GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3151604
Semester – V
Subject Name: Object Oriented Analysis and Design

Type of course: Undergraduate (Open Elective)

Prerequisite: None

Rationale: Object oriented modeling and design promotes better understanding of requirements; clear designs and gives maintainable systems. A good design leads to better implementation of product and saves on time.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs	Marks Weightage (%)
1	Introduction OO orientation, OO development, OO themes, Usefulness of OO Development Modeling as a Design Technique Modeling, Abstraction, The Three models	02	10
2	Class Modeling Object and Class concepts, Link and Association Concepts, Generalization and inheritance, Class Model, Navigation of Class model Advanced class Modeling Advanced object and class concepts, Association Ends, N-ary Associations, Aggregation, Abstract classes, Multiple inheritance, Metadata, Reification, Constraints, Derived Data,Packages	12	25
3	State Modeling Events, States, Transitions and Conditions, State Diagrams, State Diagram behavior Advance State Modeling Nested state diagram, Nested states, Signal Generalization, Concurrency,State Model, Relation of class and State Models Interaction Modeling Use case models, Sequence Models, Activity Models Advanced interaction Modeling Use case relations, Procedural sequence Models, Special constructs of activity Models	12	25
4	Process Overview Development stages, Development life cycle	08	20

	System conception Developing a system concept, Elaborating a concept, preparing a Problem statement **Domain Analysis** Overview of analysis, Domain class model, domain state model, domain interaction model, Iterating the analysis **Application Analysis** Application Interaction model, Application Class model, Application State Model, Adding operations		
5	System Design Overview, Estimating performance, Making a reuse plan, breaking a system into subsystems, Identifying concurrency, Allocation of subsystems, Management of data storage, Handling global resources,Choosing a software control strategy, Handling boundary conditions, Setting trade off priorities,common architectural styles, Architecture of the ATM system **Class Design** Overview, gap , realizing use cases, Designing algorithms, Recursing downward, refactoring, Design optimization, Reification of behavior, Adjustment of inheritance, Organizing a class design, ATM example	08	20

Suggested Specification table with Marks (Theory): (For BE only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	**20**	**30**	**10**	**--**	**--**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Course Outcomes: Students will be able to

Sr. No.	CO statement	Marks % weightage
CO-1	Describe the static structure of a system.	30
CO-2	Describe the aspects of a system that change over time as well as control behaviour.	15
CO-3	Describe how objects collaborate to achieve overall results.	15
CO-4	Formulate a model and device high level strategy for building a solution.	40

Reference Books:
1. **Object Oriented Modeling and design with UML , By Michael Blaha, James Rambaugh, Pearson**
2. **Object Oriented Analysis, Design and Implementation By Brahma Dathan, Sarnath Ramnath, University Press**
3. **Object Oriented Systems and Development By Ali Bahrami Tata McGrawHill Edition.**

w.e.f. AY 2018-19

List of Practical:

1. Write an algorithm to draw ellipse and rectangle. Find out ellipse algorithm can be used for drawing circles and rectangle algorithm is suitable for squares. Implement the algorithm in OO language.
2. Prepare Pseudocode for following
   There are competitions organized in an event. Many participants have registered. There are judges in the event. (i) Register a competitor for event. (ii) schedule an event. Assign judges to the event. Implement the pesudocode to retrieve event with participants and judge for the event in OO language.
3. Describe the ATM model for login and balance verification and displaying mini statement. Implement the model in OO language.
4. Prepare a class diagram for a library checkout system that shows the late charges for an overdue book as a derived attribute. Implement this in OO language.
5. Prepare a state model to describe the function of digital watch with two buttons A and B. Pressing A button displays hours and minutes. Button B advances hours and minutes once each time it is pressed. Implement the model in OO language.
6. Prepare activity diagram for computing restaurant bill. The total amount should be subject to tax and service charge of 18%. Any coupons submitted by the customer should be subtracted. Implement the activities in OO language.