



**Computer Science Paper-II**  
**Software Engineering**  
**[CORE COURSE]**

<b>Semester III</b>	<b>Credits: 2</b>	<b>Subject Code: BS32102</b>	<b>Lectures: 48</b>
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**Course Outcomes:**

**At the end of this course, the learner will be able to:**

- Explain basic SW engineering methods and practices, and their appropriate application
- Illustrate data models, object models, context models and behavioral models.
- Compare and chose a process model for a software projectdevelopment.
- Decide the Software Requirement Specification, Design document, Project plan of a given softwaresystem.

**Unit 1: Introduction to Software Engineering and Process Models**

**8**

- Definition ofSoftware
- Nature of Software Engineering
- Changing nature of software
- SoftwareProcess
  - The ProcessFramework
  - Umbrella Activities
  - ProcessAdaptation
- Generic ProcessModel
- Prescriptive ProcessModels
  - The Waterfall Model
  - Incremental Process Models
  - Evolutionary Process Models
  - Concurrent Models
  - The UnifiedProcess

**Unit 2: Agile Development**

**5**

- What is Agility?
- AgileProcess
  - AgilityPrinciples
  - The Politics of Agile Development
  - HumanFactors
- Extreme Programming (XP)
  - XPValues, XPProcess, IndustrialXP
- Adaptive Software Development (ASD)
- Scrum
- Dynamic System Development Model (DSDM)
- Agile Unified Process (AUP)

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<ul style="list-style-type: none"> <li>Case study on Agile Project</li> </ul>	
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<b>Unit 3: Requirements Analysis and Requirements Modeling</b>	<b>7</b>
<ul style="list-style-type: none"> <li>RequirementElicitation</li> <li>Software requirement specification (SRS)</li> <li>Developing Use Cases (UML)</li> <li>Building the Analysis Model</li> <li>Elements of the Analysis Model</li> <li>Analysis Patterns</li> <li>Agile Requirements Engineering</li> <li>Negotiating Requirements</li> <li>ValidatingRequirement</li> </ul>	

<b>Unit 4: Requirements Modeling</b>	<b>10</b>
<ul style="list-style-type: none"> <li>Introduction to UML</li> <li>Structural Modeling <ul style="list-style-type: none"> <li>Use case model</li> <li>Class model</li> </ul> </li> <li>BehavioralModeling <ul style="list-style-type: none"> <li>Behavioral Modeling</li> <li>Activity model</li> <li>Communication or Collaborationmodel</li> </ul> </li> <li>ArchitecturalModeling <ul style="list-style-type: none"> <li>Component model</li> <li>Artifact model</li> <li>Deploymentmodel</li> </ul> </li> </ul>	

<b>Unit 5:Design Concepts</b>	<b>6</b>
<ul style="list-style-type: none"> <li>DesignProcess <ul style="list-style-type: none"> <li>Software Quality Guidelines andAttributes</li> <li>Evolution of SoftwareDesign</li> </ul> </li> <li>DesignConcepts <ul style="list-style-type: none"> <li>Abstraction</li> <li>Architecture</li> <li>Patterns</li> <li>Separation of Concerns</li> <li>Modularity</li> <li>Information Hiding</li> <li>Functional Independence</li> <li>Refinement</li> <li>Aspects</li> </ul> </li> </ul>	

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<ul style="list-style-type: none"><li>○ Refactoring</li><li>○ Object Oriented Design Concepts</li><li>○ Design Classes</li><li>○ Dependency Inversion</li><li>○ Design for Test</li><li>● The Design Model<ul style="list-style-type: none"><li>○ Data Design Elements</li><li>○ Architectural Design Elements</li><li>○ Interface Design Elements</li><li>○ Component-Level Diagram</li><li>○ Deployment-Level Diagram</li></ul></li></ul>	
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\*Contact hours=12

<b>Recommended Books:</b>
<ul style="list-style-type: none"><li>● Jalote, P. (2008). <i>A Concise Introduction to Software Engineering</i>. Springer. ISBN: 978-1-84800-301-9</li><li>● Pressman, R. S. (1987). <i>Software engineering: A practitioner's approach</i>. (6th ed.). New York: McGraw-Hill. ISBN-13: 978-0-07-802212-8, ISBN-10: 0-07-802212-6</li><li>● Rumbaugh, J., Jacobson, I., Booch, G. (2004). <i>The Unified Modeling Language Reference Manual</i> (2<sup>nd</sup> ed.). Addison-Wesley. ISBN 0-201-30998-X</li></ul>

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