Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
M.Tech(CSE)
Choice Based Credit System (CBCS)-2024-26
SEMESTER-I

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
MBAI301C	AECC	Advance Human Values and Professional Ethics	60	20	20	0	0	3	0	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

The objective of the course is to disseminate the theory and practice of moral code of conduct and familiarize the students with the concepts of "right" and "good" in individual, social and professional context.

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes. The students will be able to

1. Help the learners to determine what action or life is best to do or live.
2. Right conduct and good life.
3. To equip students with understanding of the ethical philosophies, principles, models that directly and indirectly affect business.

SYLLABUS

UNIT–I 10HRS
Human Value

1. Type of Values –competent
2. Instrumental, terminal
3. Extrinsic & intrinsic values; Hierarchy of values; Dysfunctionality of values
4. Basis of values: Philosophical, Psychological and socio-cultural

UNIT–II 9HRS
Theories of Value Development

1. Psycho-analytic
2. Learning theory –social leaning
3. Models of Value Development
4. Value Analysis
5. Inquiry
6. Social Action

UNIT–III 8HRS
Professional Ethics

1. Meaning
2. Objectives
3. Sources of Ethics
4. Ethics V/s Morals and Values
5. Ethico-Moral Action
6. Theories of Ethics, Codes of Ethics

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UNIT–IV 7HRS

Human Behavior – Indian Thoughts

1. Guna Theory
2. Sanskara Theory
3. Karma Theory
4. Nishkama Karma Yoga and Professionalism

UNIT–V 8HRS

Globalization and Ethics

1. Impact of globalization on Indian corporate and social culture
2. Corporate Citizenship
3. Environmental Protection
4. Social Welfare and Community Development Activities

References:

1. Beteille, Andre (1991). **Society and Politics in India**. New Jersey: Athlone Press
2. Chakraborty, S. K. (1999). **Values and Ethics for Organizations**. oxford university press
3. Fernando, A.C. (2009). **Business Ethics - An Indian Perspective .**India: Pearson Education, India
4. Fleddermann, Charles D. (2012). **Engineering Ethics**. New Jersey: Pearson Education / Prentice Hall.
5. Boatright, John R (2012). **Ethics and the Conduct of Business**. New Delhi: Pearson. Education.
6. Crane, Andrew and Matten, Dirk (2015). **Business ethics**. New York. : Oxford University Press Inc.
7. Murthy, C.S.V. (2016). Business **Ethics – Text and Cases**. Mumbai: Himalaya Publishing House Pvt. Ltd.
8. Naagrajan, R.R (2016). **Professional Ethics and Human Values**. New Delhi: New Age International Publication

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MTCS101N	DCC	ADVANCE DATA STRUCTURES & ALGORITHMS	60	20	20	30	20	2	0	2	3

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Course Educational Objectives (CEOs):

1. Ability to analyze asymptotic runtime complexity of algorithms including formulating r recurrence relations
2. Basic knowledge of computational complexity, approximation and randomized algorithms
3. Ability to understand and design algorithms using , greedy strategy, divide and conquer approach, dynamic programming, and max flow - min cut theory.
4. Apply important algorithmic design paradigms and methods of analysis. Demonstrate a familiarity with major algorithms and data structures.
5. Basic knowledge of graph and matching algorithms

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.

The students will be able to

1. Basic ability to analyze algorithms and to determine algorithm correctness and time efficiency class
2. Master a variety of advanced abstract data type (ADT) and data structures and their implementations.
3. Master different algorithm design techniques (brute force, divide and conquer, greedy, etc.)
4. Ability to apply and implement learned algorithm design techniques and data structures to solve problems.

Syllabus

UNIT I **10HRS**

Basic concepts- Algorithm Specification-Introduction, Recursive algorithms, Data Abstraction Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations, Introduction to Linear and Non Linear data structures. Singly Linked Lists-Operations-Insertion, Deletion, Concatenating singly linked lists, Circularly linked lists-Operations for Circularly linked lists, Doubly Linked Lists- Operations- Insertion, Deletion. Representation of single, two dimensional arrays, sparse matrices-array and linked representations.

UNIT II **9HRS**

Stacks and Queue- Stack ADT, definition, operations, array and linked implementations in C, applications infix to postfix conversion, Postfix expression evaluation, recursion implementation, Queue ADT, definition and operations ,array and linked Implementations in C, Circular queues-Insertion and deletion operations, Dequeue (Double ended queue)ADT, array and linked implementations in C.

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MTCS101N	DCC	ADVANCE DATA STRUCTURES & ALGORITHMS	60	20	20	30	20	2	0	2	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
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UNIT III 8**HRS**

Trees – Terminology, Representation of Trees, Binary tree ADT, Properties of Binary Trees, Binary Tree Representations-array and linked representations, Binary tree traversals, Threaded binary trees, Max Priority Queue ADT-implementation-Max Heap-Definition, Insertion into a Max Heap, Deletion from a Max Heap. Graphs – Introduction, Definition, Terminology, Graph ADT, Graph Representations- Adjacency matrix, Adjacency lists, Graph traversals- DFS and BFS.

UNIT IV **7HRS**

Searching- Linear Search, Binary Search, Static Hashing-Introduction, hash tables, hash functions, Overflow Handling. Sorting-Insertion Sort, Selection Sort, Radix Sort, Quick sort, Heap Sort, Comparison of Sorting methods.

UNIT V **8HRS**

Search Trees-Binary Search Trees, Definition, Operations- Searching, Insertion and Deletion, AVL Trees Definition and Examples, Insertion into an AVL Tree ,B-Trees, Definition, B-Tree of order m, operations Insertion and Searching, Introduction to Red-Black and Splay Trees(Elementary treatment-only Definitions and Examples), Comparison of Search Trees. Pattern matching algorithm- The Knuth-Morris-Pratt algorithm, Tries (examples only).

Text Book:

1. Introduction to Algorithms 3rd ed, by Cormen, Leiserson, Rivest, and Stein Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Pearson P

Reference:

1. Aho, Hopcroft, Ullman, "Data Structures and Algorithms", Pearson Education
2. P Drozdek, Data Structures and algorithm in Jawa, Cengage (Thomson)Gilberg,
3. Data structures Using C++, Cengage
4. Horowitz, Sahni, Rajasekaran, "Computer Algorithms", Galgotia
5. Tanenbaum A.S., Langram Y, Augestien M.J., "Data Structures using C & C++",Prentice

Suggested list of Practicals:-

1. Implement Recursive Binary Search and Linear Search and determine the time required to search an element. Repeat the experiment for different values of n, the number of elements in the list to be searched and plot a graph of the time taken versus n.
2. Sort a given set of elements using the Heapsort method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken.
3. Sort a given set of elements using Merge sort method and determine the time required to sort the

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MTCS101N	**DCC**	**ADVANCE DATA STRUCTURES & ALGORITHMS**	**60**	**20**	**20**	30	20	2	0	2	**3**

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
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elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n.
4. Sort a given set of elements using Selection sort and determine the time required to sort elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n.
5. Obtain the Topological ordering of vertices in a given digraph.
6. Implement All Pair Shortest paths problem using Floyd's algorithm.
7. Implement 0/1 Knapsack problem using dynamic programming.
8. From a given vertex in a weighted connected graph, find the shortest paths to other vertices using Dijkstra's algorithm.
9. Sort a given set of elements using Quick sort method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n.
10. Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm.

11. Print all the nodes reachable from a given starting node in a digraph using BFS method.
12. Check whether a given graph is connected or not using DFS method.
13. Find a subset of a given set S= {s1, s2, Sn} of n positive integers whose sum is equal to a given positive integer d. For example, if S = {1,2,5,6,8} and d=9 there are two solutions {1,2,6} and {1,8}. A suitable message is to be displayed if the given problem instance doesn't have a solution.
14. Implement Horspool algorithm for String Matching.
15. Find the Binomial Co-efficient using Dynamic Programming.
16. Find Minimum Cost Spanning Tree of a given undirected graph using Prim's algorithm.
17. Implement Floyd's algorithm for the All-Pairs-Shortest-Paths problem.
18. Compute the transitive closure of a given directed graph using Warshall's algorithm.
19. Implement N Queen's problem using Back Tracking.

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MTCS102N	**DCC**	**Object Oriented Analysis & Design**	**60**	**20**	**20**	30	20	2	0	2	**3**

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***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. Learn the basics of OO analysis and design skills.
2. Learn the UML design diagrams.
3. Learn to map design to code.
4. Be exposed to the various testing techniques.

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.

The students will be able to

1. Design and implement projects using OO concepts.
2. Use the UML analysis and design diagrams.
3. Apply appropriate design patterns.
4. Create code from design.
5. Compare and contrast various testing techniques.

Syllabus

UNIT I **10HRS**

Introduction to OOAD , Unified Process - UML diagrams , Use Case , Class Diagrams, Interaction Diagrams , State Diagrams , Activity Diagrams , Package, component and Deployment Diagrams.

UNIT II **9HRS**

GRASP: Designing objects with responsibilities , Creator , Information expert , Low Coupling , High Cohesion , Controller - Design Patterns , creational - factory method -structural , Bridge , Adapter - behavioral , Strategy , observer.

UNIT III **8HRS**

Reusing Pattern Solutions , Concepts , Activities , Managing Reuse , Case Study - Specifying Interfaces , Concepts , Activities , Management , Case Study - Mapping Models to Code , Concepts , Activities , Management ,Case Study , Testing , Concepts , Activities , Management.

UNIT IV **7HRS**

System sequence diagrams - Relationship between sequence diagrams and use cases Logical architecture and UML package diagram , Logical architecture refinement , UML class diagrams , UML interaction diagrams - Applying GoF design patterns.

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MTCS102N	**DCC**	**Object Oriented Analysis & Design**	**60**	**20**	**20**	30	20	2	0	2	**3**

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UNIT V **8HRS**

Mapping design to code , Testing: Issues in OO Testing , Class Testing , OO Integration Testing , GUI Testing , OO System Testing.

Text Books:

1. Craig Larman, "Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development", Third Edition, Pearson Education, 2005.

References:

1. Martin Fowler, "UML Distilled: A Brief Guide to the Standard Object Modeling Language", Third edition, Addison Wesley, 2003.
2. Paul C. Jorgensen, "Software Testing:- A Craftsman's Approach", Third Edition, Auerbach Publications, Taylor and Francis Group, 2008.
3. Simon Bennett, Steve Mc Robb and Ray Farmer, "Object Oriented Systems Analysis and Design Using UML", Fourth Edition, Mc-Graw Hill Education, 2010.
4. Erich Gamma, a n d Richard Helm, Ralph Johnson, John Vlissides, "Design patterns: Elements of Reusable Object-Oriented Software", Addison-Wesley, 1995.

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MTCS103N	**DCC**	**Cloud Computing**	**60**	**20**	**20**	30	20	2	0	2	**3**

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***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

To impart fundamental concepts in the area of cloud computing

1. To impart knowledge in applications of cloud computing.
2. To gain competence in Map Reduce as a programming model for distributed processing of large datasets specifically.
3. To understand the features of cloud simulator apply different cloud programming model as per need.

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.

The students will be able to

1. Understanding the systems, protocols and mechanisms to support cloud computing.
2. Develop applications for cloud computing
3. Understanding the hardware necessary for cloud computing.
4. Design and implement a novel cloud computing application.

Syllabus

UNIT I **10HRS**

Cloud Computing definition, private, public and hybrid cloud. Cloud types; IaaS, PaaS, SaaS. Benefits and challenges of cloud computing, public vs private clouds, role of virtualization in enabling the cloud; Business Agility: Benefits and challenges to Cloud architecture. Application availability, performance, security and disaster recovery; next generation Cloud Applications.

UNIT II **9HRS**

Technologies and the processes required when deploying web services; Deploying a web service from inside and outside a cloud architecture, advantages and disadvantages

UNIT III **8HRS**

Reliability, availability and security of services deployed from the cloud. Performance and scalability of services, tools and technologies used to manage cloud services deployment; business needs (e.g Amazon, Microsoft and Google, Salesforce.com, Ubuntu and Redhat)

UNIT IV **7HRS**

Cloud security reference model, How security gets integrated , Cloud security , Understanding security risks , Principal security dangers to cloud computing, Virtualization and multitenancy, Internal security breaches, Data corruption or loss, User account and service hijacking, Steps to

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MTCS103N	**DCC**	**Cloud Computing**	**60**	**20**	**20**	30	20	2	0	2	**3**

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reduce cloud security breaches, Steps to reduce cloud security breaches , Reducing cloud security , Encryption & Encrypting data , Symmetric key encryption, Asymmetric key encryption , Digital signature, What is SSL? ,Identity management: Detection and forensics, Identity management: Detection and Identity management, Benefits of identity, Encryption techniques.

UNIT V **8HRS**

Global storage management locations, scalability, operational efficiency. Global storage distribution; terabytes to pet bytes and greater. Policy based information management; metadata attitudes; file systems or object storage. Overview Review of Service Models, SWOT Analysis and Value Proposition ,General Cloud Computing Risks , Performance, Network Dependence, Reliability, Outages, and Safety Critical Processing ,Compliance and Information Security ,Value and Risk of Open Source Software , Cloud Computing Cost Analysis, Selecting an IaaS Provider Cloud Standards and Intercloud Interoperability. - Application Development : Service creation environments to develop cloud based applications. Development environments for service development; Amazon, Azure, Google App.

Text Books:

1. Galloway, P. Haack, B. Wilson, K.S. Allen, and D. Matson , [ASP] Professional ASP.NET MVC 5 , Wiley, 2014

References:

2. K. Hwang, G. Fox, and J. Dongarra , [HFD] Distributed and Cloud Computing , Morgan Kaufmann, 2011
3. K. Chodorow , [M] MongoDB: The Definitive Guide , O'Reilly, 2013
4. S. Krishnan , [WA] Programming Windows Azure: Programming the Microsoft Cloud , O'Reilly, 2010
5. J. Lowry , [WCF] Programming WCF Services: Mastering WCF Services and the Azure AppFabric Bus , O'Reilly, 2011

Suggested list of Practicals:-

1. Analyze the components of cloud computing showing how business agility in an organization can be created
2. Evaluate the deployment of web services from cloud architecture
3. Critique the consistency of services deployed from a cloud architecture
4. Compare and contrast the economic benefits delivered by various cloud models based on application requirements, economic constraints and business requirements.
5. Critically analyze case studies to derive the best practice model to apply when developing and deploying cloud based_applications.

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MTCS104N	**DCC**	**Internet Of Things**	**60**	**20**	**20**	30	20	2	0	2	**3**

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Course Educational Objectives (CEOs):

The objective of the course is to:
1. Vision and Introduction to IoT.
2. Understand IoT Market perspective.
3. Data and Knowledge Management and use of Devices in IoT Technology.
4. Understand State of the Art – IoT Architecture.
5. Real World IoT Design Constraints, Industrial Automation and Commercial Building Automation in IoT.

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.
The students will be able to
1. Understand the vision of IoT from a global context.
2. Determine the Market perspective of IoT.
3. Use of Devices, Gateways and Data Management in IoT.
4. Building state of the art architecture in IoT.
5. Application of IoT in Industrial and Commercial Building Automation and Real World Design Constraints

Syllabus

UNIT I **10HRS**

Introduction to the internet of things – origins, early concepts and products, Examples of current products and value propositions, Architectures and design patterns, Analysis of a full connected-object experience. State of the Art, challenges and future directions

UNIT II **10HRS**

Prototyping connected objects - open-source prototyping platforms, Basic arduino programming, Extended Arduino libraries. Arduino-based Internet communication, Practical activities,

UNIT III **8HRS**

Integrating internet services xml and json http apis for accessing popular Internet services (Facebook, Twitter, and others). Practical activities.

UNIT IV **7HRS**

User Experience And Interaction Design - The three levels of user engagement: aesthetics, functional and emotional. Good examples of user interaction design. Designing your own user experience Practical activities

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MTCS104N	**DCC**	**Internet Of Things**	**60**	**20**	**20**	30	20	2	0	2	**3**

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UNIT V **8HRS**

Project Development And Competition - Development of a project including: value proposition, physical connected object prototyping, programming the behaviour, accessing Internet services and designing the user experience. Project competition

Text books:

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.

Reference:

1. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014.
2. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013

Suggested list of Practicals:-

1. Write an Arduino code Connect an external LED to the Arduino, blink it on a multiple rate. Connect a push button and trigger the LED.
2. Write an Arduino code using analogWrite and analog Read function to control the brightness of a LED using PWM enabled pin and Potentiometer.
3. Develop an application of home automation using LDR to automatically control the switching of LED based upon the brightness level.
4. Write an Arduino code to print some numbers/data on serial monitor and log the event timing. (take a reference from arduino.cc).
5. Read current Room Temperature in Celsius.
6. Note down the change in temperature by putting your finger on IC.

(Temperature will be increased because of body temperature)

7. Change the resolution of TMP75 and note down changes (if any).
8. Configure TMP75 in Shut Down Mode and One Shot Mode.

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MTCS104N	**DCC**	**Internet Of Things**	**60**	**20**	**20**	30	20	2	0	2	**3**

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9. Use Compara tor mode and Interrupt mode using ALERT pin.

10. Perform Daisy Chaining (Connect multiple TMP75 with one Arduino board).

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MTCS106N	**SEC**	**Design Pattern Lab**	**0**	**0**	**0**	0	50	0	0	4	**2**

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***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

To strengthen the knowledge of Object Oriented Design and Development by understanding various design patterns.

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Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.
The students will be able to
1. Understand common design patterns in the context of incremental/iterative development.
2. Evaluate and retractor software source code using patterns.
3. Analyze and combine design patterns to work together in software design.
4. Implement the design patterns in an object oriented language.
5. Understand the benefits of a pattern approach over program in a software application.

Syllabus

UNIT I **10HRS**

Introduction to Software Patterns, Overview of UML, Class Diagrams, Collaboration Diagrams, State chart Diagram, Deployment Diagram, Fundamental Design Patterns: Delegation, Interface, Abstract Super-class, Interface and Abstract class, Immutable, Marker Interface

UNIT II **9HRS**

Creational Patterns:

Simple Factory pattern, Factory Method, Abstract Factory, Builder, Prototype, Singleton

UNIT III **8HRS**

Structural Patterns:

Adaptor, Bridge, Composite, Façade, Flyweight, Decorator, Proxy Pattern

UNIT IV **7HRS**

Behavioural Patterns:

Chain of Responsibility, Command, Interpreter, Mediator, Memento Pattern

Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
M.Tech(CSE)
Choice Based Credit System (CBCS)-2024-2
SEMESTER-I

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
MTCS106N	**SEC**	**Design Pattern Lab**	**0**	**0**	**0**	0	50	0	0	4	**2**

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

UNIT V **8HRS**
Observer, State, Strategy, Template Method, Visitor, Iterator Pattern

Text Books:
1.Gamma, Helm, Johnson, Vlissides, Design Patterns. Elements of Reusable Software., Pearson Education 2006.

Refernce:
1. Cooper, J. W., Java Design Patterns, A Tutorial, Pearson Education, 2000.
2. Freeman, Freeman, Head First Design Patterns, O'Reilly Pub. 2007
3. Mark Grand, Patterns in Java Vol. 1, Wiley 2002
4. Mark Grand, Patterns in Java Vol. 2, Wiley 2002
5. Mark Grand, Patterns in Java Vol. 3, Wiley 2002
6. Douglas Schmidt, Pattern Oriented Software Architecture Vol1, John Wiley 2000, also called as POSA

Suggested list of Practicals:-
Implementation the following kinds of designs patterns in java with suitable example and also draw the UML Diagrams.

1. Abstract factory design pattern
2. Adapter-class Design pattern
3. Adapter-object Design pattern
4. Strategy Design pattern
5. Builder Design pattern
6. Bridge Design pattern
7. Decorator Design pattern
8. Flyweight Design pattern
9. Facade Design pattern
10. Facade Design pattern
11. Iterator Design pattern
12. Mediator Design pattern
13. Proxy Design pattern
14. Visitor Design pattern.