure d'Ingénieurs Privée de Gafsa