



**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.

<b>Unit 1: Introduction to Software Engineering and Process Models</b>	<b>8</b>
<ul style="list-style-type: none"> <li>● Definition ofSoftware</li> <li>● Nature of Software Engineering</li> <li>● Changing nature of software</li> <li>● SoftwareProcess <ul style="list-style-type: none"> <li>○ The ProcessFramework</li> <li>○ Umbrella Activities</li> <li>○ ProcessAdaptation</li> </ul> </li> <li>● Generic ProcessModel</li> <li>● Prescriptive ProcessModels <ul style="list-style-type: none"> <li>○ The Waterfall Model</li> <li>○ Incremental Process Models</li> <li>○ Evolutionary Process Models</li> <li>○ Concurrent Models</li> <li>○ The UnifiedProcess</li> </ul> </li> </ul>	

<b>Unit 2: Agile Development</b>	<b>5</b>
<ul style="list-style-type: none"> <li>● What is Agility?</li> <li>● AgileProcess <ul style="list-style-type: none"> <li>○ AgilityPrinciples</li> <li>○ The Politics of Agile Development</li> <li>○ HumanFactors</li> </ul> </li> <li>● Extreme Programming (XP) <ul style="list-style-type: none"> <li>○ XPValues, XPProcess, IndustrialXP</li> </ul> </li> <li>● Adaptive Software Development (ASD)</li> <li>● Scrum</li> <li>● Dynamic System Development Model (DSDM)</li> <li>● Agile Unified Process (AUP)</li> </ul>	

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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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