GUJARAT TECHNOLOGICAL UNIVERSITY

Syllabus for Integrated MCA 3rd Semester

Subject Name: Structured & Object Oriented Analysis and Design Methodology (SOOADM)

Subject Code: 2638603

1. **Learning Objectives:**

▪ System Analysis and Design is a applied field that relies on a core set of concepts and principles.
▪ The objective of this course is to teach the students tried-and-tested techniques widely embraced by experienced analysts plus new and emerging tools and techniques that recent graduates are expected to apply on the job.
▪ The course is meant to give balanced exposure to both traditional and object oriented approaches to system analysis & design

2. **Prerequisites:** Fundamentals of Structured Programming and Fundamentals of Object Oriented Programming

3. **Contents:**

Unit	Chapter Details	Weightage Percentage
Unit I	**System Analysis Fundamentals** • Need for Systems Analysis and Design • Systems, Roles, and Development Methodologies • Understanding and Modeling Organization Systems • Project Management	20%
Unit II	**Analysis Modeling** • Information Gathering: Interactive Methods • Agile Modeling, Prototyping, and Scrum • Using Data Flow Diagrams • Analyzing Systems Using Data Dictionaries • Process Specifications and Structured Decisions	20%
Unit III	**System Design** • Designing Effective Output • Designing Effective Input • Designing Databases • Human-Computer Interaction and UX Design	20%
Unit IV	**Structural Modeling** • Introduction to UML • Classes and Relationships • Class Diagrams • Object Diagrams • Components • Artifact Diagrams	20%
Unit V	**Behavioural Modeling** • Use Case Diagrams • Interaction Diagrams • Activity Diagrams • State Diagrams	20%

Note: Case Study only to be asked in the Examination from Unit -5.

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4. Text Book:

1) Systems Analysis and Design by Kendall & Kendall, PHI Publication, 8th Edition.
2) The Unified Modeling Language - User Guide 2nd edition by Grady Booch, James Rumbaugh, Ivar Jacobson, Addison-Wesley Professional; 2 edition

5. Reference Books:
1) Modern Systems Analysis and Design by Jeffrey A. Hoffer, Joey F. George, Joseph S. Valacich, Prabin K. Panigrahi, Pearson Education Publication, 4th Edition.
2) Object Oriented Analysis and Design Using UML by Mahesh P. Matha, PHI Publication
3) UML Distilled by Martin Fowler, Pearson Edition, 3rd Edition.
4) Object Oriented Systems Development Using the Modified Modeling Language by Ali Bahrami, Tata McGraw Hill Publication.
5) System Analysis and Design with UML Version 2.0 by Alan Dennis, Barbary Haley Wixom, David Tegarden, John Wiley India Publication, 2nd Edition.
6) Appling UML and Patterns by Craig Larman, Pearson Education, 2nd Edition.
   An Introduction to Object-Oriented Analysis – Objects and UML in Plain English by David William Brown, John Wiley & Sons Publication, 2nd Edition

Chapter wise Coverage from Main Reference Book(s):

Unit No.	Text Books	Topics/Subtopics
1	Book 1	1,2,3
2	Book 1	4,6,7,8,9
3	Book 1	11,12,13,14
4	Book 2	2,4,5,8,14,15,26
5	Book 2	18,19,20,25

7. Accomplishments of the student after completing the course:

After completion of the course the students will be able to,
- Perform tasks of System Analyst
- Apply Modern structured analysis approaches
- Key modeling concepts that apply to both the traditional structured approach and object-oriented approach
- Unified Process and use of UML for Object-Oriented Analysis and Design

8. Draw UML Diagrams (Use case, Class, Sequence, Activity and Collaboration diagrams) for the following cases; if some UML Diagrams are not relevant / applicable, say so with justification:

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

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The cashier requests to customer for payment. The customer gives credit card to cashier.   The verifier and checkout system scans the card. The verifier accepts the card and   payment is accepted. Customer signs the credit card slip. The purchased books are handed   over to customer.

2. 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.

3. A customer **decides** to upgrade her PC and purchase a DVD player. She begins by calling the sales department of PC vendor and they tell her to contact customer support. She than calls customer support and they put her on hold while talking to engineering. Finally, customer support tells the customer about several supported DVD options. The customer chooses a DVD and it is shipped by the mail department. The customer receives the DVD, installs it satisfactorily and then mails her payment to accounts department.

4. **C**omputing a restaurant bill : There should be a charge for each delivered item. The total amount should be subject to tax and service charge of 18% for groups of six or more. Any coupons charge submitted by the customer is subtracted from bill.

5. 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.

6. The telephone agent uses an order registry and customer catalog to obtain access to an order & a customer respectively. The order registry uses an order number as a qualifier to select particular order instance. A customer catalog uses customer name and phone number as a qualifier to select particular customer. The attributes of an order are the order numbers and time when it is placed. The order consists of many items. An item has item_number, a quantity, unit price. It also has reference to catalog item which represents listing. When an order is cancelled or committed, it cancels or commits each of its items first. When an order's total price method is invoked, the order calls the total price method of each of items and returns the sum.

7. 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.

8. 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.

9. 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.

10. Facebook Application

11. Whats App Application

12. Twitter Application

13. Food Delivery App like Zomato etc.

14. Service Booking App like Urban clap etc