	Software Engineering and Project Management	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Basic knowledge of software system.				
Co-requisites					

Course Objectives

1. To gain a good understanding of software engineering framework and the software engineering process models applied to various categories of software projects.
2. To understand the software requirements engineering process, the importance and structure of SRS, software design concepts and design the use case diagram and data flow diagrams.
3. To acquire understanding of planning a software project, its cost estimation models and to understand the software quality models.
4. To understand risk management in software projects and concept of project management.

Course Outcomes

On completion of this course, the students will be able to

CO1. Discuss various software process models.

CO2. Demonstrate skills of managing the software projects.

CO3. Demonstrate quality control and risk management techniques in project management.

CO4. Analyze results of standard tests for validation of the projects management techniques.

Catalog Description

Computer software is the product that software professionals build and then support over the long term. Software engineering encompasses a process, a collection of methods and an array of tools that allow professionals to build high quality software. This course includes software engineering concepts to build complex systems in a timely manner and with high quality. The concepts of project management, which includes planning, monitoring, and control, of the people, process, and events that occur as software evolves from a preliminary concept to full operational deployment, is included in detail. The concept of risk management to handle the risks involved in projects is also included in the course.

Course Content

Unit I:	**04 Lecture hours**

INTRODUCTION TO SOFTWARE ENGINEERING

Software Engineering definition; S/W characteristics, applications, Life Cycle Models – Waterfall (classical and iterative), Spiral, Prototyping & RAD Models, Scope of each model and their comparison

Unit II:	**06 Lecture hours**

REQUIREMENTS MODELING AND DESIGN

Requirements Engineering-Crucial steps; types of requirements, Requirements documentation – Nature of SRS, characteristics of a good SRS, Use case diagrams with guidelines, DFD (level 0, 1 and 2), SRS Structure, Introduction to software design, Modularity and Function-oriented design.

Unit II:	**06 Lecture hours**

SOFTWARE PROJECT PLANNING

Cost estimation– Static, Single variable and Multivariable Models (SEL, Watson Felix model), COCOMO: basic and intermediate model, Cost-benefit evaluation techniques (Net Profit, Payback period, ROI, NPV and IRR computation), numerical problems on cost estimation and cost-benefit evaluation methods.

Unit IV: **06 Lecture hours**
SOFTWARE METRICS
Understanding metrics: definition, process metrics, product and project metrics. Size metrics – LOC and Function Count, Albrecht FPA. Product metrics – Metrics for source code; metrics for testing(Halstead metrics) and its numerical, Metrics for software maintenance

Unit V: **06 Lecture hours**
SOFTWARE TESTING
Understanding software testing, its need and objectives; Error, mistake, bug, fault and failure, testing strategies, test case and test suite, Verification and Validation, Black Box and White box testing – concept and comparison, Boundary Value Analysis and Equivalence Partitioning with numerical problems, Basis Path testing(flow graph) and Cyclomatic complexity with numerical problems.

Unit VI: **04 Lecture hours**
SOFTWARE QUALITY AND RISK MANAGEMENT
Importance of software quality, McCall quality factors, ISO and CMM Model, Risk Management – importance, types, process and phases, qualitative and quantitative risk analysis,

Unit VII: **04 Lecture hours**
PROJECT SELECTION AND SCOPE MANAGEMENT
Project Selection and its methods, analysis of each method, Role and responsibilities of Project manager, Issues in project staffing, Project Scope, Project life cycle phases and its deliverables, Project life cycle vs. product life cycle.

Text Books
1. Software Engineering, New Age International Third Edition, Aggarwal, K. K. & Singh, Yogesh
2. Software Project Management, Tata Mcgraw Hill, New Delhi, Fifth Edition, Bob Hughes And Mike Cotterell

Reference Books:
1. Fundamentals of Software Engineering by Rajib Mall
2. Software Engineering by Ian Sommerville, Pearson Education, New Delhi
3. Software Engineering Principles and Practices, OXFORD, New Delhi by Deepak Jain
4. Software Project Management – A Concise Study by S.A. Kelkar.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Internal	Mid Term	ESE	Total
Weightage (%)	**30%**	**20%**	**50%**	**100%**

Relationship between the Course Outcomes (COs) and Program Outcomes (POs) and Program Specific Outcomes (PSOs)

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	2	2	1				2	2	3		1	2	
CO2	2	3	2	2	1				2	2	3		1	2	
CO3	2	3	2	3	1				2	2	3		1	2	
CO4	2	3	2	3	1				2	2	3		1	2	
Average	2	3	2	2.5	1				2	2	3		1	2	

1. Weak   2. Moderate   3. Strong