



SRI KRISHNA INSTITUTE OF TECHNOLOGY

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#57, Chimney Hills, Hesaraghatta Main Road, Chikkabanavara Post, Bengaluru- 560090

Department of Artificial Intelligence & Machine Learning

Academic Year	: 2026-2027	Course Name	: Software Engineering & Project Management
Semester	: V	Course Code	: BCS501
Scheme	: 2022	L: T: P: S	: 3:0:0:0 Credit: 3
Total Contact hours	: 45	CIE Marks	: 50
Course Plan Author	: Mrs. Megha H	SEE Marks	: 50
Date	: 24/08/2026	Total Marks	: 100

Course Prerequisites:

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Course Objectives:

This course will enable students to:

- Outline software engineering principles and activities involved in building large software programs. Identify ethical and professional issues and explain why they are of concern to Software Engineers.
- Describe the process of requirement gathering, requirement classification, requirement specification and requirements validation.
- Recognize the importance of Project Management with its methods and methodologies.
- Identify software quality parameters and quantify software using measurements and metrics. List software quality standards and outline the practices involved.

Course Outcomes:

CO	At the end of the course, student should be able to . . .	Blooms' Level
CO1	: Differentiate process models to judge which process model has to be adopted for the given scenarios.	L2
CO2	: Derive both functional and nonfunctional requirements from the case study.	L3
CO3	: Analyze the importance of various software testing methods and agile methodology.	L3
CO4	: Illustrate the role of project planning and quality management in software development.	L3
CO5	: Identify appropriate techniques to enhance software quality.	L3

Blooms' Taxonomy:

L1	L2	L3	L4	L5	L6
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Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
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Program Outcomes:

PO1	:	Engineering knowledge	PO7	:	Environment and sustainability
PO2	:	Problem analysis	PO8	:	Ethics
PO3	:	Design/development of solutions	PO9	:	Individual and team work
PO4	:	Conduct investigations of complex problems	PO10	:	Communication
PO5	:	Modern tool usage	PO11	:	Project management and finance
PO6	:	The engineer and society	PO12	:	Life-long learning

Program Specific Outcomes:

PSO1:	Adapt, Contribute innovative ideas in the field of Artificial Intelligence and Machine Learning
PSO2:	Enrich the abilities to qualify for Employment, Higher studies and Research in various domains of Artificial Intelligence and Machine Learning such as Data Science, Computer Vision, Natural Language Processing with ethical values
PSO3:	Acquire practical proficiency with niche technologies and open source platforms to become Entrepreneur in the domain of Artificial Intelligence and Machine Learning

CO-PO-PSO Mapping:

CO	Program Outcomes														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	3	2	-	1	-	-	-	1	1	1	1	-	1	2
CO2	3	3	3	2	1	-	-	-	2	3	1	1	-	2	3
CO3	3	3	2	2	3	-	-	1	2	2	1	2	-	2	3
CO4	3	2	2	2	1	1	-	1	2	2	3	1	2	2	3
CO5	3	3	2	2	2	-	-	2	1	2	2	2	2	3	3

CO-PO Mapping justification

CO	PO / PSO	Correlation Weightage	Justification
CO1	PO1	3	Requires application of software engineering principles and knowledge of different software process models.
	PO2	3	Students analyze project scenarios and constraints to determine the most appropriate process model.



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	PO3	2	Selection of an appropriate process model forms part of planning an appropriate software development solution.
	PO5	1	Exposure to different process frameworks and practices provides limited awareness of tools/process environments.
	PO9	1	Understanding personal and team process models provides a limited connection with team-oriented software development.
	PO10	1	Justifying a process-model selection requires students to articulate their reasoning.
	PO11	1	Process-model selection influences project organization, planning and management.
	PO12	1	Understanding different process models supports adaptation to changing software development practices.
	PSO1	-	Process-model selection does not substantially involve mathematical principles.
	PSO2	1	Process assessment and improvement provide limited experimental/evaluative exposure.
	PSO3	2	Selection and justification of a process model requires communication of decisions and awareness of team processes.
CO 2	PO1	3	Applies software engineering and requirements engineering knowledge.
	PO2	3	Students analyze a case study to identify, classify and derive functional and nonfunctional requirements.
	PO3	3	Requirements form the foundation for designing and developing an appropriate software solution.
	PO4	2	Case-study investigation involves collecting, analyzing and validating information about a software problem.
	PO5	1	UML/use-case and requirements modeling may involve software engineering tools.
	PO9	2	Group-based case study/project work requires collaborative analysis.
	PO10	3	Requirements elicitation, negotiation, specification and documentation require effective communication.
	PO11	1	Requirements affect project scope and planning, although project management is not the primary focus of CO2.
	PO12	1	Requirements engineering practices evolve with software development approaches.
	PSO1	-	Requirements elicitation and modeling have limited direct mathematical content.
	PSO2	2	Requirements are derived and validated through case-study-based investigation.
	PSO3	3	Requirements engineering involves elicitation, negotiation, specification and validation, all requiring strong communication and teamwork.



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CO 3	PO1	3	Requires knowledge of software engineering, agile and software quality/testing concepts.
	PO2	3	Students analyze the suitability and importance of testing approaches and agile practices.
	PO3	2	Agile practices and testing contribute to developing and improving software solutions.
	PO4	2	Analysis of testing methods involves systematic investigation and evaluation.
	PO5	3	The syllabus explicitly recommends demonstration/learning of an agile tool.
	PO8	1	Professional software development practices require attention to responsible quality-oriented development.
	PO9	2	Agile development emphasizes collaboration and team-based development.
	PO10	2	Agile practices require communication among development team members and stakeholders.
	PO11	1	Agile methodologies influence project organization and management.
	PO12	2	Agile methods and tools evolve continuously, requiring students to adapt and learn new practices.
	PSO1	-	Agile and testing analysis does not have a significant mathematical/design-principle component in the given syllabus.
	PSO2	2	Testing and agile approaches can be explored through practical/project activities.
	PSO3	3	Agile development is inherently collaborative and depends heavily on communication and team interaction.
CO 4	PO1	3	Applies software engineering and project management principles.
	PO2	2	Project planning requires identification and analysis of objectives, risks, stakeholders and project constraints.
	PO3	2	Planning and quality management support systematic development of software solutions.
	PO4	2	Project and risk evaluation involves systematic investigation and assessment.
	PO5	1	Project management may make use of software/project management tools.
	PO6	1	Stakeholder considerations provide a limited connection with the engineer's role and societal context.
	PO8	1	Project and quality management involve professional responsibility and responsible software practices.
	PO9	2	Project management requires coordination and collaborative team work.
	PO10	2	Stakeholder management, objectives and project reporting require communication.
	PO11	3	Directly addresses project planning, management methods, methodologies, evaluation, risk and project life cycle.
	PO12	1	Exposure to traditional and modern project management practices encourages continued professional learning.
	PSO1	2	Project evaluation, cost-benefit evaluation and risk evaluation provide a moderate connection to quantitative reasoning.



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	PSO2	2	Project evaluation, risk and cost-benefit analysis involve systematic evaluation.
	PSO3	3	Project planning involves stakeholders, objectives, coordination, communication and teamwork.
CO 5	PO1	3	Requires application of software quality principles, models, measurements and metrics.
	PO2	3	Students identify and evaluate appropriate quality improvement techniques based on a software situation.
	PO3	2	Quality enhancement is an integral part of developing effective software solutions.
	PO4	2	Quality improvement requires investigation, measurement and evaluation of software characteristics.
	PO5	2	Quality measurement, metrics and modern software engineering tools support quality improvement.
	PO8	2	Quality-oriented software development reinforces professional responsibility and adherence to standards.
	PO9	1	Quality assurance activities involve interaction among developers, testers and other team members.
	PO10	2	Quality findings and improvement recommendations must be documented and communicated.
	PO11	2	Quality management is an important component of software project planning and management.
	PO12	2	Software quality standards and practices evolve, requiring continuous professional learning.
	PSO1	2	Software quality measurements, metrics and estimation provide a quantitative component.
	PSO2	3	Quality improvement is strongly supported by measurement, metrics, evaluation and empirical assessment.
	PSO3	3	Software quality improvement requires collaborative quality management, documentation, communication and professional responsibility.

Course Content (Syllabus)

Module 1	CH
Software and Software Engineering: The nature of Software, The unique nature of WebApps, Software Engineering, The software Process, Software Engineering Practice, Software Myths. Process Models: A generic process model, Process assessment and improvement, Prescriptive process models: Waterfall model, Incremental process models, Evolutionary process models, Concurrent models, Specialized process models. Unified Process, Personal and Team process models Textbook 1: Chapter 1: 1.1 to 1.6, Chapter 2: 2.1 to 2.5	10



RBT: L1, L2	
Module 2	
Understanding Requirements: Requirements Engineering, Establishing the ground work, Eliciting Requirements, Developing use cases, Building the requirements model, Negotiating Requirements, Validating Requirements. Requirements Modeling Scenarios, Information and Analysis classes: Requirement Analysis, Scenario based modeling, UML models that supplement the Use Case, Data modeling Concepts, Class-Based Modeling. Requirement Modeling Strategies : Flow oriented Modeling , Behavioral Modeling. Textbook 1: Chapter 5: 5.1 to 5.7, Chapter 6: 6.1 to 6.5, Chapter 7: 7.1 to 7.3 RBT: L1, L2	12
Module 3	
Agile Development: What is Agility? Agility and the cost of change. What is an agile Process? Extreme Programming (XP), Other Agile Process Models, A tool set for Agile process. Principles that guide practice: Software Engineering Knowledge, Core principles, Principles that guide each framework activity. Textbook 1: Chapter 3: 3.1 to 3.6, Chapter 4: 4.1 to 4.3 RBT: L1, L2	10
Module 4	
Introduction to Project Management: Introduction, Project and Importance of Project Management, Contract Management, Activities Covered by Software Project Management, Plans, Methods and Methodologies, Some ways of categorizing Software Projects, Stakeholders, Setting Objectives, Business Case, Project Success and Failure, Management and Management Control, Project Management life cycle, Traditional versus Modern Project Management Practices. Project Evaluation: Evaluation of Individual projects, Cost-benefit Evaluation Techniques, Risk Evaluation Textbook 2: Chapter 1: 1.1 to 1.17 , Chapter 2: 2.4 to 2.6 RBT: L1, L2	08
Module 5	
Software Quality: Introduction, The place of software quality in project planning, Importance of software quality, Defining software quality, Software quality models, product versus process quality management. Software Project Estimation: Observations on Estimation, Decomposition Techniques, Empirical Estimation Models. Textbook 2: Chapter 13: 13.1 to 13.5, 13.7, 13.8, Text Book 1: Chapter 26: 26.5 to 26.7 Textbook 1: Part-2 RBT: L1, L2	08



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Schedule of Instruction:

Class No	Topic	Date	RB T	C O	Mode
Module-1					
Chapter Name: Software and Software Engineering					
1.	Introduction to the course, course website	15/9/26	2	1	brain storm
2.	The nature of Software, The unique nature of WebApps,		2	1	L
3.	Software Engineering, The software Process,		2	1	PPT
4.	Software Engineering Practice, Software Myths.		2	1	PPT
5.	Process Models: A generic process model, Process assessment and improvement		2	1	PPT
6.	Prescriptive process models: Waterfall model,		2	1	PPT
7.	Incremental process models		2	1	PPT
8.	Evolutionary process models		2	1	PPT
9.	Concurrent models		2	1	PPT
10.	Specialized process models		2	1	PPT
11.	Unified Process, Personal and Team process models		2	1	PPT
12.	Activity class - Portfolio		3	1	Role play
Module-2					
Chapter Name: Understanding Requirements					
13.	Requirements Engineering, Establishing the ground work		2	2	PPT
14.	Eliciting Requirements,		2	2	PPT
15.	Developing use cases, Building the requirements model		2	2	PPT
16.	Negotiating Requirements,		2	2	PPT
17.	Validating Requirements		2	2	PPT
18.	Requirements Modeling Scenarios, Information and Analysis classes: Requirement Analysis,		2	2	PPT
19.	Scenario based modeling		2	2	PPT
20.	UML models that supplement the Use Case		2	2	PPT
21.	Data modeling Concepts		2	2	PPT
22.	Class-Based Modeling.		2	2	PPT
23.	Requirement Modeling Strategies Modeling		2	2	PPT



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Class No	Topic	Date	RB T	C O	Mode
24.	Flow oriented		2	2	PPT
25.	Behavioral Modeling		2	2	PPT
26.	Case study , Revision - Quiz		3	2	Case Study , Quiz

Module-3

Chapter Name: Agile Development

27.	What is Agility?		2	3	PPT
28.	Agility and the cost of change		2	3	PPT
29.	What is an agile Process?		2	3	PPT
30.	Extreme Programming (XP)		2	3	PPT
31.	Other Agile Process Models		2	3	PPT
32.	A tool set for Agile process		2	3	PPT
33.	Principles that guide practice: Software Engineering Knowledge		2	3	PPT
34.	Core principles		2	3	PPT
35.	Principles that guide each framework activity		2	3	PPT
36.	Revision - quiz		3	3	quiz
37.	Agile Sprint Challenge		3	3	Role Play

Module-4

Chapter Name: Introduction to Project Management

38.	Introduction, Project and Importance of Project Management		2	4	PPT
39.	Contract Management		2	4	PPT
40.	Activities Covered by Software Project Management		2	4	PPT
41.	Plans, Methods and Methodologies		2	4	PPT
42.	Some ways of categorizing Software Projects, Stakeholders,		2	4	PPT
43.	Setting Objectives, Business Case,		2	4	PPT
44.	Project Success and Failure, Management and Management Control		2	4	PPT
45.	Project Management life cycle,		2	4	PPT



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Class No	Topic	Date	RB T	C O	Mode
46.	Traditional versus Modern Project Management Practices.		2	4	PPT
47.	Project Evaluation: Evaluation of Individual projects		2	4	PPT
48.	Cost-benefit Evaluation Techniques		2	4	PPT
49.	Risk Evaluation		2	4	PPT
50.	Case Study on failed projects, Revision - Quiz		3	4	Case Study, Quiz

Module-5

Chapter Name: Software Quality

51.	Introduction, The place of software quality in project planning		2	5	PPT
52.	Importance of software quality		2	5	PPT
53.	Defining software quality		2	5	PPT
54.	Software quality models		2	5	PPT
55.	product versus process quality management.		2	5	PPT
56.	Software Project Estimation: Observations on Estimation		2	5	PPT
57.	Decomposition Techniques		2	5	PPT
58.	Empirical Estimation Models.		2	5	PPT

Self-study hours:

For 3 credits: Self-study hours = 90 hours – Course delivery planned hours = 33 hours

SL#	Self-study content	Hours	Output
1.	Software Engineering case-study analysis	4	Case report
2.	Requirements elicitation exercise	4	Interview+requirement
3.	UML modelling	4	UML portfolio
4.	Agile tool learning	4	Trello/Jira/GitHub board
5.	Software project failure investigation	3	Failure analysis
6.	Project planning & risk analysis	4	Project plan
7.	Software quality audit	3	Quality report



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8.	Estimation exercise	3	Estimation sheet
9.	Reflection/video presentation	4	5-minute presentation
Total hours		33	

Textbooks:

T1	Roger S. Pressman: Software Engineering-A Practitioners approach, 7th Edition, Tata McGraw Hill.
T2	Bob Hughes, Mike Cotterell, Rajib Mall: Software Project Management, 6th Edition, McGraw Hill

Reference books:

R1	Pankaj Jalote: An Integrated Approach to Software Engineering, Wiley India.
R2	"Software Engineering: Principles and Practice", Hans van Vliet, Wiley India, 3rd Edition, 2010.

Web links and Video Lectures (e-Resources):

1.	https://onlinecourses.nptel.ac.in/noc20_cs68/preview
2.	https://onlinecourses.nptel.ac.in/noc24_mg01/preview

Mini Projects list:

1.	College ERP enhancement
2.	Library Management System
3.	Hospital Appointment System
4.	Campus Transportation System
5.	Placement Management System
6.	Hostel Management System
7.	Student Event Management System
8.	College Complaint/Grievance System
9.	Canteen Management System
10.	Alumni Management System
11.	IQAC Management System
12.	Railways/ Bus Booking System



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13.	Tourism Management System
14.	Admission Management System

Activity: Software Engineering Portfolio

1.	Process model comparison
2.	Requirements document
3.	Use-case diagram
4.	Class diagram
5.	Behavioural/flow model
6.	Agile board
7.	Sprint reflection
8.	Risk register
9.	Project estimation
10.	Quality checklist
11.	Software failure case study
12.	Final reflection

Assessment Schedule:

S.N.	Assessment Type	Content	CO	Duration	Marks	Date
1.	IA-1	M1, M2, M3	1,2,3	1.5 hrs	50	
2.	IA-2	M3, M4, M5	2,4,5	1.5 hrs		
IA Scaled down to					25	
IA Theory component					25	
3.	Mini Project	M1, M2, M3, M4, M5	1,2,3,4,5		15	
4.	Activity: Software Engineering Portfolio	M1, M2, M3, M4, M5	1,2,3,4,5		10	
Assessment Total					50	
Total (IA + Assessment)					50	



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5.	Semester End Examination	M1, M2, M3, M4, M5	1,2,3,4,5	3 Hrs	100	
SEE Scaled down to					50	
Total (IA+ SEE)					100	

RB – Text Book/Reference Book, ***L** – Interactive Lecture, **V**- Videos or any other mode, ***RBT** – Revised Blooms’ Taxonomy, **L: T: P:**
C – Theory/Lecture: Tutorial: Practical/Drawing: Credits, **SEE**: Semester End Examination, **CIE**: Continuous Internal Evaluation

Faculty In charge

Course Coordinator

HoD