FACULTY OF TECHNOLOGY & ENGINEERING
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

CS346: SOFTWARE ENGINEERING

Credit and Hours:

Teaching Scheme	Theory	Practical	Total	Credit
Hours/week	3	2	5	4
Marks	100	50	150	

Pre-requisite courses:

- Introduction to Computer Programming
- Database Management System

Outline of the Course:

Sr. No.	Title of the unit	Minimum Number of Hours
1	Introduction to Software and Software Engineering	4
2	Agile Development	4
3	Managing Software Project	5
4	Requirement Analysis and Specification	4
5	Software Design	5
6	Software Coding &Testing	6
7	Quality Assurance and Management	5
8	Software Maintenance and Configuration Management	5
9	Introduction to SaaS	3
10	Advanced Topics in Software Engineering	4

Total Hours (Theory): 45

Total Hours (Lab): 30

Total Hours: 75

Detailed Syllabus:

1	**Introduction to Software and Software Engineering**	**04 Hours**	**9%**
1.1	The Evolving Role of Software		
1.2	Software: A Crisis on the Horizon and Software Myths		
1.3	Software Engineering: A Layered Technology		
1.4	Software Process Models, The Linear Sequential Model, The Prototyping Model, The RAD Model, Evolutionary Process Models, Agile Process Model		
1.5	Component-Based Development, Process, Product and Process		
2.	**Agile Development**	**04 Hours**	**9%**
2.1	Agility and Agile Process model		
2.2	Extreme Programming		
2.3	Other process models of Agile Development and Tools		
3	**Managing Software Project**	**05 Hours**	**11%**
3.1	Software Metrics (Process, Product and Project Metrics)		
3.2	Software Project Estimations		
3.3	Software Project Planning (MS Project Tool)		
3.4	Project Scheduling & Tracking		
3.5	Risk Analysis & Management(Risk Identification, Risk Projection, Risk Refinement ,Risk Mitigation)		
4	**Requirement Analysis and Specification**	**04 Hours**	**9%**
4.1	Understanding the Requirement		
4.2	Requirement Modeling		
4.3	Requirement Specification (SRS)		
4.4	Requirement Analysis and Requirement Elicitation		
4.5	Requirement Engineering		
5	**Software Design**	**05 Hours**	**11%**
5.1	Design Concepts and Design Principal		
5.2	Architectural Design		
5.3	Process and Component Level Design (Function Oriented Design, Object Oriented Design-UML)		

	(MS Visio Tool)		
5.4	User Interface Design		
5.5	Web Application Design, Design Patterns		
6.	**Software Coding & Testing**	**06 Hours**	**13%**
6.1	Coding Standard and Coding Guidelines		
6.2	Code Review		
6.3	Software Documentation		
6.4	Testing Strategies		
6.5	Testing Techniques and Test Case, Test Suites Design		
6.6	Testing Conventional Applications		
6.7	Testing Object-Oriented Applications		
6.8	Testing Web and Mobile Applications, Testing Tools (Win runner, Load runner)		
7	**Quality Assurance and Management**	**05 Hours**	**11%**
7.1	Quality Concepts and Software Quality Assurance		
7.2	Software Reviews (Formal Technical Reviews)		
7.3	Software Reliability		
7.4	The Quality Standards: ISO 9000, CMM, Six Sigma for SE.		
7.5	SQA Plan		
8	**Software Maintenance and Configuration Management**	**05 Hours**	**11%**
8.1	Types of Software Maintenance, Re-Engineering, Reverse Engineering, Forward Engineering		
8.1	The SCM Process, Identification of Objects in the Software Configuration		
8.2	Version Control and Change Control		
9.	**Introduction to SaaS and SOA**	**03 Hours**	**7%**
9.1	Product Lifetime: Independent Product Vs. Continues Improvement		
9.2	Software as a Service		
9.3	Service Oriented Architecture		
9.4	Cloud Computing		
9.5	SaaS Architecture		
10	**Advanced Topics in Software Engineering**	**04 Hours**	**9%**

10.1 Component-Based Software Engineering, Client/Server Software Engineering, Web Engineering, Reengineering, Computer-Aided Software Engineering, Real-Time Software Engineering

10.2 Software Process Improvement

10.3 Design Thinking

Course Outcome:

After completion of the course students will be able to

CO1	Understand basics about software engineering principles, methods and practices and to analyze software requirement specification Prepare, SRS (Software Requirement Specification) document and SPMP (Software Project Management Plan) document.
CO2	Apply the concept of Functional Oriented and Object-Oriented Approach for Software Design, To explain the software design strategies and to apply software measurement and metrics using Function point, Cyclomatic complexity and Heal stead software science measures.
CO3	Recognize how to ensure the quality of software product, different quality standards and software review techniques.
CO4	Formulate problem by following Software Testing Life Cycle. Apply various testing techniques and test plan in. Design Manual Test cases for Software Project. Use automation testing tool students will be able test the software.
CO5	Able to understand modern Agile Development and Service Oriented Architecture Concept of Industry.
CO6	Analyze software risk with estimation parameters such as cost, effort, schedule/duration and understand the concepts of software maintenance, reengineering, reverse engineering, software configuration management.

Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	-	2	1	-	-	3	-	-	-	-	2	-
CO2	2	2	2	1	2	1	-	-	2	-	1	-	2	-
CO3	1	2	3	2	1	1	1	-	2	1	1	1	-	-
CO4	1	3	2		1	-	-	-	1	-	-	1	2	-
CO5	-	-	-	-	-	1	-	2	1	1	1	1	1	1
CO6	-	2	-	-	-	-	1	-	2	2	1	2	1	-

Recommended Study Material:

❖ **Text Books:**

1. Roger S. Pressman, Software engineering- A practitioner's Approach, McGraw-Hill International Editions
2. Ivar Jacobson, Object Oriented Software Engineering: A Use Case Driven

Approach, 1st edition

- **Reference Books:**

1. Engineering Software as a Service An Agile Software Approach, Armando Fox and David Patterson
2. Ian Sommerville, Software engineering, Pearson education Asia
3. Pankaj Jalote, An Integrated Approach to Software Engineering by, Springer
4. Rajib Mall, Fundamentals of software Engineering, Prentice Hall of India.
5. John M Nicolas, Project Management for Business, Engineering and Technology, Elsevier

- **Web Materials:**

1. www.en.wikipedia.org/wiki/Software_engineering
2. www.win.tue.nl
3. www.rspa.com/spi
4. www.onesmartclick.com/engsineering/software-engineering.html
5. www.sei.cmu.edus
6. https://www.edx.org/school/uc-berkeleyx