Lesson Plan

T.E. (CE- Section A) (Semester V)

Subject: SOFTWARE ENGINEERING

Subject code: CSC502

Teacher-in-charge: Dr. B. S. Daga

Academic Term: July – November 2023

Module		Content	Hrs	Course Outcomes
1		**Introduction To Software Engineering and Process Models**	**7**	CSC502.1
	1.1	Nature of Software, Software Engineering, Software Process, Capability Maturity Model (CMM)		
	1.2	Generic Process Model, **Prescriptive Process Models:** The Waterfall Model, V-model, Incremental Process Models, Evolutionary Process Models, Concurrent Models, Agile process, Agility Principles, Extreme Programming (XP), Scrum, Kanban model		
2		**Requirements Analysis and Modelling**	**4**	CSC502.1
	2.1	Requirement Elicitation, Software requirement specification (SRS), Developing Use Cases (UML)		
	2.2	Requirement Model – Scenario-based model, Class-based model, Behavioural model.		
3		**Project Scheduling and Tracking**	**7**	CSC502.2
	3.1	Management Spectrum, 3Ps (people, product and process)		
	3.2	Process and Project metrics		
	3.3	Software Project Estimation:LOC, FP, Empirical Estimation Models - COCOMO II Model, Specialized Estimation Techniques		
	3.4	Project scheduling:Defining a Task Set for the Software Project, Timeline charts, Tracking the Schedule, Earned Value Analysis		
4		**Software Design**	**7**	CSC502.3
	4.1	Design Principles, Design Concepts, Effective Modular Design – Cohesion and Coupling		
	4.2	Architectural Design		
	4.3	Component-level design		
	4.4	User Interface Design		

5		**Software Testing and Maintenance**	**7**	CSC502.4
	6.1	Strategic Approach to Software Testing, Unit testing, Integration testing, Verification, Validation Testing, System Testing		
	6.2	Software Testing Fundamentals, White-Box Testing , Basis Path Testing, Control Structure Testing, Black-Box Testing		
	6.3	Software maintenance and its types, Software Re-engineering, Reverse Engineering		
6		**Software Risk, Configuration Management & Quality Assurance**	**6**	CSC502.5
	5.1	Risk Identification, Risk Assessment, Risk Projection, RMMM		
	5.2	Software Configuration management, SCM repositories, SCM process		
	5.3	Software Quality Assurance Task and Plan, Metrics, Software Reliability, Formal Technical Review (FTR), Walkthrough		

Course Objectives:

1. To provide knowledge of software engineering discipline.
2. To analyse risk in software design and quality.
3. To introduce the concept of advance software methodology

Course Outcomes:

Upon completion of this course students will be able to:

CSC502.1: Recognize software requirements and various process models. (Understanding)
CSC502.2: Develop project Plan, schedule and track the progress of the given project (Applying)
CSC502.3: Formulate software project designs of the given project. (Creating)
CSC502.4: Conduct software project testing of the given project. (Applying)
CSC502.5: Analyze potential risks, implement changes, and ensure software project quality of the given project. (Analyzing)

CO-PO-PSO Mapping with Justifications

Course Outcomes (CSC502)	Program Outcomes (PO)	Program Specific Outcomes (PSO)	Competency Indicators	Bloom's Taxonomy Level	Justification
CSC502.1:	PO1: Engineering knowledge	-	1.1.1 , 1.1.2	Understanding	This objective involves understanding engineering fundamentals, which is directly related to PO1. It doesn't directly align with any PSO.
CSC502.2:	PO11: Project management and finance	-	11.3.1 , 11.3.2	Applying	Effective project management is a key aspect of PO11.
CSC502.3:	PO3: Design/Development of Solutions		3.1.1, 3.1.2, 3.1.6	Applying	Designing software projects aligns with the broader concept of designing solutions, covered under PO3.
CSC502.4:	PO2: Problem analysis	-	2.4.1, 2.4.2	Applying	Software testing involves analyzing the problem of software quality and performance, which relates to PO2.
CSC502.5:	PO8: Ethics	PSO2: Apply cyber security mechanisms	2.1.1, 2.1.2, 2.2.1, 2.2.2	Applying, Analyzing	Identifying risks and ensuring quality aligns with ethical considerations (PO8). Additionally, applying cyber security mechanisms (PSO2) involves risk management and quality assurance.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CSC502.1	**2**	1												
CSC502.2	1	1									**3**			
CSC502.3	1	1	3											
CSC502.4	1	1		3										
CSC502.5	1	1												3

CSC502.1: Recognize and apply software requirements and evaluate various process models. (Understanding)
Competency Indicators: Analyze and apply discrete structures, linear algebra, statistics, and calculus to solve problems. Apply probability, statistics, and queuing theory to model computer-based systems, data, and network protocols.
CSC502.2: Develop plans, schedules, and progress tracking methods for software projects. (Applying)
Competency Indicators: Articulate problem statements, objectives, and identify processes/modules of computer-based systems. Choose algorithms suitable for given problems.
CSC502.3: Formulate designs for software projects considering functional requirements. (Creating)

Competency Indicators: Define precise problem statements with objectives and scope. Synthesize system requirements from stakeholders and literature. Create software requirement specifications (SRS).
CSC502.4: Execute software project testing procedures and analyze results. (Applying)
Competency Indicators: Implement engineering mathematics for testing. Analyze and interpret results using contemporary tools. Identify limitations of solutions and sources/causes.
CSC502.5: Identify risks, manage change, and ensure quality in software projects. (Analyzing)
Competency Indicators: Interpret cyber security legislation and regulations. Analyze potential threats and attacks. Choose tools and methods for protecting assets. Analyze strengths and weaknesses of security mechanisms.

CO Assessment Tools:

Course Outcomes		***Indirect Method (20%)***				
	Unit Test	Assignment	Practical	End Sem Exam (T)	End Sem Exam (Oral)	Course exit survey
	1	1	1			
CSC502.1	20%	20%	20%	20%	20%	100%
CSC502.2	20%	20%	20%	20%	20%	100%
CSC502.3	20%	20%	20%	20%	20%	100%
CSC502.4	20%	20%	20%	20%	20%	100%
CSC502.5	--	30%	30%	20%	20%	100%

CO calculation= (0.4 *Direct method + 0.6*Indirect method)

Rubrics for assessing Course Outcome with each assessment tool:

Assignments:

Indicator	**Average**	**Good**	**Excellent**	**Marks**
Organization (2)	Readable with some mistakes and structured (1)	Readable with some mistakes and structured (1)	Very well written and structured (2)	
Level of content(4)	Minimal topics are covered with limited information (2)	Limited major topics with minor details are presented(3)	All major topics with minor details are covered (4)	

Depth and breadth of discussion(4)	Minimal points with missing information (1)	Relatively more points with information (2)	All points with in depth information(4)	
Total Marks(10)				

Curriculum Gap identified:

Content beyond syllabus:

Modes of content delivery

Modes of Delivery	Brief description of content delivered
Class room lecture	1. Introduction To Software Engineering and Process Models 2. Requirements Analysis and Modeling 3. Software projects Design 4. Software testing 5. Software Quality Assurance
Assignments	Assignment 1 is based on : CO1 Introduction To Software Engineering and Process Models CO2 Requirements Analysis and Modeling Assignment 2 is based on : CO 3: Design the software projects. CO 4: Do testing of software project. C0 5: Identify risks, manage the change to assure quality in software projects.
Quizzes	Quiz 1: 1. Process Models 2. Requirements Analysis and Modeling 3. Software Project Design Quiz 2: 1. Software project testing 2. Risks, change management 3. Software quality assurance.

Text books:

1. T1. Roger Pressman, Software Engineering: A Practitioners Approach, (6th Edition),McGraw Hill, 2010
2. T2. Ian Somerville, Software Engineering, 9th edition, Addison Wesley, 2011

Reference Books:

3. R1. Eric J. Braude and Micheal E. Bernstein, Software Engineering Modern Approach, 2nd edition, Wiley, 2011.
4. R2. Ali Behforooz Fredrick Hudson, Software Engineering Fundamentals, Oxford UniversityPress, 2006.
5. R3. PankajJalote, " IntegratedSoftware Engineering", Wiley.

Submitted By	**Approved By**
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Date of Submission:	**Date of Approval:**
Remarks by DQAC (if any)	