Programme	:	**Diploma in Computer Engineering/Information Technology**
Programme Code	:	**06/07/26**
Name of Course	:	**Software Engineering**
Course Code	:	**CM483**

Teaching Scheme:

	Hours /Week	Total Hours
Theory	03	48
Practical	02	32

Evaluation Scheme:

	Progressive Assessment	Semester End Examination			
		Theory	Practical	Oral	Term work
Duration	Three class tests, each of 60 minutes	3Hrs.	--	--	--
Marks	20	80	--	25	25

Course Rationale:

Software has become the key element in the evolution of Computer-based systems and products. Over the past 50 years, software has evolved from a specialized problem solving and information analysis tool to an industry in itself. Software is composed of programs, data and documents. Each of these items comprises a configuration that is created as part of the software engineering process. The intent of software engineering is to provide a framework for building software with higher quality.

Course Objectives:

After studying this course, the student will be able to

- Become familiar with the standard Software Engineering Practices.
- Know Project management concepts Planning ,estimation ,Scheduling and tracking
- Apply design concepts and to build design
- Software Quality assurance
- Apply project management and analysis principles to S/W project development.
- Apply design & testing principles to S/W project development.

Course Content:

Chapter No.	Name of Topic/Sub topic		Hrs	Marks
1	**Software Engineering Concepts**		06	12
	1.1	The Evolving Role of Software		
	1.2	Software Characteristics and Application		
	1.3	Framework of Umbrella Activities		
	1.4	TheProcess:Software Engineering: A Layered Technology - Process, Methods, and Tools		
	1.5	A Generic View of Software Engineering, The Software Process		

	1.6	Software process model: Prototyping model , RAD Model, Evolutionary Software Process Models, Incremental model , Spiral model, WINWIN spiral model, Concurrent development model ,Component-based development model, Formal methods model, Fourth generation techniques .Component based Development(CBD),Aspect-Oriented Software Development,Agile Process Model: Extreme Programming, Adaptive Software Development(ASD),		
2	**Requirement Engineering&Design**			
	2.1	Requirement Engineering Tasks: Inception, Elicitation, Elaboration, Negotiation, Specification,Validation	**10**	**12**
	2.2	Initiating the Requirement Engineering Process: Stakeholders, Recognizing Multipoint Viewpoint, Working towards Collaboration		
	2.3	Eliciting Requirements: Collaborative Requirements Gathering, Quality Function Deployment ,User Scenarios ,Elicitation Work Products		
	2.4	Developing Use-Cases, Building the Analysis model, Negotiating Requirement, Validating Requirement		
	2.5	Design Concepts The Design models: Data Design Elements, Architectural-Design elements, Interface Design Elements		
	2.6	Component-Level design elements, Deployment-Level Design Elements		
3	**Software Project Management**			
	3.1	The Management Spectrum:4 P's and Significance	**08**	**16**
	3.2	The People: The Stakeholders ,Team Leader, Software Team, Agile Team ,Communication issues		
	3.3	The Process: Software Scope ,Problem Decomposition ,Decomposition Techniques: LOC and FP estimation, Effort estimation		
	3.4	Empirical Estimation Models: COCOMO, Putnam estimation model,Function-point models, Automated Estimation Tools.		
	3.5	Risk Analysis and Management: Risk identification, Risk projection, Risk assessment, Risk management and monitoring, Risk Refinement and Mitigation, RMMM Plan		
4	**Project Scheduling**			
	4.1	Basic concepts,-Basic principles :The relationship between people and effort ,	**06**	**08**
	4.2	An empirical relationship:-Effort distribution ,Defining a task set Examples		
	4.3	Selecting the task set :Selecting software engineering tasks		
	4.4	Defining a task network ,Tracking the schedule -Earned value analysis-Error tracking, Tracking Progress for an OO Project		
5	**Software Quality Assurance**			

	5.1	Quality concepts ,The quality movement, Software quality assurance ,SQA activities, Software reviews	08	16
	5.2	Defect amplification and removal: Formal technical reviews, The review meeting, Review reporting and record keeping		
	5.3	Software reliability: Measures of reliability and availability		
	5.4	The ISO approach to quality assurance system: The ISO 9001 standard ,Six Sigma for Software Engineering, The SQA plan		
	5.5	Functional modeling and information flow: Data Flow diagrams, UML Modeling :Use-Case ,Class Diagrams ,Sequence Diagrams		
6	**Software Testing Techniques and Maintenance**			
	6.1	Software testing Fundamentals ,Testing objectives ,Testing principles ,Testability	10	16
	6.2	White box testing :Basis path testing , Flow graph notation, Cyclomatic complexity , Graph matrices , Control structure testing, Condition testing , Data flow testing, Loop testing		
	6.3	Black box testing : Graph based testing methods .		
	6.4	Testing documentation , Testing for real time systems.		
	6.5	Software Maintenance: A definition of software maintenance, Maintenance Characteristics, Maintainability, Maintenance tasks, Maintenance side effects, Software Configuration Management		
		Reverse engineering and Re-engineering.		
		Total	**48**	**80**

List of Experiments/Assignments:

Sr. No.	Name of Experiment/Assignment	Hrs
1	Application and use of studied process models such as Agile, CBD,AOSD.	2
2	Define the project title with bounded Scope of Your Project.	2
3	Design Project Plan and SQA Plan	2
4	To Develop Software Requirement Specification using Use-Case Scenario	4
5	To perform data design using design concepts eg. DFD	2
6	To Draw the Activity Diagram to represent a flow from one activity to another activity and draw ER diagram.	4
7	To Draw class diagram, Sequence diagram, Collaboration diagram, State Transition Diagram for assigned project (eg. Library Management)	6
8	To determine Size using Function-Point metric and Cost Estimation using COCOMO model	6
9	To Test software by developing various test cases for software project and practice it on the project	4
	Total	**32**

Instructional Strategy:

Sr. No.	Topic	Instructional Strategy
1	Software and Software Engineering	Explanation & case study
2	Project management concepts	Explanation & case study
3	Project Management estimation and planning	Explanation & case study
4	Project Scheduling and tracking	Explanation & case study
5	Software Quality assurance	Explanation & case study
6	Software Testing Techniques and Maintenance	Explanation & case study

Text Books:

Sr. No	Author	Title	Publication
1	Roger S. Pressman	Software Engineering 6th Edition	Mc. Graw Hill

Reference Books:

Sr. No	Author	Title	Publication
1	Jawadekar	Software Engineering	Wiley India
2	Richard Fairly	Software Engineering Concepts	Mc. Graw Hill

Learning Resources: Black Board, LCD Projector, Transparencies

Specification Table:

Sr. No.	Topic	Cognitive Levels			Total
		Knowledge	Comprehension	Application	
1	Software Engineering Concepts	03	03	04	10
2	Project management concepts	05	05	00	10
3	Software Project Planning	05	06	00	11
4	Project Scheduling and tracking	04	04	05	13
5	Software Quality assurance	11	06	06	23
6	Software Testing Techniques and Maintenance	06	03	04	13
	Total	**34**	**27**	**19**	**80**

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