

## CS346: SOFTWARE ENGINEERING

### Credits and Hours:

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

### Pre-requisite courses:

- N/A

### Outline of the Course:

Sr. No.	Title of the unit	Minimum number of hours
1.	Introduction to Software and Software Engineering	04
2.	Agile Development	04
3.	Managing Software Project	05
4.	Requirement Analysis and Specification	04
5.	Software Design	05
6.	Software Coding & Testing	06
7.	Quality Assurance and Management	05
8.	Software Maintenance and Configuration Management	05
9.	Introduction to SaaS	03
10.	Advanced Topics in Software Engineering	04
	Total hours (Theory) :	45
	Total hours (Lab) :	30
	Total hours :	75

### Detailed Syllabus:

1.	<b>Introduction to Software and Software Engineering</b>	<b>04 Hours</b>	<b>09%</b>
	The Evolving Role of Software, Software: A Crisis on the Horizon and Software Myths, Software Engineering: A Layered Technology, Software Process Models, The Linear Sequential Model, The Prototyping Model, The RAD Model,		

	Evolutionary Process Models, Agile Process Model, Component-Based Development, Process, Product and Process		
<b>2.</b>	<b>Agile Development</b>	<b>04 Hours</b>	<b>09%</b>
	Agility and Agile Process model, Extreme Programming, Other process models of Agile Development and Tools		
<b>3.</b>	<b>Managing Software Project</b>	<b>05 Hours</b>	<b>11%</b>
	Software Metrics (Process, Product and Project Metrics), Software Project Estimations, Software Project Planning (MS Project Tool), Project Scheduling & Tracking, Risk Analysis & Management(Risk Identification, Risk Projection, Risk Refinement ,Risk Mitigation)		
<b>4.</b>	<b>Requirement Analysis and Specification</b>	<b>04 Hours</b>	<b>09%</b>
	Understanding the Requirement, Requirement Modeling, Requirement Specification (SRS), Requirement Analysis and Requirement Elicitation, Requirement Engineering		
<b>5.</b>	<b>Software Design</b>	<b>10 Hours</b>	<b>20%</b>
	Design Concepts and Design Principal, Architectural Design, Component Level Design (Function Oriented Design, Object Oriented Design) (MS Visio Tool ), User Interface Design, Web Application Design		
<b>6.</b>	<b>Software Coding &amp; Testing</b>	<b>06 Hours</b>	<b>13%</b>
	Coding Standard and coding Guidelines, Code Review, Software Documentation, Testing Strategies, Testing Techniques and Test Case, Test Suites Design, Testing Conventional Applications, Testing Object Oriented Applications, Testing Web and Mobile Applications, Testing Tools (Win runner, Load runner)		
<b>7.</b>	<b>Quality Assurance and Management</b>	<b>05 Hours</b>	<b>11%</b>
	Quality Concepts and Software Quality Assurance, Software Reviews (Formal Technical Reviews), Software Reliability, The Quality Standards: ISO 9000, CMM, Six Sigma for SE, SQA Plan		

<b>8.</b>	<b>Software Maintenance and Configuration Management</b>	<b>05 Hours</b>	<b>11%</b>
	Types of Software Maintenance, Re-Engineering, Reverse Engineering, Forward Engineering, The SCM Process, Identification of Objects in the Software Configuration, Version Control and Change Control		
<b>9.</b>	<b>Introduction to SaaS</b>	<b>03 Hours</b>	<b>07%</b>
	Product Lifetime : Independent Product Vs. Continuous Improvement, Service Oriented Architecture, Cloud Computing, SaaS Architecture		
<b>10</b>	<b>Advanced Topics in Software Engineering</b>	<b>04 Hours</b>	<b>09%</b>
.	Component-Based Software Engineering, Client/Server Software Engineering, Web Engineering, Reengineering, Computer-Aided Software Engineering, Software Process Improvement, Emerging Trends in software Engineering		

### **Course Outcome (COs):**

At the end of the course, the 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 Halstead 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.
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### Course Articulation Matrix:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO 1	3	3	-	2	1	-	-	3	-	-	-	-	2	-
CO 2	2	2	2	1	2	1	-	-	2	-	1	-	2	-
CO 3	1	2	3	2	1	1	1	-	2	1	1	1	-	-
CO 4	1	3	2	-	1	-	-	-	1	-	-	1	2	-
CO 5	-	-	-	-	-	1	-	2	1	1	1	1	1	1
CO 6	-	2	-	1	-	-	1	-	2	2	1	2	1	-

Enter correlation levels 1, 2 or 3 as defined below:

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

If there is no correlation, put “-”

### Recommended Study Material:

#### ❖ Text book:

1. Roger S. Pressman, Software engineering- A practitioner's Approach, McGraw-Hill International Editions

#### ❖ Reference book:

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 material:**

1. [www.en.wikipedia.org/wiki/Software\\_engineering](http://www.en.wikipedia.org/wiki/Software_engineering)
2. [www.win.tue.nl](http://www.win.tue.nl)
3. [www.rspa.com/spi](http://www.rspa.com/spi)
4. [www.onesmartclick.com/engsineering/software-engineering.html](http://www.onesmartclick.com/engsineering/software-engineering.html)
5. [www.sei.cmu.edu](http://www.sei.cmu.edu)
6. <https://www.edx.org/school/uc-berkeleyx>