

## B.C.A (5<sup>th</sup> Semester) Teaching Schedule

030010515: DSE7 Introduction to Software Engineering

**Objective:** To introduce the concept of software engineering, development models and object-oriented paradigm for efficient design and development of reliable software.

**Course Outcomes:** Upon completion of the course, students shall be able to

- C01:** Comprehend the basic concepts and importance of traditional and object-oriented software engineering.
- C02:** Compare and contrast conventional and object-oriented software process models with its applicability.
- C03:** Recognize the prominence of V-model for development of quality software.
- C04:** Identify needs and significance of requirements engineering using analysis modelling, data and object-oriented modelling concepts.
- C05:** Identify and design UML diagrams for a given system.
- C06:** Classify and construct architectural, component level and user interface design for a given system.
- C07:** Comprehend the latest software engineering development trends.

Unit	Sub Unit	No. of Lecture(s)	Topics	Reference Chapter/Additional Reading	Teaching Methodology	Evaluation Parameters
					Planned	
<b>Unit 1: Introduction to Software Engineering Concepts</b>						<b>Total Lecture:06</b>
1	1.1	1	Types of Systems	(KK)#1- Page No. 2-4 <a href="http://www.chris-kimble.com/Courses/World_Med_MBA/Types-of-Information-System.html">http://www.chris-kimble.com/Courses/World_Med_MBA/Types-of-Information-System.html</a>	PowerPoint Presentation +Video( <a href="http://www.nptelvideos.in/2012/11/systems-analysis-and-design.html">www.nptelvideos.in/2012/11/systems-analysis-and-design.html</a> )	
	1.2	1	Need of Systems Analysis and Design	(KK)#1-Page No. 6	PowerPoint Presentation	
	1.3	1	Role of System Analyst: System Analyst as Consultant and Supportive Expert	(KK)#1- Page No.6- 7	PowerPoint Presentation	
	1.4	1	Software complexity and characteristics of software	(RP)#1- Page No. 4 - 7 (YS)#1- Page No. 3-6	PowerPoint Presentation	
	1.5	1	General principles of	(RP)#1-Page	PowerPoint	

			software engineering	No.19-21	Open textbook study	
	1.6	1	Traditional vs. object oriented software engineering	(YS)#1- Page No. 24.	Group Discussion	
<b>Unit 2: Models for Software Development and Testing</b>						<b>Total Lectures:08</b>
2	2.1	1	Meaning of process, process framework and umbrella activities	(RP)#2-Page No.31-37	PowerPoint Presentation	
	2.2	1	Conventional life cycle models : Overview	(RP)#2-Page No.38-44 (YS)#2- Page No. 32-37	PowerPoint Presentation + video( <a href="http://www.nptelvideos.in/2012/11/software-engineering.html">http://www.nptelvideos.in/2012/11/software-engineering.html</a> )	Quiz
	2.3	1	Iterative Enhancement model and Spiral model	(RP)#2-Page No.45-47 (YS)#2-Page No.37-40	PowerPoint Presentation	
	2.4	1	Outline of Object oriented software life cycle models	(RP)#2- Page No. 53-56 (YS)#2-Page No.43-54	PowerPoint Presentation	
	2.5	1	Agile model : Extreme programming	(RP)#3-Page No.67-79 (YS)#2-Page No.40-43	PowerPoint Presentation	
	2.6	1	V-model for software engineering and testing	(RP)#2-Page No.39-41	Chalk & Talk + model/poster Presentation by students	
	2.7	2	Verification and validation : concepts, techniques and checklist	(RP)#17- Page No. 450-455.	PowerPoint Presentation + Case study	
	<b>Unit 3: Software Requirement</b>					
3	3.1	1	Software Requirement and Requirement Engineering	(RP)#5-Page No. 120-133. (YS)#3- Page No. 63-65	PowerPoint Presentation	

	3.2	2	Overview of requirements elicitation techniques	(YS)#3- Page No. 65-71	Case study	
	3.3	2	Initial requirement document	(YS)#3- Page No. 71-72	PowerPoint Presentation	
	3.4	1	Characteristics of good requirements	(YS)#3- Page No. 82-86	Open textbook study	
	3.5	3	Software requirement specification(SRS) document	(YS)#3- Page No. 86-109	PowerPoint Presentation + Project document	
<b>Unit 4: Analysis Modelling</b>						<b>Total Lectures:10</b>
4	4.1	1	Structured vs. object oriented analysis	(YS)#5-Page No.174-175	Group discussion	Unit test
	4.2	1	Data dictionary and repository: need of data dictionary, creating and using data dictionary	(KK)#8- Page No. 210-224	Chalk &Talk + PowerPoint Presentation	
	4.3	2	Decision analysis techniques: Structured English, decision tables and decision trees	(KK)#9- Page No. 238-248	Chalk & Talk	
	4.4	3	Class Modelling: class diagrams: link and association concepts and generalization and inheritance concepts	(YS)#5- Page No. 175-193 (KK)#10- Page No. 254,255,269-272	Chalk &Talk	
	4.5	3	Interaction Modelling : Use case approach: Use case and actors, creating use case diagram for requirement , use case description , Activity diagram and sequence diagram	(RP)#6- Page No. 161-164 (YS)#3- Page No. 73-81 (YS)#6- Page No. 204-222 (YS)#7- Page No. 260-268 (KK)#10 Page No. 272-275	Chalk & Talk + Demonstration	
<b>Unit 5: System Design</b>						<b>Total Lectures:11</b>

	5.1	1	Concept of Software Design	(RP)#8- Page No. 216-218	Power Point Presentation	
	5.2	2	Cohesion and coupling with its types	( RP)#10- Page No. 286-289	PowerPoint Presentation + Quizdown gaming	
	5.3	2	Object oriented Design Concepts: Types of Design Classes	(RP)#8-Page No.230-231	PowerPoint Presentation + Chalk Talk	
	5.4	2	Types of Design Elements, Data Design	(RP)#8-Page No.233-238	PowerPoint Presentation	
	5.5	3	Architectural Design Styles, Component-Level Design and Basic Principles	(RP)#8- Page No. 234,237 (RP)#9- Page No. 243,249-253 (RP)#10- Page No. 282-285	PowerPoint Presentation + video(www.nptelvideos.in/2012/11/software-engineering.html)	
	5.6	1	Interface design and golden rules of designing	(RP)#8- Page No. 235	PowerPoint Presentation	
	5.7		Deployment design	(RP)#11- Page No. 312-316		
<b>Unit 6: Current Trends in Software</b>						<b>Total Lectures:04</b>
	6.1	1	Emergent Requirement	(RP)#31- Page No-816	Discussion + PowerPoint Presentation	Internal
	6.2	1	Open Source Development	(RP)#31- Page No-818	PowerPoint Presentation	
	6.3	2	Importing code into project	(RP)#31- Page No-820	Power Point Presentation	
<b>References:</b>						
Text Books:						
1. Roger S. Pressman, Software Engineering, McGraw-Hill - [RP]						
2. Yogesh Singh and Ruchika Malhotra, Object Oriented Software Engineering, PHI [YS]						
Reference Books:						
1. Kendall & Kendall, System Analysis and Design, PHI- Ninth Edition [KK]						

2. Michael R. Blaha and James R. Rumbaugh, Object-Oriented Modeling and Design with UML, Pearson [MB&JR]  
 3. S. Thangasamy, Essentials of Software Engineering Principles and Practices, Willey [ST]  
 4. Deepak Jain, Software Engineering, OXFORD [DJ]  
 Note : # denotes chapter number.

**Course objectives and Course outcomes mapping:**

- To introduce the concept of software engineering, development models: C01, C02, C03.
- To Introduce Object-oriented paradigm for efficient design and development of reliable software: C04, C05, C06

**Course units and Course outcomes mapping:**

Unit No.	Unit	Course outcome						
		CO1	CO2	CO3	CO4	CO5	CO6	CO7
1	Introduction to Software Engineering Concepts	✓						
2	Models for Software Development and Testing	✓	✓					
3	Software Requirements	✓		✓				
4	Analysis Modelling	✓			✓	✓		
5	System Design	✓				✓	✓	
6	Current Trends in Software	✓						✓

**Programme Outcomes:**

- PO1: Proficiency in and ability to identify problems related to computer science as well as design and apply computational knowledge to solve them.
- PO2: Ability to design, develop, test and maintain system, component, product or process as per needs and specification.
- PO3: Understanding of professional and ethical role and responsibility.
- PO4: Recognition of the need for and ability towards life-long learning.
- PO5: Knowledge of programming languages, database systems, operating systems, software engineering, Web & Mobile technology and relevant modern issues.
- PO6: Ability to demonstrate the use of modern tools, models and languages to solve problems related to software development.
- PO7: Ability to communicate and present knowledge effectively.

**Course Outcomes and Program Outcome Mapping:**

Course Outcomes	Program outcome						
	P01	P02	P03	P04	P05	P06	P07

CO1	✓			✓			✓
CO2		✓			✓		
CO3		✓			✓		
CO4		✓		✓	✓	✓	
CO5	✓	✓				✓	
CO6			✓		✓		
CO7	✓				✓		✓

**Modes of Transaction (Delivery):**

Unit No	Topic Detail	Teaching Approach	P0 mapped
2	Verification and validation: concepts, techniques and checklist	Case study (case study will be provided by the course teacher and students need to prepare checklist of it) , Course teacher check a checklist.	PO1, PO5
5	Cohesion and coupling with its types	Gaming (questions will be given to the student and they need to identify the type of cohesion and coupling)	PO1, PO4, PO5

**Activities/Practicum:**

The following activities shall be carried out by the students.

- Prepare Software Requirements Specification (SRS) document for problem definition allocated.

The following activities shall be carried out by the teacher.

Learner	Activities to be done	P0 mapped
For slow learners	After completion of every unit, a bowl containing chits with question(s) for all the topics from that unit is given by teacher.  The student selected by teacher shall pick a chit of his choice from bowl and discuss answer for the question(s) available in chit in classroom.	PO4, PO7
For advanced learners	Forward thinking problems (Given the flowchart of the system and they have to defined UML diagram.	PO1, PO2, PO4, PO6, PO7
For all	Demonstrate the different use case with example (Demonstration of UMLet for UML diagrams)	PO2, PO6

**Concept Linkage:**

<b>Unit/Sub Unit</b>	<b>Prior concept linkage</b>	<b>Post concept linkage</b>
2,3		060060609: Project
1-1.1	060060309: 4.4 e-Business Requirement, Roles and Challenges	