

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme	Bachelor of Technology				Branch/Spec.	Computer Science & Engineering (CSE/BDA/CS/AI&ML)			
Semester	IV				Version	1.0.0.0			
Effective from Academic Year		2026-27			Effective for the batch Admitted in		June 2025		
Subject code	2CSE411		Subject Name		Software Engineering				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	5	Practical	30	20	50
<b>Pre-requisites:</b>									
Application Development, Database, fundamentals of programming languages									
<b>Learning Outcome:</b>									
After successful completion of this course, students will be able to:									
<ul style="list-style-type: none"> <li>• Understand Software Engineering lifecycle, model and basics of project management.</li> <li>• Design UML and functional diagrams for various use cases.</li> <li>• Learn and evaluate various software measurement techniques.</li> <li>• Apply manual and automated software testing &amp; debugging techniques.</li> </ul>									
<b>Theory syllabus</b>									
Unit	Content								Hrs
1	<b>Software Engineering Fundamentals</b> Introduction, SDLC life cycle, SDLC Models, Project Management								5
2	<b>Agile Development</b> Agility and Agile Process model, Extreme Programming, SCRUM development, Other process models of Agile Development and Tools.								8
3	<b>Software Requirement Analysis and Design using UML</b> Understanding the Requirement, Requirement Modeling, Requirement Specification (SRS), Requirement Analysis and Requirement Elicitation, Requirement Engineering, Feasibility Studies, Structural design, behavior design, functional design, UML Diagrams, Design Pattern								14
4	<b>Software Architectural Design</b> Data centered architecture, data flow architecture, call and return architecture, object oriented architecture and layered architecture, Wireframing								4
5	<b>Source Code Management &amp; Versioning</b> Software configuration management, Software Configuration Items· SCM repository, SCM process, Version Control, Change Management								4
6	<b>Manual and Automated Software Testing</b> Software Quality Assurance Plan, Unit testing, integration testing, black box and white box testing, regression testing, performance testing, object-oriented testing, Automation testing. Verification and validation of Software.								4

7	<b>Software Measurement Techniques</b> Size and Cost Estimation: Function point analysis, LOC estimation, COCOMO. Software metrics, risk estimation, effort estimation	6
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<b>Practical content</b> Practicals will be based on drafting Software Requirement Specifications, UML diagrams and software designs, UML diagrams, software change management and version control, Estimation of Test Coverage Metrics and Structural Complexity, software quality assurance through manual and automated testing approaches.
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<b>Self - Study topics</b>
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| 1. Software analysis for legacy systems                  |
| 2. Agile Methodology and its impact on project execution |

<b>Mooc Course</b>
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Course Name: Software Engineering
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Link: <a href="https://onlinecourses.nptel.ac.in/noc20_cs68/preview">https://onlinecourses.nptel.ac.in/noc20_cs68/preview</a>
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<b>Text Books</b>
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| 1 | Software Engineering By Sommerville, Pearson Education                             |
| 2 | Software Engineering – A Practitioner’s Approach By: Roger S Pressman, McGraw-Hill |
| 3 | Object - Oriented Modeling and Design With UML by James Rumbaugh                   |

<b>Reference Books</b>
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|---|---|
| 1 | Pankaj Jalote, Software Engineering – A Precise Approach Wiley                                |
| 2 | Software Engineering Fundamentals by Ali Behhforoz& Frederick Hudson OXFORD                   |
| 3 | Rajib Mall, Fundamentals of software Engineering, Prentice Hall of India.                     |
| 4 | Engineering Software as a Service An Agile Software Approach, Armando Fox and David Patterson |
| 5 | John M Nicolas, Project Management for Business, Engineering and Technology, Elsevier         |

<b>Course Outcomes:</b>
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COs	Description
CO1	Illustrate the key components of the Software Engineering field
CO2	Analyze and apply best SDLC models as per business need
CO3	Design appropriate system requirement specifications
CO4	Design and implement appropriate solutions for testing software quality

**Mapping of CO and PO:**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	1	2	3	2	3	1	1	2	3
CO2	1	3	2	2	2	2	1	2	1	2	2	2
CO3	3	2	2	3	2	1	2	3	2	3	1	3
CO4	2	3	1	2	2	3	3	2	3	2	2	1