Mandsaur University

Master of Technology (Computer Science and Engineering)

Semester - II

L-3 T-1 P-0 C- 4

24CSE590 T: Software Project planning and Management

Course Objectives

- Understand key concepts of software project planning, including processes, resources, and risk management.
- Learn to plan, estimate, and manage time, cost, and resources effectively.
- Master effort estimation techniques like COCOMO and Function Point Analysis.
- Apply quality assurance practices and process improvement models.
- Develop strategies to manage global teams and handle globalization challenges.

Course Outcomes (COs)

1. Apply project planning techniques to define scope, objectives, deliverables, and estimate cost, resources, and risks.
2. Understand proficiency in software effort estimation using models and techniques like COCOMO, Function Point Analysis, and Delphi.
3. Analyze and implement resource allocation, project tracking, and control using Earned Value Analysis and change control.
4. Understand software quality assurance, process improvement models (CMM, CMMI), and configuration management for better project performance.
5. Evaluate globalization challenges and implement strategies for managing geographically distributed teams.

Articulation Matrix

(Program Articulation Matrix is formed by the strength of correlation of COs with POs and PSOs. The strength of correlation is indicated as 3 for substantial (high), 2 for moderate (medium) correlation, and 1 for slight (low) correlation)

CO/PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	-	3	-	-	-	-	-	-	-	-	1	1	-
CO2	1	3	1	-	-	-	-	-	-	-	-	-	3	1	-
CO3	2	1	-	-	3	-	-	-	-	-	-	-	2	2	-
CO4	3	-	2	-	-	-	-	-	-	-	-	-	2	3	2
CO5	1	-	-	-	3	-	-	-	-	-	-	-	3	1	1

High-3 Medium-2 Low-1

Unit I: Software Project Planning, Evaluation and Metrics Management **12 Hours**

Introduction: Software product, process, resources, quality, and cost. Objectives, issues, and problems relating to software projects. Overview of Project Planning, Steps in project planning, scope and objectives, work breakdown structure, Deliverables and other products. time, cost, and resource estimation; Project Evaluation, Strategic assessment, Technical assessment, Cost-benefit analysis, Cash flow forecasting; Cost-benefit evaluation techniques; Break-even analysis; Risk evaluation, process model, Rapid application development Metrics Introduction, The Metrics Roadmap, A Typical Metrics Strategy, What Should you Measure?, Set Targets and track Them, Understanding and Trying to minimize variability, Act on data, People and Organizational issues in Metrics Programs, Common Pitfalls to watch out for in Metrics Programs, Matrices implementation checklists and tools

Unit II: Software Effort Estimation, Activity Planning and Risk Management **12 Hours**

Software Effort Estimation: What is Estimation? when and why is Estimation done? The three phases of Estimation, Estimation methodology, formal models for size Estimation, Translating size Estimate into effort Estimate, Translating effort Estimates into schedule Estimate, common challenges during Estimation. Effort estimation techniques; Estimation by analogy, Delphi technique, Algorithmic methods, Top-down and bottom-up estimation, Function point analysis, Object points, COCOMO model. Metrics for the Estimation processes. Activity Planning Network planning model, Activity-on-arrow network, Precedence network, Forward pass, Backward pass, Critical path, Slack and float. Risk Analysis and Management Nature and categories of risk in software development; risk Identification; Risk assessment; Risk mitigation, monitoring, and management;

Evaluating schedule risk using PERT.

Unit III: Resource Allocation and Contract Management 12 Hours

Recourse Allocation: Nature of project resources, Identifying resource requirement of activities; Allocating and scheduling resources; cost of resources; Standard, planned, and actual cost; Cost variance; time-cost trade-off. Project Tracking and Control: Measurement of physical and financial progress; Earned value analysis; Status reports; Milestone reports; Change control. Contact Management: Outsourcing of products and services; Types of contracts; Stages in contract placement; Terms of contract; Contract monitoring; Acceptance testing

Unit IV: Managing Teams, Quality Assurance, and Configuration Management 12 Hours

Managing People and Teams Organizational behavior, Recruitment and placement; Motivation, Group behavior; Individual and group decision making, Leadership and leadership styles, forms of organizational structures. Software Quality Assurance: Planning for quality, Product versus process quality management, Procedural and quantitative approaches, Defect analysis and prevention, Statistical process control, Pareto analysis, Causal analysis, skill sets for people in the maintenance phase, estimating size, effort, and people resources for the maintenance phase, advantages of using geographically distributed teams for the maintenance phase, metrics for the maintenance phase.

Quality standards; ISO 9000; Capability Maturity Model; Software maturity Framework Quality audit. Principles of Software Process Change Configuration Management : Configuration management process; Software configuration items; Version control; change control; Configuration audit; Status reporting. CMM, CMMI, PCMM, PSP, TSP.

Unit V: Globalization Challenges and People-Centric Models 12 Hours

Globalization issues in project management: Evolution of globalization, challenges in building global teams, Models for the execution of global projects, some effective management techniques for managing global teams. advantages of using geographically distributed teams for the maintenance phase, management structures for testing in global teams, the effect of internet on project management, managing projects for the internet, emphasis on people centric models, people capability maturity model (P-CMM), other people Effect on the project management activities. People focused process models, Growing focused models in the literature.

Text Books:

1. Bob Hughes and Mike Cotterell, "Software Project Management", McGraw-Hill 2. Pankaj Jalote, "Software Project Management in Practice", Pearson Education Asia Reference Books:
2. Roger S. Pressman, "Software Engineering: A practitioner's Approach", McGraw-Hill 2. Robert T. Futrell, Donald F. Shafer, and Linda I. Shafer, "Quality Software Project Management", Pearson Education Asia.
3. Ramesh Gopalaswamy, "Managing Global Software Projects", 2003, Tata McGraw-Hill 4. Jennifer Greene & Andrew Stellman, Head First PMP, O'Reilly

Subject Tr. Academic Coordinator HoD Sr. Faculty Nominated by DOAA

Mandsaur University

Master of Technology (Computer Science and Engineering)

Semester - II

L-3 T-1 P-0 C- 4

24CSE590 T: Software Project planning and Management

Course Objectives

- Understand key concepts of software project planning, including processes, resources, and risk management.
- Learn to plan, estimate, and manage time, cost, and resources effectively.
- Master effort estimation techniques like COCOMO and Function Point Analysis.
- Apply quality assurance practices and process improvement models.
- Develop strategies to manage global teams and handle globalization challenges.

Course Outcomes (COs)

1. Apply project planning techniques to define scope, objectives, deliverables, and estimate cost, resources, and risks.
2. Understand proficiency in software effort estimation using models and techniques like COCOMO, Function Point Analysis, and Delphi.
3. Analyze and implement resource allocation, project tracking, and control using Earned Value Analysis and change control.
4. Implement software quality assurance, process improvement models (CMM, CMMI), and configuration management for better project performance.
5. Evaluate globalization challenges and implement strategies for managing geographically distributed teams.

Articulation Matrix

(Program Articulation Matrix is formed by the strength of correlation of COs with POs and PSOs. The strength of correlation is indicated as 3 for substantial (high), 2 for moderate (medium) correlation, and 1 for slight (low) correlation)

CO/PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	-	3	-	-	-	-	-	-	-	-	1	1	-
CO2	1	3	1	-	-	-	-	-	-	-	-	-	3	1	-
CO3	2	1	-	-	3	-	-	-	-	-	-	-	2	2	-
CO4	3	-	2	-	-	-	-	-	-	-	-	-	2	3	2
CO5	1	-	-	-	3	-	-	-	-	-	-	-	3	1	1

High-3 Medium-2 Low-1

Unit I: Software Project Planning, Evaluation and Metrics Management **12 Hours**

Introduction: Software product, process, resources, quality, and cost. Objectives, issues, and problems relating to software projects. Overview of Project Planning, Steps in project planning, scope and objectives, work breakdown structure, Deliverables and other products. time, cost, and resource estimation; Project Evaluation, Strategic assessment, Technical assessment, Cost-benefit analysis, Cash flow forecasting; Cost-benefit evaluation techniques; Break-even analysis; Risk evaluation, process model, Rapid application development Metrics Introduction, The Metrics Roadmap, A Typical Metrics Strategy, What Should you Measure?, Set Targets and track Them, Understanding and Trying to minimize variability, Act on data, People and Organizational issues in Metrics Programs, Common Pitfalls to watch out for in Metrics Programs, Matrices implementation checklists and tools

Unit II: Software Effort Estimation, Activity Planning and Risk Management **12 Hours**

Software Effort Estimation: What is Estimation? when and why is Estimation done? The three phases of Estimation, Estimation methodology, formal models for size Estimation, Translating size Estimate into effort Estimate, Translating effort Estimates into schedule Estimate, common challenges during Estimation. Effort estimation techniques; Estimation by analogy, Delphi technique, Algorithmic methods, Top-down and bottom-up estimation, Function point analysis, Object points, COCOMO model. Metrics for the Estimation processes. Activity Planning Network planning model, Activity-on-arrow network, Precedence network, Forward pass, Backward pass, Critical path, Slack and float. Risk Analysis and Management Nature and categories of risk in software development; risk Identification; Risk assessment; Risk mitigation, monitoring, and management;

Evaluating schedule risk using PERT.

Unit III: Resource Allocation and Contract Management 12 Hours

Recourse Allocation: Nature of project resources, Identifying resource requirement of activities; Allocating and scheduling resources; cost of resources; Standard, planned, and actual cost; Cost variance; time-cost trade-off. Project Tracking and Control: Measurement of physical and financial progress; Earned value analysis; Status reports; Milestone reports; Change control. Contact Management: Outsourcing of products and services; Types of contracts; Stages in contract placement; Terms of contract; Contract monitoring; Acceptance testing

Unit IV: Managing Teams, Quality Assurance, and Configuration Management 12 Hours

Managing People and Teams Organizational behavior, Recruitment and placement; Motivation, Group behavior; Individual and group decision making, Leadership and leadership styles, forms of organizational structures. Software Quality Assurance: Planning for quality, Product versus process quality management, Procedural and quantitative approaches, Defect analysis and prevention, Statistical process control, Pareto analysis, Causal analysis, skill sets for people in the maintenance phase, estimating size, effort, and people resources for the maintenance phase, advantages of using geographically distributed teams for the maintenance phase, metrics for the maintenance phase.

Quality standards; ISO 9000; Capability Maturity Model; Software maturity Framework Quality audit. Principles of Software Process Change Configuration Management : Configuration management process; Software configuration items; Version control; change control; Configuration audit; Status reporting. CMM, CMMI, PCMM, PSP, TSP.

Unit V: Globalization Challenges and People-Centric Models 12 Hours

Globalization issues in project management: Evolution of globalization, challenges in building global teams, Models for the execution of global projects, some effective management techniques for managing global teams. advantages of using geographically distributed teams for the maintenance phase, management structures for testing in global teams, the effect of internet on project management, managing projects for the internet, emphasis on people centric models, people capability maturity model (P-CMM), other people Effect on the project management activities. People focused process models, Growing focused models in the literature.

Text Books:

1. Bob Hughes and Mike Cotterell, "Software Project Management", McGraw-Hill 2. Pankaj Jalote, "Software Project Management in Practice", Pearson Education Asia Reference Books:
2. Roger S. Pressman, "Software Engineering: A practitioner's Approach", McGraw-Hill 2. Robert T. Futrell, Donald F. Shafer, and Linda I. Shafer, "Quality Software Project Management", Pearson Education Asia.
3. Ramesh Gopalaswamy, "Managing Global Software Projects", 2003, Tata McGraw-Hill 4. Jennifer Greene & Andrew Stellman, Head First PMP, O'Reilly

Subject Tr. Academic Coordinator HoD Sr. Faculty Nominated by DOAA