Uka Tarsadia University

B. Tech.
Semester VI

SOFTWARE PROJECT MANAGEMENT
CE5025

Effective from June-2023

Syllabus version: 1.00

Subject Code	Subject Title	Teaching Scheme			
		Hours		Credits	
		Theory	Practical	Theory	Practical
CE5025	Software Project Management	3	2	3	1

Subject Code	Subject Title	Theory Examination Marks		Practical Examination Marks	Total Marks
		Internal	External	CIE	
CE5025	Software Project Management	40	60	50	150

Objectives of the course:
● To understand the project management concepts in software development and acquire proficiency in software project planning, evaluation, and effort estimation techniques.
● To develop the ability to create project activity plans, estimate project durations, manage risks, and enhance skills to navigate various phases of software project and people management.

Course outcomes:
CO1:   Understand project management concepts while developing software.
CO2:   Understand the Software Project Planning and Evaluation techniques.
CO3:   Gain adequate knowledge about software process models and software effort estimation techniques.
CO4:   Produce activity plan of project,estimate duration of project and create a critical path and a precedence network of a project.
CO5:   Identify and Estimate the risks involved in various project activities, produce a work plan and resource schedule.
CO6:   Develop skills to manage the various phases involved in project management and people management.

Sr. No.	Topics	Hours
Unit – I		
1	**Introduction to Software Project Management:** Importance of software project Management, What is a project?Software projects versus other types of project, Contract management and technical project management, Activities, plans, methods and methodologies, Categorization of software projects, Setting objectives, Project success and failure, What is management? Management control.	5

	Unit – II	
2	**Project Evaluation and Project Planning:** A business case, Projectportfolio management, Evaluationof individual projects, Costbenefit evaluation techniques, Riskevaluation, Programmemanagement, Managingthe allocation of resources within programmes, Strategicprogramme management, Creatinga programme, Aidsto programme management, Somereservations about programme management, Benefitsmanagement, Projectplanning steps.	8
	Unit – III	
3	**Project Approach Selection:** Choosingmethodologies andtechnologies, Choice of process models, Structure versus speed of delivery,The waterfall model, The spiral model, Software prototyping, Other ways of categorizingprototypes, Incremental delivery,Atern/Dynamic systems development method, Rapid application development, Agilemethods, Extreme programming (XP), Scrum, Managingiterative processes, Selecting the most appropriate process model.	9
4	**Software Effort Estimation:** Whereare estimates done? Problems with over and under estimates, Thebasis for software estimating, Softwareeffort estimation techniques, Bottom-up estimating, The top-down approach and parametric models,Expertjudgment, Estimatingby analogy, Albrechtfunction point analysis, Functionpoints Mark II, COSMIC full function points, COCOMO 13 –A parametric productivity model.	
	Unit – IV	
5	**Activity Planning:** The objectives of activity planning,When to plan?Project schedules, Projects and activities, Sequencing and scheduling activities, Network planning models, Formulating a network model, Adding the time dimension, The forward pass, The backward pass, Identifying the critical path, Activity float, Shortening the project duration, Identifying critical activities, Activity-on-arrow.	8
	Unit – V	
6	**Risk Management:** Introduction of risk management, Risk, Categoriesof risk, Aframework for dealing with risk, Riskidentification, Riskassessment, Riskplanning, Riskmanagement, Evaluatingrisks to the schedule, Applyingthe PERT technique, MonteCarlo simulation, Criticalchain concepts.	9

7	**Resource Allocation:** Thenature of resources, Identifyingresource requirements, Scheduling resources, Creatingcritical paths, Counting the cost, Beingspecific, Publishingthe resource schedule, Costschedules, Thescheduling sequence.	
Unit – VI		
8	**Project Management and Control:** Monitoring and control, Managing contracts, Managing people in software environments.	6

Sr.No.	Software Project Management(Practicals)	Hours
1	Identify the requirement and set objectives for the software projects.1) Identify the requirements and list the key objectives for the mobile application project and Stock Inventory System.2) Ensure that each objective follows the SMART criteria.3) Create Epic, Stories and Tasks using Jira software.	4
2	Categorization of software projects 1) Study and identify the requirements, modules and list the key objectives for themobile application project, 2) Study the different categories of software projects, 3) Categorize projects based on size, complexity, and criticality, 4) Justify your categorization decisions.	4
3	Study cost-benefit evaluation Techniques and apply for Project Selection. 1) Study cost-benefit evaluation Techniques, 2) Conduct a cost-benefit analysis for both projects by using techniques such as Return on Investment (ROI) and Net Present Value (NPV) to evaluate and compare the projects.3) Make a recommendation on which project should be selected based on the analysis.	4
4	Study and apply stepwise project planning activities. 1) Study the steps and activities involved in project planning,2) Create project planning for a given scenario.	2
5	Select the most appropriate Process model: 1) Study the importance of selecting an appropriate process model for a given project,2) Evaluate different process models based on project characteristics, 3) Choose the most appropriate process model for a given scenario, 4) Consider factors such as project size, requirements volatility, and the need for customer involvement.	4
6	Study and apply software effort estimation techniques:1) Choose two estimation techniques from the list (e.g., Bottom-up estimating, Expert judgment, Function Point Analysis, COCOMO), 2) Draw up an outline program structure diagram for a given scenario,3) Calculation of SLOC from Albrecht function points, 4)Apply COCOMO to estimate the effort.	4

7	Consider a software development project with the following activities:Activity A: Define Requirements (Duration: 5 days),Activity B: Design Database (Duration: 8 days), Activity C: Develop Frontend (Duration: 10 days), Activity D: Implement Backend (Duration: 12 days), Activity E: Perform Testing (Duration: 6 days), Activity F: Deployment (Duration: 8 days), 1) Construct a Precedence Diagram, 2) Calculate Early Start (ES), Early Finish (EF), Late Start (LS), Late Finish (LF), and Total Float for each activity, 3) Determine the Critical Path, 4) Calculate the total project duration.	2
8	Build PERT networks, estimate activity times, and calculate project durations and completion probabilities.	2
9	Study the principles of resource allocation and scheduling in project management.	2
10	Study the challenges and strategies in managing people in software development projects.	2

Text book:
1. Bob Hughes, Mike Cotterell and RajibMall,"Software Project Management", Fifth Edition, Tata McGraw Hill.

Reference books:
1. Pankaj Jalote,"Software Project Management in Practice", Pearson.
2. Sanjay Mohapatra,"Project Management", Cengage Learning.
3. Roger S. Pressman, "Software Engineering: A practical Approach", McGraw-Hill.

Course objectives and Course outcomes mapping:
● To understand the project management concepts in software development and acquire proficiency in software project planning, evaluation, and effort estimation techniques:CO1,CO2, and CO3
● To develop the ability to create project activity plans, estimate project durations, manage risks, and enhance skills to navigate various phases of software project and people management: CO4,CO5, and CO6

Course units and Course outcomes mapping:

Unit No.	Unit Name	Course Outcomes					
		CO1	CO2	CO3	CO4	CO5	CO6
1	Introduction to Software Project Management	✓					
2	Project Evaluation and Project Planning		✓				
3	Project Approach Selection and			✓			

	Software Effort Estimation						
4	Activity Planning				✓		
5	Risk Management and Resource Allocation					✓	
6	Project Management and Control						✓

Programme outcomes:

PO 1: Engineering knowledge: An ability to apply knowledge of mathematics, science, and engineering.

PO 2: Problem analysis: An ability to identify, formulates, and solves engineering problems.

PO 3: Design/development of solutions: An ability to design a system, component, or process to meet desired needs within realistic constraints.

PO 4: Conduct investigations of complex problems: An ability to use the techniques, skills, and modern engineering tools necessary for solving engineering problems.

PO 5: Modern tool usage: The broad education and understanding of new engineering techniques necessary to solve engineering problems.

PO 6: The engineer and society: Achieve professional success with an understanding and appreciation of ethical behavior, social responsibility, and diversity, both as individuals and in team environments.

PO 7: Environment and sustainability: Articulate a comprehensive world view that integrates diverse approaches to sustainability.

PO 8: Ethics: Identify and demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work.

PO 9: Individual and team work: An ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give/receive clear instructions.

PO 11: Project management and finance: An ability to demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12: Life-long learning: A recognition of the need for, and an ability to engage in life-long learning.

Programme outcomes and Course outcomes mapping:

Programme Outcomes	Course Outcomes					
	CO1	CO2	CO3	CO4	CO5	CO6
PO1	✓	✓	✓	✓	✓	✓
PO2		✓	✓		✓	
PO3			✓	✓		
PO4						
PO5		✓	✓			✓
PO6	✓			✓		
PO7					✓	✓
PO8	✓	✓				✓
PO9						
PO10	✓	✓		✓		
PO11		✓	✓			
PO12						