

GUJARAT TECHNOLOGICAL UNIVERSITY

Master in Computer Application

Year II – (Semester-IV) (W.E.F. January 2017)

Subject Name: Software Engineering (SE)

Subject Code: 3640003

1. Learning Objectives:

- To understand the concepts of software Engineering
- To understand how to Select and apply Appropriate Process Model to All Stages of Software Development Life Cycle (SDLC)
- To understand how to manage user's Requirement
- To understand how to Analyze, Design, Build and test software
- To understand software effort size, and estimation models.
- To understand object modelling
- To understand Use Case, Activity, Sequence, Class and Deployment diagram.

2. Prerequisites: Systems & Object Oriented Design Methodologies

3. Contents:

Unit No.	Course Content	%age	No of Lectures
1	Introduction to Software Engineering & Process Models Software Engineering, Software Process Process Models – Waterfall, Incremental, Evolutionary Process Model – Prototype, Spiral and concurrent Development Model Agile Process; Extreme Programming (XP); Brief Overview of Other Agile Process Models: Adaptive Software Development, Scrum Case Study: Identify process model and activities for Online Shopping Application	05%	04
2	Requirement Engineering Requirements Engineering; Groundwork for Understanding of Software Requirements; Overview of Eliciting Requirements, Developing Use Cases, Building the Requirements Model; Negotiating Requirements; Validating Requirements; Requirement Modelling Strategies; Overview of Flow-Oriented Modelling, Behavioural Modelling; Case Study: Prepare SRS for Online Shopping Application	15%	06

3	<p>Design Concepts</p> <p>Design Concepts, Design Model;</p> <p>Architectural Styles, Architectural Design, Assessing Alternative architectural Designs, Architectural mapping Using Data Flow</p> <p>User Interface Design: Golden Rules of User Interface Design; User Interface Analysis and Design; Interface Analysis; Interface Design steps</p> <p>Case Study: Prepare Architecture Design, Data flow and UI for Online Shopping Application</p>	15%	06
4	<p>Software Review; Software Testing</p> <p>Overview of Review Techniques: Formal Technical Review (FTR)</p> <p>A Strategic Approach to Software Testing; Test Strategies for Conventional Software; Test Strategies for Object Oriented Software; Test Strategies for WebApps; System Testing; Debugging;</p> <p>Software Testing Fundamentals; White-Box Testing; Basic Path Testing; Control Structure Testing; Black-Box Testing;</p> <p>Case Study: Prepare Test Cases for Online Shopping Application</p>	10%	06
5	<p>Project Management Concepts, Software Estimation And Scheduling</p> <p>The Management Spectrum people, Product, process, Project, W5HH principle.</p> <p>Software Project Estimation; Decomposition Techniques; Empirical Estimation Models; Estimation for O_O Projects, Estimation for Agile Development and webapps projects</p> <p>Overview of Project Scheduling</p> <p>Case Study: Prepare Timeline Chart for online Shopping Application</p>	10%	04
6	<p>Object Modeling Concepts</p> <p>Introduction, Modeling as a design technique, Class Modeling-Object and Classes, Association, Generalization, aggregation, Abstract class, Multiple inheritance, Metadata, Reification, Constraints, Derived data, Packages, State Modeling- State, Transitions and Conditions, State Diagrams, Nested state diagrams , Nested States, Signal Generalization, Concurrency</p> <p>Case Study: Draw Class and state diagram for online Shopping Application</p>	20%	10
7	<p>Behavioral Modeling Interactions, Use Cases, Use Case Diagrams, Interaction Diagrams, Activity Diagrams</p> <p>Case Study: Draw Usecase, Activity and Sequence for online Shopping Application</p>	20%	12

Notes:

4. Reference Book(s):

1. Roger S. Pressman, “Software Engineering – A Practitioner’s Approach”, 7th Edition, McGraw Hill Publications
2. Object-Oriented Modeling and Design with UML by Michael Blaha, James Rumbaugh, Pearson Education Publication, 2nd Edition, 2007 Reprint
3. The Unified Modeling Language - User Guide by Grady Booch, James Rumbaugh, Ivar Jacobson, Pearson Education Publication, 2009 Reprint

5. Suggested Additional Reading:

1. Chandramouli Subramanian, , Saikat Dutt., Chandramouli Seetharaman, B G Geetha, Software Engineering, Pearson
2. Sommerville, “Software Engineering”, 8th Edition, Pearson Education
3. Waman S. Jawadekar, “Software Engineering – Principles and Practices”, TMGH Publication
4. Pankaj Jalote, “Software Engineering – A Precise Approach”, Wiley India
5. Waman S. Jawadekar, “Software Engineering – A Primer”, TMGH Publication
6. Shari Lawrence Pfleeger and Joanne M. Atlee, “Software Engineering – Theory and Practice”, 3rd Edition, Pearson Education
7. M. G. Limaye, “Software Testing – Principles, Techniques and Tools”, TMGH

6. Chapter wise Coverage from Main Reference Book(s):

Unit	Book#	Topics
1	1	1.3,1.4, 2.1 to 2.3, 3.3, 3.4, 3.5.1 ,3.5.2
2	1	Ch-5, 7.1 to 7.3
3	1	Ch-8.3, 8.4, 9.1.1, 9.3,9.4,9.5, 9.6, 11.1 to 11.4
4	1	Ch-15 , 17, 18.1 to 18.6,
5	1	Ch. 24, 26.5 to 26.8, 27.5
6	2	Ch. 1 to 6
7	3	Ch. 15 to 19

Note:

• Reference for Case Study of SRS

- Chapter 3 of Pankaj Jalote, “Software Engineering – A Precise Approach”, Wiley India
- Chandramouli Subramanian, , Saikat Dutt., Chandramouli Seetharaman, B G Geetha, Software Engineering, Pearson

8. Suggestions for Laboratory Sessions :

D) Activity : UML Diagrams

- A) Tool : Dia (It can be downloaded from http://sourceforge.net/projects/dia-installer/?source=typ_redirect)

Or any other open source.

Tasks

- a. Creation of Use case,
- b. Creation of Activity diagram

- c. Creation of Sequence
- d. Creation of Class diagram
- e. Deployment Diagram
- f. State transition Diagram

- **Sample Case Study**

1	<p>Consider the air transportation system. Many flights land And depart from city's airport. Some of the big cities may have more than one airports. Every flight belongs to specific airline. The planes may have many flights to different airports. Each plane is identified with serial number and model. E.g. hypersonic. There are specific pilots for each airline and they fly many flights. Each flight is identified by flight number and date on which flight is scheduled. The passenger reserves a seat for a flight. The seat is identified by a location.</p> <p>1) Draw Use case for system, Admin and Passengers 2) Draw Activity Diagram for Login & Book flight 3) Draw Sequence Diagram for Login & Book flight 4) Draw Class diagram.</p>
2	<p>Consider Online Learning (e.g. courser.org) web site.</p> <p>1) Draw Deployment diagram</p>
3	<p>Draw the State Transition diagram for Washing Machine.</p> <p>Possible states may be Wash, Rinse and Dry</p>

9. Accomplishments

Students will understand a high-level overview of the software development process. Student will understand various process models available for software engineering, activities of software engineering like software requirements, software design, software construction, software management, and software quality etc.