17CS31E3 - SOFTWARE ARCHITECTURE

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| **Course Category:** | Program Core | **Credits:** | 3 |
| **Course Type:** | Theory | **Lecture – Tutorial – Practical:** | 3-0-0 |
| **Prerequisite:** | Need to know the fundamentals of Software engineering | **Sessional Evaluation:****Univ.Exam Evaluation:****Total Marks:** | 4060100 |
| **Objectives** | * Understand basic software architecture requirements, views and patterns etc.
* Evaluate software architecture and quality attributes
* Select and use appropriate architectural styles
* Explore appropriate key architectural structures, tactics and methods
* Defining guidelines for documenting software Architecture
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| **Course Outcomes** | Upon successful completion of the course, the students will be able to: |
| CO1 | Understand the basics of software architectural requirements, views, patterns and influences on business and technical issues |
| CO2 | Analyze the quality attributes and to apply the same to prepare the documentation based on the suitability of attributes |
| CO3 | Specify the key structures, tactics and patterns to design and specify the architecture. |
| CO4 | Study different methods of agility and understand the business goals using other methods including various design strategies |
| CO5 | Prepare a document for a given architecture using views |
| CO6 | Identify the factors that influence the management and governance |
| **Course Content** | UNIT – I**Introduction to Software Architecture:** Definitions**,** Architectural Structures and Views, Patterns, What Makes a “Good” Architecture.**Importance of Software Architecture:** System’s Quality Attributes, change and prediction, communication enhancement, Design Decisions, Constraints, Influences, Evolutionary Prototyping, Improving Cost and Schedule Estimates, Transferable, Reusable Model, Independently Developed Components, Vocabulary of Design Alternatives and Training.UNIT – II**Context of Software Architecture:** Technical Context, Project Life-Cycle, Business, Professional**,** Stakeholders and influences**Quality Attributes:** Architecture and Requirements, Functionality ,Considerations, Requirements, Achieving Quality Attributes through Tactics, Guiding Design Decisions, Other Quality AttributesUNIT – III**Architectural Tactics and Patterns:** Architectural Patterns, Overview, Relationships between Tactics and Patterns.**Quality Attribute Modeling and Analysis :** Modeling Architectures, Attribute Analysis and Checklists, Experiments, Simulations, and Prototypes, Different Stages of the Life UNIT – IV**Architecture in Agile Projects: Overview,** Agility and Architecture Methods, examples, Guidelines for the Agile.**Architecture and Requirements:** Gathering ASRs from Requirements Documents, Stakeholders, Understanding the Business Goals, Utility Tree and Methods.**Designing an Architecture:** Design Strategy, The Attribute-Driven Design Method and supporting stepsUNIT – V**Documenting Software Architectures:** Uses and Audiences for Architecture Documentation, Notations, and Views, Choosing and Combining Views, Building the Documentation Package, Documenting Behavior, Architecture Documentation and Quality Attributes.**Architecture, Implementation, and Testing:** Architecture and Implementation, Architecture and Testing.**Architecture Reconstruction and Conformance:** Architecture Reconstruction Process, View Extraction, Database Construction, View Fusion, Finding Violations and Guidelines.**UNIT – VI****Architecture Evaluation:** Evaluation Factors, Architecture Tradeoff Analysis Method and Evaluation.**Management and Governance:** Planning, Organizing, Implementing, Measuring and Governance.**Architecture and Software Product Lines:** Example of Product Line Variability, What Makes a Software Product Line Work, Scope, The Role of a Product Line Architecture, Variation Mechanisms, Evaluation and Key Issues. |
| **Text Books and References:** | **Text Book:**1. Len Bass, Paul Clements, Rick Kazman “Software Architecture in Practice”, Third Edition**,** Addison Wesley Publishers, 2013.

**Reference Books:**1. Mary Show, David Garlan**, “S/W Arch. Perspective: on an Emerging Discipline”,** 1996, PHI.
2. Jeff Garland, Richard Anthony, “Large**-Scale Software Architecture A Practical Guide using UML**”, John Wiley and Sons Ltd, 2003.
3. Oliver Vogel, Ingo Arnold, Arif Chughtai, Timo Kehrer “**Software Architecture A Comprehensive Framework and Guide for Practitioners**”, Springer Publishers, 2009.
4. Ian Gorton, “**Essential Software Architecture**”, Second Edition, Springer Publishers, 2011.
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| **E-Resources** | 1. [**https://nptel.ac.in/courses**](https://nptel.ac.in/courses)
2. [**https://freevideolectures.com/university/iitm**](https://freevideolectures.com/university/iitm)
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