SOFTWARE ENGINEERING & PROJECT MANAGEMENT
(Effective from the Academic Year 2022 - 2023)
VI SEMESTER

Course Code	**21CS61**	CIA Marks	50
Number of Contact Hours/Week (L: T: P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	**40L**	Exam Hours	03

CREDITS – 3

COURSE PREREQUISITES:

● Fundamentals of software Development activities, Management functions.

COURSE OBJECTIVES:

- 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.
- Infer the fundamentals of object-oriented concepts, differentiate system models, use UML diagrams and apply design patterns.
- Explain the importance of Agile Software Development.
- Discuss various types of software testing practices and software evolution processes.
- Recognize the importance 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

TEACHING - LEARNING STRATEGY:

Following are some sample strategies that can be incorporate for the Course Delivery
- ● Chalk and Talk Method/Blended Mode Method
- ● Power Point Presentation
- ● Expert Talk/Webinar/Seminar
- ● Video Streaming/Self-Study/Simulations
- ● Peer-to-Peer Activities
- ● Activity/Problem Based Learning
- ● Case Studies
- ● MOOC/NPTEL Courses
- ● Any other innovative initiatives with respect to the Course contents

COURSE CONTENTS

MODULE - I

Introduction: The evolving role of software, The changing nature of software, Softwareengineering, A Process Framework, Process Patterns, Process Assessment, Personal and Team Process Models, Process Technology, Product and Process. **Process Models**: Prescriptive models, Waterfall model, Incremental process models, Evolutionary process models, Specialized process models.	**8 Hours**

MODULE - II	
Introduction, Modelling Concepts and Class Modelling: What is Object orientation? What is OO-	**8 Hours**

development? OO Themes; Evidence for usefulness of OO development; OO modelling history. Modelling as Design technique: Modelling, abstraction, The Three models. Class Modelling: Object and Class Concept, Link and associations concepts, Generalization and Inheritance, A sample class model, Navigation of class models, and UML diagrams	

MODULE - III	
Software Testing: A Strategic Approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, Test Strategies for Object -Oriented Software, Validation Testing, System Testing, The Art of Debugging. Agile Methodology: Before Agile – Waterfall, Agile Development,	**8 Hours**

MODULE - IV	
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.	**8 Hours**

MODULE - V	
Activity Planning: Objectives of Activity Planning, When to Plan, Project Schedules, Sequencing and Scheduling Activities, Network Planning Models, Forward Pass– Backward Pass, identifying critical path, Activity Float, Shortening Project Duration, Activity on Arrow Networks. Software Quality: Introduction, the place of software quality in project planning, Importance of software quality, software quality models, ISO 9126, quality management systems, process capability models, techniques to enhance software quality, quality plans.	**8 Hours**

COURSE OUTCOMES	
Upon completion of this course, the students will be able to:	

CO No.	Course Outcome Description	Bloom's Taxonomy Level

CO1	Understand the activities involved in software engineering and analyse the role of various process models	CL2
CO2	Explain the basics of object-oriented concepts and build a suitable class model using modelling techniques	CL2
CO3	Interpret various software testing methods and to understand the importance of agile methodology.	CL2
CO4	Apply the Concepts of project planning and quality management in software development	CL3
CO5	Illustrate the importance of activity planning and its models	CL2

CO-PO-PSO MAPPING

CO No.	Programme Outcomes (PO)												Programme Specific Outcome (PSO)		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	1				1		2	1	1		2	1	1	
CO2	2	2	2		2	1		2	2	2	2	2	2	1	
CO3	2	2	2		2			2	2	3	1	2	3	1	1
CO4	2	2	2		2			2	3	3	2	2	3	1	1
CO5	2	2	2		2	2	2	2	3	3	2	2	3	1	1

3: Substantial (High)	2: Moderate (Medium)	1: Poor (Low)

ASSESSMENT STRATEGY

Assessment will be both CIA and SEE. Students learning will be assessed using Direct and Indirect methods:

Sl. No.	Assessment Description	Weightage (%)	Max. Marks
1	Continuous Internal Assessment (CIA)	100 %	50
	Continuous Internal Evaluation (CIE)	60 %	30
	Assignments	40 %	20
2	Semester End Examination (SEE)	100 %	50

ASSESSMENT DETAILS

Continuous Internal Assessment (CIA) (50%)				Semester End Exam (SEE) (50%)
Continuous Internal Evaluation (CIE) (60%)			Assignment/ Activities (40%)	
I	II	III		
Syllabus Coverage			Syllabus Coverage	Syllabus Coverage
40%	30%	30%	100%	100%
MI			MI	MI
MII	MII		MII	MII

		MIII		MIII		MIII
			MIV	MIV		MIV
			MV	MV		MV

Note: For Examinations (both CIE and SEE), the question papers shall contain the questions mapped to the appropriate Bloom's Level. Any COs mapped with higher cognitive Bloom's Level may also be assessed through the assignments.

ASSIGNMENT TYPES WITH WEIGHTAGES

Sl. No.	Assignment Description	Max. Weightage (%)	Max. Marks
1	Written Assignments	25 %	05
2	Quiz	10 %	02
3	Case Studies	25 %	05
4	Seminar/Presentation	15 %	03
5	Peer - to - Peer Learning	10 %	02
6	Activity Based Learning	50 %	10
7	Project Based Learning	50 %	10
8	Field Work + Report	50 %	10
9	Industry Visit + Report	50 %	10
10	NPTEL/MOOC Courses – Registration and Assignment Submissions	50 %	10

	NPTEL Certification	75 %	15
11	Any other Innovative Assignments (CL4 and above)	50 %	10

Note: The assignments mentioned above may be provided appropriately to the students belonging to different bands

SEE QUESTION PAPER PATTERN:

● The question paper will have **TEN** full questions from **FIVE** Modules
● There will be 2 full questions from each module. Every question will carry a maximum of 20 marks.
● Each full question may have a maximum of four sub-questions covering all the topics under a module. ● The students will have to answer FIVE full questions, selecting one full question from each module.

TEXT BOOKS:

1. Roger S. Pressman: Software Engineering-A Practitioners approach, 6th Edition, Tata McGraw Hill.
2. Michael Blaha, James Rumbaugh: Object Oriented Modelling and Design with UML, 2nd Edition, Pearson Education, 2005.
3. Bob Hughes, Mike Cotterell, Rajib Mall: Software Project Management, 6th Edition, McGraw Hill Education, 2018.
4. Deepak Gaikwad, Viral Thakkar, DevOps Tools From Practitioner's Viewpoint, Wiley.

REFERENCE WEB LINKS AND VIDEO LECTURES (E - RESOURCES):

1. https://onlinecourses.nptel.ac.in/noc20_cs68/preview
2. https://www.youtube.com/watch?v=WxkP5KR_Emk&list=PLrjkTql3jnm9b5nrggx7Pt1G4UAHeFl
3. http://elearning.vtu.ac.in/econtent/CSE.php
4. http://elearning.vtu.ac.in/econtent/courses/video/CSE/15CS42.html
5. https://nptel.ac.in/courses/128/106/128106012/ (DevOps)