SEMESTER S8

SOFTWARE ARCHITECTURES

Course Code	**PECST861**	**CIE Marks**	40
Teaching Hours/Week (L:T:P: R)	3:0:0:0	**ESE Marks**	60
Credits	3	**Exam Hours**	2 Hrs. 30 Min.
Prerequisites (if any)	None	**Course Type**	Theory

Course Objectives:

1. To develop a comprehensive understanding of software architecture principles and patterns.
2. To provide the ability to design and analyze software architectures.

SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	**Introduction to Software Architecture:** Definition and Importance, Architecture in the Life Cycle, Role of the Architect vs. Engineer, Requirements engineering: Stakeholders, Concerns, and Types of Requirements, Use Cases and Tactics.	8
2	**Architectural Patterns and Styles:** Architectural Patterns- Overview of Patterns and Styles, Applying Patterns and Choosing a Style. Patterns for Enterprise Applications: Enterprise Applications and Layered Patterns, Concurrency Problems.	8
3	**Components, Contracts, and Service-Oriented Architectures:** Component Software- Nature of Components and Reuse, UML and Components Design by Contract- Contracts, Polymorphism, Inheritance, and Delegation Service-Oriented Architectures- Standards, Technologies, and Security.	9
4	**Architecture Evaluation and Description:** Describing Architectures and Viewpoints, Evaluating Architectures. Architectural Description Languages (ADLs)- Overview and Applications.	7

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Course Assessment Method
(CIE: 40 marks, ESE: 60 marks)

Continuous Internal Evaluation Marks (CIE):

Attendance	Assignment/ Microproject	Internal Examination-1 (Written)	Internal Examination- 2 (Written)	Total
5	15	10	10	40

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 3 marks **(8x3 =24 marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 subdivisions. **(4x9 = 36 marks)**	60

Course Outcomes (COs)

At the end of the course students should be able to:

	Course Outcome	Bloom's Knowledge Level (KL)
CO1	Understand the foundational concepts of software architecture, including the roles of stakeholders and the importance of requirements engineering.	K2
CO2	Apply architectural patterns and styles to design software systems, particularly in enterprise contexts.	K3
CO3	Understand the principles of component-based software design and the use of contracts in ensuring reliable software systems.	K2
CO4	Apply architectural description techniques to document and evaluate software architectures.	K3

Note*: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create*

CO-PO Mapping Table (Mapping of Course Outcomes to Program Outcomes)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2									3
CO2	3	3	3		2							3
CO3	3	2	2		2							3
CO4	3	3	3		2							3

Note: *1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), -: No Correlation*

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Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Software Architecture	A.Bijlsma, B.J.Heeren, E.E.Roubtsova,S. Stuurman	Free Technology Academy	1/e, 2011
2	Software Architecture 1	Mourad Chabane Oussalah	Wiley	1/e, 2014

Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Head First Software Architecture: A Learner's Guide to Architectural Thinking	Raju Gandhi, Mark Richards, Neal Ford	Oreilly	1/e, 2024

Video Links (NPTEL, SWAYAM…)	
No.	**Link ID**
1	https://www.youtube.com/playlist?list=PL4JxLacgYgqTgS8qQPC17fM-NWMTr5GW6

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