GUJARAT TECHNOLOGICAL UNIVERSITY

Syllabus for Master of Computer Applications, 5th Semester
Subject Name: Software Engineering (SE)
Subject Code: 4659303

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 agile methodology.

2. Prerequisites: Systems & Object Oriented Design Methodologies

3. Contents:

Unit	Chapter Details	Weightage Percentage
Unit I	**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	10%
Unit II	**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;	20%
Unit III	**Design Concepts** Design Concepts, Design Model; Architectural Styles, Architectural Design, Assessing Alternative architectural Designs, Architectural mapping Using Data Flow User Interface Design: Golden Rules of User Interface Design; User Interface Analysis and Design; Interface Analysis; Interface Design steps	20%
Unit IV	**Software Testing** Software; Test Strategies for Object Oriented Software; Test Strategies for WebApps; System Testing; Debugging;	10%

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	Software Testing Fundamentals; White-Box Testing; Basic Path Testing; Control Structure Testing; Black-Box Testing; **Case Study: Prepare Test Cases for Online Shopping Application**	
Unit V	**Introduction to Agile Methodology** Agile Principles: 12 principles of Agile software, The customer is always right, Delivering the project, Communicating and working togather, Project execution - Moving the project Along,Constantly Improving the Project and the Team, Agile Project: Bringing all teh principles Together Scrum and Self organizing Teams: The rules of Scrum, Everyone on a Scrum Team Owns Project, The whole team uses the daily Scrum, Sprints, planning and retrospectives Scrum Planning and collective commitment: User stories, Velocity and Accepted Scrum Practices, Scrum Values revisited. Case study : For any Application (e.g. Payroll, Online Shopping etc.), create Agile documents using SCRUM. i) Agile Project Charter ii) Agile Roadmap / Schedule iii) Agile Project Plan iv) Agile User Story (Minimum 3 Tasks) v) Agile Release Plan vi) Agile Sprint Backlog vii) Agile Test Plan viii) Earned-value and burn charts	**20%**
Unit VI (*)	**HIGH LEVEL DESIGN** **Overview:** What to specify: Security, Hardware (External) , User Interface, Internal Interfaces, External Interfaces, Architecture, Reports, Other Outputs, Database (Audit trails, User Access, Database Maintenance), Configuration Data, Data Flows and States, Training, UML Diagrams (Structure Diagram, Behavior Diagrams (Use case, Activity, State Diagram), Interaction Diagrams, Sequence Diagram, Communication Diagram, Timing Diagram, Interaction Overview Diagram Case study: For any application (e.g. Payroll, Online Shopping etc.) System, create i) Data Flow Diagram (0 Level) ii) UML Diagrams : Use Case Diagram, Activity Diagram, Sequence Diagram, Class Diagram	**20%**

(*) Only application / case study to be asked in theory exam from Unit 5 and 6

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Desirable Topics:

i) 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

ii) Agile Methodology XP, Lean and Kanban

iii) Project Estimation and Scheduling

4. **Text Book:**

1) Roger S. Pressman, "Software Engineering – A Practitioner's Approach", 7th Edition, McGraw Hill Publications

2) Andrew Stellman, Greene Jennifer, Beginning Agile, O'Reilly

3) Rods Stephen, Beginning Software Engineering, WROX

5. **Reference Books:**

1) Sommerville, "Software Engineering", 8th Edition, Pearson Education
2) Chandramouli Subramanian, , Saikat Dutt,, Chandramouli Seetharaman, B G Geetha,Software Engineering, Pearson
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) M G Limaye, Software Testing, Tata McGraw-Hill Education, 2009

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

Unit No.	Text Books	Topics/Subtopics
I	Book-1	Chapter : 1.3,1.4, 2.1 to 2.3, 3.3, 3.4, 3.5.1 ,3.5.2
II	Book-1	Ch-5, 7.1 to 7.3
III	Book-1	Ch-8.3, 8.4, 9.1.1, 9.3,9.4,9.5, 9.6, 11.1 to 11.4
IV	Book-1	Ch-17, 18.1 to 18.6,
VI	Book-2	Chapter 3,4,5
VII	Book-3	Chapter 5 (Overview)

7. **Accomplishments of the student after completing the course:**

- 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.
- Student will understand agile methodology.

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8. Suggested case studies for Unit 6:

Prepare Data Flow Diagram (0 Level) and ii) UML Diagrams (Use Case Diagram, Activity Diagram, Sequence Diagram, Class Diagram) for following definitions:

1. Consider a book store in a shopping mall. The customer selects the books from racks to purchase. Prepare a sequence diagram for bookstore checkout system. The customer brings selected books to cashier. The cashier scans each item with checkout system to prepare an order.**.**

2. Consider an Online shopping web site, where customer selects the items and adds into cart. At the customer will proceed for payments. Prepare a Use case, Activity and sequence diagram for online shoppingcheckout system. The customer brings selected books to cashier. The cashier scans each item with checkout system to prepare an order.

3. The case study 'Online Mobile Recharge' gives us the information about all the mobile service providers. This application provides us the complete information regarding any mobile service provider in terms of their plans, options, benefits, etc. Suppose, any Airtel customer wants to have the information of all the schemes and services provided by the company, he/she can have the information and according to his convenience he can recharge the mobile from the same application. The major advantage of this proposed system is to have the recharging facility of any service provider under same roof.

4. In tour management system, System will check whether the customer is existing or new. New user will enter his personal and tour details for reservation. This login information could be used for further transactions. When customer is satisfied with tour package he/she would request for reservation of tour. Personal details of new customer is stored in cust_info while the details regarding the tour selected by particular customer is stored in tour_info and the details regarding it would be restructured in Tour Information System. Existing customer can update his/her personal details in cust_info and cancel reservation for tour from tour_info and changes regarding it are also reflected in Tour Information System. After confirming the tour package the customer will make payment either online or through staff by personally going at the office. Customer can make payment by cash, credit card or by cheque. System checks for the validity of staff. Once the payment is done by customer, valid staff will make Ticket Reservation System. Reserved customer will be able to view details about reservation by providing login information from cust_info and tour_info system. Administrator can add, delete or modify tour schemes from Tour Information System.

5. "Railway Reservation System is a system used for booking tickets over internet. Any Customer Can book tickets for different trains.Customer can book a ticket only if the tickets are available. Customer searches for the availability of tickets then if the tickets are available he books the tickets by initially filling details in a form. Tickets can be booked in two ways by i-ticket or by e-ticket booking. In case of i-ticket booking customer can book the tickets online and the tickets are couriered to Particular customer at their address. But in case of e-ticket booking and cancelling.
Tickets are booked and cancelled online sitting at the home and customer himself has to take print of the ticket but in both the cases amount for tickets are deducted from customers account. For cancellation of ticket the customer has to go at reservation office than fill cancellation form and ask the clerk to cancel the ticket than the refund is transferred to customer account. After booking ticket the customer has to checkout by paying fare amount to clerk".

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6. The **University** runs various diploma, graduation and post-graduation courses such as DE, Dpharm, BE, MBA. MCA, ME, Mpharm etc. The courses follows semester patterns and under each course various subjects are taught. Students seek admissions to these courses and if found elligible, the student is enrolled for the requested course. There are several faculty members in the university who teach the various subjects of these courses. The subject teacher conducts semester examinations for the concerned subject at the end of the semester and the student's performance is recorded. Even if a student is unable to pass a subject, he is promoted to the next semester but has to reappear for the subject examination again and clear his backlog.

7. Others:
   a) Facebook Application.
   b) WhatsApp Application.
   c) Library Management System
   d) Online Quiz System
   e) ATM System

PS: Above is a suggestive list. You may select any other relevant Application.