Pimpri Chinchwad Education Trust's

PIMPRI CHINCHWAD COLLEGE OF ENGINEERING

SECTOR NO. 26, PRADHIKARAN, NIGDI, PUNE 411044

An Autonomous Institute Approved by AICTE and affiliated to SPPU, Pune

Curriculum Structure of MCA

and

Syllabus of F.Y. MCA Courses (Approved by MCA BOS)

(Course 2020)

DEPARTMENT OF MASTER OF COMPUTER APPLICATION

Effective from Academic Year 2020-21

CURRICULUM FRAMEWORK (2020-2021; 2021-2022)

The MCA. Program is the based on the following type of course:

SR.NO.	TYPE OF COURSE	ABBREVIATION
1	Professional Core Course	PCC
2	Professional Elective Course	PEC
3	Basic Science Course	BSC
4	Management Course	MGT
5	Open Elective Course	OEC
6	Project	PROJ
7	Professional Development Course	PDT
8	Proficiency Course	PFC
9	Life Skill Course	LS
10	Audit Course	Audit
11	Massive Open Online Course	MOOC

- **The Course and Credit Distribution is as under**

Sr. No.	Type of Course	Number of Courses	Total Credit	
			NO.	(%)
1	Professional Core Course (PCC)	15	36	38.71
2	Basic Science Course (BSC)	2	8	8.6
3	Management Course (MGT)	2	8	8.6
4	Professional Elective Course (PEC)	9	19	20.43
5	Open Elective Course (OEC)	1	3	3.23
6	Project /Mini Project (PROJ)	3	18	19.35
7	MOOC's Course (MOOC)	1	1	1.08
8	Professional Development Training	1	-	-
9	Proficiency Course (PFC)	1	-	-
10	Life Skill (LS)	1	-	-
11	Audit Course (Audit)	2	-	-
	Total	**38**	**93**	**100**

Course Distribution: Semester wise

Sr. No.	Type of Course	Number of Courses Per Semester				Total
		I	II	III	IV	
1	Professional Core Course (PCC)	7	4	4	0	**15**
2	Basic Science Course (BSC)	1	1	0	0	**02**
3	Management Course (MGT)	1	1	0	0	**02**
4	Professional Elective Course (PEC)	0	4	4	1	**09**
5	Open Elective Course (OEC)	0	0	1	0	**01**
6	Project /Mini Project (PROJ)	0	1	1	1	**03**
7	MOOC's Course (MOOC)	0	0	0	1	**01**
8	Professional Development Training	0	0	1	0	**01**
9	Proficiency Course (PFC)	0	1	0	0	**01**
10	Life Skill (LS)	1	0	0	0	**01**
11	Audit Course (Audit)	1	1	0	0	**02**
	Total	**11**	**13**	**11**	**03**	**38**

Credit Distribution: Semester wise						
1 Lecture hour = 1 Credit 2 Lab Hours = 1 Credit 1 Tutorial Hour = 1 Credit						
Sr. No.	**Type of Course**	**Number of Credit Per Semester**				**Total**
		I	**II**	**III**	**IV**	
1	Professional Core Course (PCC)	16	8	12	0	**36**
2	Basic Science Course (BSC)	4	4	0	0	**8**
3	Management Course (MGT)	4	4	0	0	**8**
4	Professional Elective Course (PEC)	0	8	8	3	**19**
5	Open Elective Course (OEC)	0	0	3	0	**3**
6	Project /Mini Project (PROJ)	0	1	1	16	**18**
7	MOOC's Course (MOOC)	0	0	0	1	**1**
8	Professional Development Training	-	-	-	-	**-**
9	Proficiency Course (PFC)	-	-	-	-	**-**
10	Life Skill (LS)	-	-	-	-	**-**
11	Audit Course (Audit)	-	-	-	-	**-**
	Total	**24**	**25**	**24**	**20**	**93**

STRUCTURE FOR 1ST YEAR MCA (MASTER OF COMPUTER APPLICATION)

SEMESTER – I

MCA Structure		Semester-I	Teaching Scheme					Examination Scheme					
Course Code	Course Type	Course Name	L	P	T/A	H	CR	IE-1	IE-2	ETE	TW	OR	Total
MCA1401	PCC	Java Programming	3	-	-	3	3	20	30	50	-	-	100
MCA1403	PCC	Data base Management System	3	-	-	3	3	20	30	50	-	-	100
MCA1405	PCC	Data Structure	3	-	-	3	3	20	30	50	-	-	100
MCA1407	PCC	Object Oriented Software Engineering	3	-	1	4	4	20	30	50	-	-	100
MCA1201	BSC	Probability and Probability distribution	3	-	1	4	4	20	30	50	-	-	100
MCA1301	MGT	Principles & Practices of Management and Organizational Behavior	3	-	1	4	4	20	30	50	-	-	100
MCA1402	PCC	Java Programming Lab	-	2	-	2	1	-	-	-	25	-	25
MCA1404	PCC	Database Management System Lab	-	2	-	2	1	-	-	-	25	-	25
MCA1406	PCC	Data Structure Lab	-	2	-	2	1	-	-	-	25	-	25
MCA1961 To MCA1963	Audit	Audit Course-1	1	-	-	1	-	-	-	-	-	-	-
MCA1936	LS	Life Skill	-	-	2	2	-	-	-	-	-	-	-
		Total	**19**	**6**	**5**	**30**	**24**	**120**	**180**	**300**	**75**	**-**	**675**

Abbreviations: Course Abbreviation;
L- Lecture; **P**- Practical; **T/A**-Tutorial/Activity;
H- Hours; **CR**- Credits; **IE-1** –Internal Evaluation-1;
IE-2 –Internal Evaluation-2; **ETE** – End Term Examination;
TW – Term Work; **OR** – Oral Exam

SEMESTER – II

MCA Structure		Semester-II	Teaching Scheme					Examination Scheme					
Course Code	Course Type	Course Name	L	P	T/A	H	CR	IE-1	IE-2	ETE	TW	OR	Total
MCA2408	PCC	Web Technology	3	-	-	3	3	20	30	50	-	-	100
MCA2410	PCC	Python Programming	3	-	-	3	3	20	30	50	-	-	100
MCA2501 TO MCA2504	PEC	Professional Elective Course-1	3	-	-	3	3	20	30	50	-	-	100
MCA2511 TO MCA2514	PEC	Professional Elective Course-2	3	-	-	3	3	20	30	50	-	-	100
MCA2202	BSC	Business Statistics	3	-	1	4	4	20	30	50	-	-	100
MCA2302	MGT	Entrepreneurship Development	3	-	1	4	4	20	30	50	-	-	100
MCA2409	PCC	Web Technology Lab	-	2	-	2	1	-	-	-	25	-	25
MCA2411	PCC	Python Programming Lab	-	2	-	2	1	-	-	-	25	-	25
MCA2505 TO MCA2508	PEC	Professional Elective Course-1 Lab	-	2	-	2	1	-	-	-	25	-	25
MCA2515 TO MCA2518	PEC	Professional Elective Course-2 Lab	-	2	-	2	1	-	-	-	25	-	25
MCA2701	PROJ	Mini Project-1	-	2	-	2	1	-	-	-	25	-	25
MCA1964 TO MCA1966	Audit	Audit Course-2	-	-	1	1	-	-	-	-	-	-	-
MCA2911	PFC	Proficiency Courses	-	2	-	2*	-	-	-	-	-	-	-
		Total	**18**	**10**	**3**	**31**	**25**	**120**	**180**	**300**	**125**	-	**725**

2*: PFC conducted in 1-2 weeks, after Semester Examination (During Vacation).
Mini Project- Societal / Internship / Sponsored / Start up / Interdisciplinary / Achievement in recognized Project Competition

STRUCTURE FOR 2ND YEAR MCA (MASTER OF COMPUTER APPLICATION)

SEMESTER-III

MCA Structure		Semester-III	Teaching Scheme					Examination Scheme					
Course Code	Course Type	Course Name	L	P	T/A	H	CR	IE-1	IE-2	ETE	TW	OR	Total
MCA3412	PCC	Software Testing & Quality Assurance	3	-	-	3	3	20	30	50	-	-	100
MCA3414	PCC	Computer Network	3	-	1	4	4	20	30	50	-	-	100
MCA3415	PCC	Research Methodology	3	-	1	4	4	20	30	50	-	-	100
MCA3501 TO MCA3504	PEC	Professional Elective Course-3	3	-	-	3	3	20	30	50	-	-	100
MCA3505 TO MCA3508	PEC	Professional Elective Course-4	3	-	-	3	3	20	30	50	-	-	100
MCA3601 TO MCA3610	OEC	Open Elective	3	-	-	3	3	20	30	50	-	-	100
MCA3413	PCC	Software Testing & Quality Assurance Lab	-	2	-	2	1	-	-	-	25	-	25
MCA3511 TO MCA3514	PEC	Professional Elective Course-3 Lab	-	2	-	2	1	-	-	-	25	-	25
MCA3515 TO MCA3518	PEC	Professional Elective Course-4 Lab	-	2	-	2	1	-	-	-	25	-	25
MCA3702	PROJ	Mini Project-2	-	2	-	2	1	-	-	-	25	-	25
MCA3901	PDT	Professional Development Training	-	2*	-	2*	-	-	-	-	-	-	-
		Total	**18**	**8**	**2**	**28**	**24**	**120**	**180**	**300**	**100**	**-**	**700**

2*: PDT course conducted in 1-2 weeks, after Semester Examination (During Vacation).
Mini Project- Societal / Internship /Sponsored / Start up/ Interdisciplinary / Achievement in recognized Project Competition

Abbreviations: Course Abbreviation;
L- Lecture; **P**- Practical; **T/A**-Tutorial/Activity;
H- Hours; **CR**- Credits; **IE-1** –Internal Evaluation-1;
IE-2 –Internal Evaluation-2; **ETE** – End Term Examination;
TW – Term Work; **OR** – Oral Exam

SEMESTER-IV

MCA Structure		Semester-IV	Teaching Scheme					Examination Scheme					
Course Code	**Course Type**	**Course Name**	**L**	**P**	**T/A**	**H**	**CR**	**IE-1**	**IE-2**	**ETE**	**TW**	**OR**	**Total**
MCA4501 To MCA4505	PEC	Professional Elective Course-5	3	-	-	3	3	20	30	50	-	-	100
MCA4995	MOOC	MOOCS Course	-	-	-	1*	1	-	-	-	50	-	50
MCA4703	PROJ	Project	-	32	-	32	16	-	-	-	200	200	400
Total			**3**	**32**	**0**	**35**	**20**	**20**	**30**	**50**	**250**	**200**	**550**

PROFESSIONAL ELECTIVE COURSES (Semester-II)

Course Code	Professional Elective Course-1	Course Code	Professional Elective Course-2
MCA2501	Design and Analysis of Algorithm	MCA2511	Introduction to Data Science
MCA2502	Web development with Java	MCA2512	Information and Security Audit
MCA2503	Data Warehouse and Mining	MCA2513	ASP.Net using C#
MCA2504	Design Thinking and Problem Solving	MCA2514	Business Process Domain
MCA2505	Design and Analysis of Algorithm Lab	MCA2515	Introduction to Data Science Lab
MCA2506	Web development Lab	MCA2516	Information & Security Audit Lab
MCA2507	Data Warehouse and Mining Lab	MCA2517	ASP.Net using C# Lab
MCA2508	Design Thinking & Problem Solving Lab	MCA2518	Business Process Domain Lab

PROFESSIONAL ELECTIVE COURSES (Semester-III)

Course Code	Professional Elective Course-3	Course Code	Professional Elective Course-4
MCA3501	Cloud Computing	MCA3511	Data Science with Python
MCA3502	Advance Internet Technology	MCA3512	Business Intelligence Tools & its Application
MCA3503	Big Data Analytics	MCA3513	Mobile Application Development
MCA3504	Business Opportunity Identification	MCA3514	Start up and New Venture Management
MCA3505	Cloud Computing Lab	MCA3515	Data Science with Python Lab
MCA3506	AIT Lab	MCA3516	Business Intelligence Tools Lab
MCA3507	Big Data Analytics Lab	MCA3517	Mobile Application Development Lab
MCA3508	Business Opportunity Identification Lab	MCA3518	Start up and New Venture Management Lab

PROFESSIONAL ELECTIVE COURSES (Semester-IV)

Course Code	Professional Elective Course-5
MCA4501	Artificial Intelligence
MCA4502	Internet Of Things
MCA4503	Project Management
MCA4504	Deep Learning
MCA4505	Block Chain

LIST OF OPEN ELECTIVES

OFFERED BY MCA DEPARTMENT TO OTHER DEPARTMENT (Semester-III)

Course Code	Semester-III
MCA3601	Entrepreneurship Development
MCA3602	Marketing Management
MCA3603	Start up and new venture Management
MCA3604	Business Process Domain
MCA3605	Finance for Corporate Professionals
MCA3606	Personal Branding
MCA3607	Organization Culture and Corporate Ethics
MCA3608	Introduction to Python
MCA3609	Introduction to Web Application Development
MCA3610	Business Intelligence

Course Syllabus
Semester I

Program: MCA (First Year)				**Semester :** I			
Course : Java Programming				**Code :** MCA1401			
Teaching Scheme				**Evaluation Scheme**			
Lecture	**Practical**	**Tutorial**	**Credit**	**IE-1**	**IE-2**	**ETE**	**Total**
3	-	-	3	20	30	50	100

Pre-requisite:

- Fundamental Programming Concepts.
- Logical thinking

Objectives:

1. To learn about the concepts and principles of java programming.
2. To understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
3. To develop application using object oriented programming concepts of java.
4. To develop GUI application using Swing and Applet programming

Outcomes:

After learning the course, the students should be able to:

1. Describe Programming Constructs and features of Java like Interface, Package, and Exception Handling.
2. Use the programming constructs and features like Interface, Package and Exception Handling to write a Java Program.
3. Develop the Java application by applying the programming constructs and features like Interface, Package and Exception Handling.
4. Describe the features of multithreading, distributed programming, AWT/Swing.
5. Develop the Java console base application based on multithreading, network programming, AWT/Swing

Detailed Syllabus

Unit	**Description**	**Duration**
1.	**Unit-1: Introduction to Java** History of java, Features of Java, Programming Concepts Identifiers, Keywords, Variables, Control Structure, Decision Making Statements, Arrays & Strings (String, String Buffer class) Object Oriented Concepts of Java Class & Objects, Encapsulation & Abstraction, Inheritance & Polymorphism, Java Input / Output Operations.	**5**
2.	**Unit-2: Java Programming Constructs:** Defining Class with data members and methods, Creating objects & accessing members of class,	

	Access specifies Public, Private and Protected. Modifiers Static, Final and Abstract Object Initialization using Constructor, Types of constructors. Inner class Inheritance Types of Inheritance Single, Multilevel and Hierarchical Inheritance Polymorphism Types of Polymorphism Method overloading Method overriding	**5**
3.	**Unit-3: Interface, Packages and Exception Handling** Interface Definition of Interface Implementing an Interface Abstract class Package Introduction Creating Package Importing Package / Class from package Package scope Exception Handling Introduction to Exception and Exception Handling Types of Exception, Exception class hierarchy Exception handling using try, catch and finally block Use of throw and throws statements User defined exception	**6**
4.	**Unit-4: Java Input / Output & Multithreading** Java Input / Output Java I/O package, IO class Hierarchy Byte Stream and Character Stream classes Buffered Reader and writer classes Classes for file IO operations PrintWriter class Multithreading in Java Introduction to multithreading Thread Life Cycle Creating Thread using Thread class or Runnable Interface Main Thread and Thread Properties Creating multithreaded application Thread Synchronization and Communication	**6**
5.	**Unit-5: Java Collection Framework** Introduction to collection framework Collection Interface, Classes and Iterator	**6**

	Collection, Set, SortedSet and List interface ArayList, LinkedList, HashSet, TreeSet classes Map and SortedMap interface HashMap and TreeMap classes	
6.	**Unit-6: Java Swing and Applet Programming** Introduction to Swing class and Features of Swing class Swing Component Classes JButton, JLabel, JTextFiled, JComboBox, JSlider, etc Creating Menu using Swing Graphics, Font, Color Class Layout Manager Classes Event Delegation Model Event Source, Event Class, Listener Interface Event class Hierarchy Anonymous and Adapter class Applet Class Applet Life Cycle Creating and displaying applet Adding component in applet HTML applet Tag, Applet Viewer Event Handling in Applet	**8**
	Total	**36**

Reference Books:

1. Java Complete Reference, Herbert Schildt, TMH
2. Programming with Java A Primer, E. Balagurusamy, TMH
3. Java 6 Programming Black Book , Kogent Solution Inc, dreamTech Pub
4. Core Java 2 Volume – I, Cay S Horstmann, Fary Cornell, Sun Microsystems Press

DATABASE MANAGEMENT SYSTEM

Program: MCA (First Year)					**Semester: I**		
Course : Database Management System					**Code: MCA1403**		
Teaching Scheme				**Evaluation Scheme**			
Lecture	**Practical**	**Tutorial**	**Credit**	**CE**	**MTE**	**ETE**	**Total**
3	**-**	**-**	**3**	**20**	**30**	**50**	**100**

Pre-requisite Basic knowledge of Set Theory and Relations, Software Engineering

Objectives:

The concepts related to database, database models, SQL, Concurrency Control, Data Recovery and issues of Database security are covered in this subject. This creates a strong foundation for application database design.

Outcomes:

After completion of this course, the students would be able to

1. Describe the concept of Database Management and its Architecture.
2. Describe various components of ER Model, Relational Model and define various types of keys and relations.
3. Design E-R Model for given requirements and convert the same into database tables using rules of Normalization.
4. Describe the fundamental issues of transaction processing, concurrency control and deadlock handling and methods to achieve concurrency satisfying ACID properties of Database.
5. Describe causes of database failures and various database recovery techniques.
6. Describe data access control at user and system level for multiple users of database.

Detailed Syllabus:

Unit	Description	Duration
1	**Introduction to DBMS:** Introduction to Database Systems, Need and Limitations of DBMS, Users of DBMS, ANSI Three-Schema Architecture of database, Data Independence, Mapping of Conceptual-External Schema and Conceptual-Internal Schema.	3
2	**Data Models : Introduction to Entity-Relation Model**. Basic Terminology related to ER Model, Notations Used in ER Diagram, Generalization, Specialization and Aggregation. Solving Simple Case studies to draw ER Diagram. **Introduction to Relational Data Model**, Structure of Relational Model, Types of Keys, Referential Integrity,Codd's rules, Relational Algebra Operators:Selection, Projection, Rename, Set Difference, Union, Intersection, Cross Product, Types of Joins,SQL Representation of Relational operators, Converting ER Model to Relational Model.	8
3	**Data Normalization:** Concept of Normalization, Functional Dependency,First Normal Form, Second Normal Form, Third Normal Form, and Solving Case Study based problems (Design ERD, Database Schema and Normalization up to 3NF).	8

4	**Transaction and Concurrency Control :**Concepts of transaction processing, ACID Properties, States of Transaction, Concurrency Control, Problems in Concurrency Control, Serial Schedule and Serializability, Test Serializability, Deadlock, Locking & Time stamp Methods for Concurrency Control.	**7**
5	**Crash Recovery and Backup :** Database Recovery Concept, Types of failures, and Types of database recovery: REDO & UNDO, Database Recovery Techniques: Deferred Update, Immediate Update, Shadow paging and Checkpoint	**6**
6	**Database Security** Database Security Issues, Discretionary Access Control Based on Grant &Revoking Privilege, Mandatory Access Control and Role Based Access Control for multilevel security.	**4**
	Total	**36**

Recommended Books:

1. Abraham Silberschatz, Henry Korth, and S. Sudarshan, Database System Concepts, McGraw-Hill.
2. Raghu Ramakrishnan, Database Management Systems, WCB/McGraw-Hill.
3. Bipin Desai, An Introduction to Database Systems, Galgotia.
4. J. D. Ullman, Principles of Database Systems, Galgotia.
5. R. Elmasri and S. Navathe, Fundamentals of Database Systems8, Addison-Wesley.
6. S.K. Singh, Foundations of Databases. Addison-Wesley.

Program: MCA (First Year)				**Semester : I**			
Course : Data Structure				**Code :** MCA1405			
Teaching Scheme				**Evaluation Scheme**			
Lecture	**Practical**	**Tutorial**	**Credit**	**IE-1**	**IE-2**	**ETE**	**Total**
3	-	-	3	20	30	50	100

Pre-requisite: Programming fundamentals , Loops, Functions, Pointers, Arrays, Memory Allocation, Recursion

Objectives:

1. To impart the basic concepts of data structure and algorithms
2. To understand concepts about searching and sorting techniques
3. To solve problems suing data structures such as stacks, queues, lists, trees and graphs.

Outcomes: After learning the course, the students should be able to:

1. To demonstrate data structures linked list, stack and queue.
2. To describe searching and sorting techniques.
3. To implement tree, graph data structures.
4. To apply design principles and concepts for Data Structure to solve problems.

Detailed Syllabus

Unit	**Description**	**Duration**
1	**Introduction to Data Structure:** Fundamentals of Data Structure, Operations of Data Structure: Traversing, Inserting and Deleting, Arrays as Data Structure, Searching, Sorting Bubble, Insertion, Selection), Storage Representation of Arrays, Applications of an Arrays as Polynomial and Sparse Matrix.	**5**
2	**Stacks:** Introduction and Definition, Representation, Operations on Stacks, Applications of Stacks, Representation of Arithmetic Expressions: Infix, Postfix, Prefix.	**5**
3	**Queues:** Introduction and Definition, Representation, Operation on Queues, Types of Queues, Dequeue, Circular Queue, Priority Queue, Applications of Queue.	**4**
4	**Linked List:** Definition of Linked List, Dynamic Memory Management, Representation of Linked List, Operations on Linked List, Inserting, Removing, Searching, Sorting, Merging Nodes , Double Linked List	**8**
5	**Trees :** Definition of Tree, Binary Tree and their types, Representation of Binary Tree, Operations on Binary Tree, Binary Search Tree (BST), Traversal of Binary Tree, Preorder Traversal, In-order Traversal, Post-order Traversal, Introduction of Threaded Binary Tree, AVL Tree and B-Tree.	**8**
6	**Graphs:** Definition of Graph, Basic Concepts of Graph, Representation of Graph, Adjacency Matrix, Adjacency List, Spanning Tree, Graph Traversal: Breadth First Search (BFS), Depth First Search (DFS)	**6**
	Total	**36**

Reference Books:

1. Data Structures Using C and C++ : Yedidyah Langsam, Moshe Augenstein, Aaron Tenenbaum, PHI,2nd Ed.
2. Magnifying Data Structures : Arpita Gopal, PHI Learning Pvt. Ltd
3. The Ultimate C with Data Structures: R. Nageswara Rao, Dreamtech publications
4. Data Structure through C++ Y.P. Kanetkar, BPB,2nd Ed.
5. Data Structures Using C ++ Malik D S, Cengage Learning
6. Data Structures in C ++ Kutty N.S., Padhye P.Y., PHI
7. Data Structure Using C++ Kasiviswanath N., Laxmi Publication
8. Principles of Data Structures Using C and C++ Das Vinu V.
9. Data Structure and Algorithms in C++ Joshi Brijendra Kumar, Tata McGraw Hill Education
10. Data Structures with C++: Schaums Outlines Hubbard John
11. Data Structures Using C and C++ (Tenenbaum) Tenenbaum, Pearson Pub.
12. Fundamental of Data Structure in C Horowitz Sahani, Galgotia pub.

Program :	MCA (First Year)			Semester : I			
Course : Object Oriented Software Engineering				Code:MCA1407			
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	IE-1	IE-2	ESE	Total
3	-	1	4	20	30	50	100

Pre-requisite:

- Knowledge any programming language.
- Excellent communication skills will be an added advantage.
- DBMS

Objectives:

1. To study phases of SDLC and different process models
2. Students learn & understand the Requirement analysis and system Design.
3. Learn the design principles to develop software in object oriented approach.
4. To know how to gather requirements for software.
5. To get acquainted with the agile software development methodology.

Outcomes:

After learning the course, the students should be able to:

1. Distinguish different process model for a software development. (Understanding)
2. Design software requirements specification solution for a given problem definitions of a software system.(Application)
3. Use an object-oriented method for analysis and design
4. Determine an appropriate and effective graphical user interface. (Evaluation)
5. Recognize and describe current trends in the area of software engineering.

Detailed Syllabus:

Unit	Description	Duration
1	**Introduction to Software and Software Engineering** The Evolving Role of Software, Software Process Models: The Linear Sequential Model, The Prototyping Model, The RAD Model, Spiral Model, Agile Process Introduction to development approach SSAD and OOAD	5
2	**Requirement Engineering** Types of Requirements – Functional and Non functional Four Phases of Requirement Engineering Software requirement Specification (SRS) Structure and contents of SRS IEEE standard format for SRS	8
3	**Object orientation and Structural modeling**	7

	Class and object Abstraction and encapsulation Method and messages Interface, Inheritance and polymorphism **Structural Modeling :** Class Diagram and Object diagram Associations and links Aggregation , Composition and containment Inheritance, Sub Types and IS-A hierarchy	
4	**Behavioral Modeling** Use case Diagram Identify Actors Identify Use cases: describing how the user will use the system Develop use-case Model Description of Use case Diagram Interaction Diagrams: Activity Diagram Sequence diagram Collaboration Diagram State Transition Diagram	10
5.	**User Interface Design** Elements of good design Eight golden rules for design Features of modern GUI, Menus, Scroll bars, windows, buttons, icons, panels, error messages etc.	4
6.	**Current trends in Software Engineering** Introduction to Web Engineering Component-Based Software Engineering, Client/Server Software Engineering, , Reengineering, Computer-Aided Software Engineering	2
	Total	**36**

Reference Books:

1. Software Engineering by Roger Pressman
2. Object-Oriented Software Engineering: A Use Case Driven Approach by Ivan Jacobson
3. Software Engineering by Sommerville,Pearson,8th Ed
4. Object Oriented System Development - Ali BahramiMcGRAW-HILL International Edition
5. Object Oriented Modeling and Design with UML by James Rumbaugh, Michael Blaha
6. Object Oriented systems Analysis and Design using UML by Simon Bennett
7. The Unified Modeling Language user guide by Grady Booch, James Rumbaugh, Ivar Jacobson
8. Ivar Jacobson, Object-Oriented Software Engineering: A Use Case Driven Approach, 2004, 1st Edition, Addison Wesley Longman Publishing

List of Tutorials / Activities:

1.Case study on Requirement Engineering (SRS)

2. Case study on Requirement Engineering (SRS)
3.Case study on Object orientation and Structural modeling
4. Case study on Object orientation and Structural modeling
5.Case study on Object orientation and Behavioral modeling
6.Case study on User Interface Design

Program:	MCA (First Year)				Semester : I		
Course : Probability and Probability distribution					Code : CA1201		
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial / Activity	Credit	CE	MTE	ETE	Total
3	-	1	4	20	30	50	100

Pre-requisite: Basic Mathematics

Objectives:

1. To count similar things in sophisticated ways.
2. To understand the mathematical underpinnings of probability.
3. To learn to make informed decisions about likelihood of events, based on a pattern of collected data.
4. To recognize and understand discrete probability distribution functions, in general.

Outcomes:

After learning the course, the students should be able to:

1. Use probability theory to solve interesting problems.
2. Apply the Addition Rule and the Principle of Inclusion and Exclusion and Dearrangement.
3. Define and use the concepts of sample space, events and compute the probability and conditional probability of events, and use Bayes' Rule.
4. Solve problems based on the concepts of discrete random variable, the discrete probability distributions, joint probability distributions and interpret Contingency Tables.
5. Recognize the discrete probability distribution and apply it appropriately.
6. Recognize the normal probability distribution and apply it appropriately.

Detailed Syllabus:

Unit	Description	Duration
1.	**Counting Principle** Addition and Multiplication Principles Permutations of n Objects, Circular Permutation Permutation with repetitions.	5
2.	**Principle of Inclusion and Exclusion:** Principle of Inclusion and Exclusion theorem and applications. Dearrangement theorem and its applications Non negative integer value solution Multinomial Theorem and application.	5
3	**Probability** Trail, Events, Sample spaces, probability axioms Independent and Dependent Events Conditional probability and its applications. Bayes's Theorem and its applications.	6
4.	**Random variables and Mathematical Expectation** Random Variable (Discrete and continuous), Probability Distribution of a Random Variable, Probability Mass Function, Probability Density Function, Distribution Function.	7

	Mathematical Expectation of Probability Distribution, Theorems, Calculation of Mean and Variance using Mathematical Expectation Concepts of Bivariate Random Variable, Discrete and Continuous Bivariate Random Variable.	
5.	**Discrete Probability Distribution** Binomial Distribution Finding Mean and variance of Binomial Distribution Poisson Distribution Finding Mean and variance of Poisson Distribution Numerical base on Binomial Distribution and Poisson Distribution	**6**
6.	**Continuous Probability Distribution** Uniform Distribution Finding Mean and variance of uniform Distribution Normal Distribution Finding Mean and variance of uniform Distribution Numerical base on Uniform Distribution and Normal Distribution	**7**
	Total	**36**

Reference Books:

1. Probability and Combinatorics by D.P Apte.
2. Discrete Mathematics by Rosen
3. Probability & Random Process by T. Veerarajan
4. Fundamentals of Mathematical Statistics by S. C. Gupta and V. K. Kapoor
5. Statistical Methods by S. P. Gupta

List of Tutorials / Activities

1. Tutorial on Counting Principle
2. Tutorial on Inclusion and Exclusion
3. Tutorial on Probability
4. Tutorial on Mathematical Expectation
5. Tutorial on Discrete Probability distribution
6. Tutorial on Continuous Probability Distribution

Program:	MCA (First Year)			Semester : I			
Course :	Principles and Practices of management and Organizational Behavior			Code : MCA1301			
Teaching Scheme				**Evaluation Scheme**			
Lecture	**Practical**	**Tutorial / Activity**	**Credit**	**IE-1**	**IE-2**	**ETE**	**Total**
3	-	1	4	20	30	50	100

Pre-requisite:
No any prerequisite

Objectives:

1. To develop skills to become administrations, managers and executives, a better insight and appreciation of human problems in both industrial and non-industrial organizations
2. To understand the processes of organizational growth and development, and the role of an individual and group behavior therein.
3. To provide a deeper knowledge of organizational behavior with specific emphasis on Indian situations.
4. To understand of the behavior of individuals and groups inside organizations should further enhance skills in understanding and appreciating individuals, interpersonal, and group process for increased effectiveness both within and outside of organizations

Outcomes:

After learning the course, the students should be able to:

1. Describe the key concepts of management
2. Understand theories about how managers should behave to motivate and control employees.
3. Describe people and leadership skills essential for managerial success.
4. Explain group and teams dynamics leading to organizational effectiveness.
5. Describe personality structure with individual behavior

Detailed Syllabus:

Unit	Description	Duration
1.	**Management:** Meaning, Definition Evolution of Management: Need and Process of Management Managerial levels/Hierarchy Five Functions of Management: Planning, Organizing, Staffing, Directing, Controlling Managerial Skills: Technical Skill, Human Skill, Conceptual Skill Introduction to Scientific Management by Taylor, Administrative Management by Fayol, Contribution of Peter Drucker.	5
2.	**Organizing and staffing:** Importance and Process of Organizing, Types of Organizations and span of control, Organizational structure: Functional organization, Product	6

	Organization, Territorial Organization Staffing and its importance in the organization, Recruitment and Selection Process, Training &Development, Performance Appraisal Human Resource Management	
3.	**Motivation and Leadership:** Concept of Motivation, Benefits to organization and Manager Maslow's need Hierarchy theory Theory X and Y, Theory Z Definition, Nature, Qualities of Leader, Leader V/s Manager Leadership Styles (Autocratic, Participative, Laissez faire or subordinate-centered ,Bureaucratic leadership, Transformational leadership, Transactional leadership) Introduction; Concept-Power, Politics, Conflict, Negotiations, Stress.	**7**
4.	**Organizational Behavior:** Definition, scope and importance of OB, Evolution of OB, Disciplines involved in the study of Organizational Behavior, -Contributing disciplines and area like psychology, social Psychology, economics, anthropology etc. Application of Organizational Behavior in Business. Limitations of OB, Globalization and OB ORGANISATIONAL CULTURE: Meaning, Definition, Culture, Organizational Effectiveness ORGANISATIONAL CHANGE: Importance of Change, Planned Change & OB Techniques	**6**
5.	**Group ,Group Dynamics and Team Building:** Concept of Group, Effect & Characteristics of group, Types of groups The Five-Stage Model of Group Development Concept of Team, Nature, Benefits from team, Types of Teams and Creating Effective Teams.	**4**
6.	**Personality and Understanding Individual Behavior**: Introduction, Values and Attitudes Definition and Concept of Emotions, Emotional Intelligence Definition Personality, importance of personality in Performance Personality Structure -Personality and Behavior Perception: Meaning and concept of perception, Factors influencing perception. Ego State, Johari window- Transactional Analysis	**8**
	Total	**36**

Reference Books:

1. Principles and Practices of Management- Shejwalkar
2. Essential of management- 7th edition Koontz H;Weitrich H TMH
3. Management Today Principles And Practices – Burton, Thakur

4. Mgmt. Principles and Functions - Ivancevich Gibson, Donnelly
5. Organizational behavior Keith Davis
6. Organizational behavior Fred Luthans TMH 10th edition
7. Organizational Behaviour - Stephen Robbins
8. Organizational Behaviour - K. Aswathappa (8th revised edition)
9. Business psychology and Organizational Behaviour – Eugene McKenna
10. Understanding Organizational Behaviour - Udai Pareek
11. Organization Development – Wendell L. French and Cecil H. Bell Jr.

List of Activities:

1. Activity based on Motivation
2. Activity Based on Leadership Skills
3. Activity for effective Group Dynamics
4. Activity for Team Building
5. Activity Based on Emotional Intelligence
6. Activity Based on Transactional Analysis

Program: MCA (First Year)				**Semester :** I			
Course : Java Programming Lab				**Code :** MCA1402			
Teaching Scheme				**Evaluation Scheme**			
Lecture	**Practical**	**Tutorial**	**Credit**	**IE-1**	**IE-2**	**ETE**	**Total**
-	2	-	1	-	-	-	-

Pre-requisite:

- Fundamental Programming Concepts
- Logical thinking

Objectives:

1. To learn about the concepts and principles of java programming.
2. To understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
3. To develop application using object oriented programming concepts of java.
4. To develop GUI application using Swing and Applet programming

Outcomes:

After learning the course, the students should be able to:

1. **Use** the programming constructs and features like Interface, Package and Exception Handling to write a Java Program
2. **Use** the Object Oriented Programming concepts of Java to write a Java Program
3. **Develop** the Java application by applying the programming constructs and features like Interface, Package and Exception Handling
4. **Develop** the Java console base application based on multithreading, network programming, AWT/Swing

Detailed Syllabus:

Unit	Description	Duration
1.	**Unit-1: Introduction to Java** Explain the term JDK, JRE, and JVM Demonstration of Java Program compilation and Execution Assignment based on Java Programming constructs Assignment based on Java Array and Strings	4
2.	**Unit-2: Java Programming Constructs:** Demonstration of program using Java Programming Construct Assignment based on Java Class and Objects Assignment based on Constructors Assignment based on Inheritance Assignment based on Polymorphism	4

3.	**Unit-3: Interface, Packages and Exception Handling** Demonstration of program using Interface, Package and Exception Handling Assignment based on Interface Assignment based on Packages Assignment based on Exception Handling	4
4.	**Unit-4: Java Input / Output & Multithreading** Demonstration of Program using Java IO classes and Multithreading Assignment based on Java IO Classes Assignment based on Java File Handling Assignment based on Multithreading	4
5.	**Unit-5: Java Collection Framework** Demonstration of java program using collection classes and interfaces Assignment based on Collection Classes Assignment based on Collection Interfaces	4
6.	**Unit-6: Java Swing and Applet Programming** Demonstration of java program using Swing component with event handling Demonstration of java program using Applet programming Assignment based on Java Swing Component Assignment based on Java Event Handling Assignment based on Applet Programming	4
	Total	**24**

Reference Books:

1. Java Complete Reference, Herbert Schildt, TMH
2. Programming with Java A Primer, E. Balagurusamy, TMH
3. Java 6 Programming Black Book , Kogent Solution Inc, dreamTech Pub
4. Core Java 2 Volume – I, Cay S Horstmann, Fary Cornell, Sun Microsystems Press

List of Experiments:

1. Programs based on basic Java programming constructs.
2. Programs based on Java Array and String.
3. Programs based on Java Class and Objects.
4. Programs based on Inheritance and Polymorphism in Java.
5. Programs based on Interface of Java.
6. Programs based on Packages of Java.
7. Programs based on Exception Handling in Java.
8. Programs based on Java IO packages and File Handling.
9. Programs based on Multithreading.
10. Programs based on Java Collection Framework.
11. Programs based on Swing component of Java with event handling.
12. Programs based on Applet Programming of Java with event handling.

Program: MCA (First Year)					**Semester:** I		
Course : DBMS Lab					**Code:** MCA1404		
Teaching Scheme				**Evaluation Scheme**			
Lecture	**Practical**	**Tutorial**	**Credit**	**IE-1**	**IE-2**	**ETE**	**Total**
-	**2**	-	**1**	-	-	-	-

Pre-requisite:
Basic knowledge of Set Theory and Relations.

Objectives:
To develop database handling, data manipulation and data processing skills through SQL which will help students to develop data centric computer applications.

Outcomes:
After learning the course, the students should be able to:

1. Use SQL commands related to database creation and manipulation.
2. Use SQL operators, Built-in functions, Subqueries on database to access data as per need of user's requirement.
3. Handle issues related to data access and ensure security.

Detailed Syllabus:

Unit	Description	Duration
1.	Introduction of SQL- DDL, DML, TCLCommands and Basic Data Types, Operators: Arithmetic Operators, Logical Operators, Set Operators, Like Clause, Between…And, In, Concatenation, Any, All	4
2.	Functions: Date & Time, String Functions, Aggregate Functions,Constraints.	3
3.	Select Query with Distinct Keyword , NULL Values , Order By Clause , Where Clause, AND & OR Clauses , Expressions, Group By…Having Clause, Alias Syntax	4
4.	Joins,Types of Join and Nested Sub-Query	4
5.	Case Study : Write Case study for any in-house problem to Draw ERD using tools	3
6.	Design Database from ERD and write 20-25 Queries based on designed model	6
	Total	**24**

Reference Books:

1. Understanding SQL by Martin Gruber, BPB
2. SQL- PL/SQL by Ivan Bayross.
3. Oracle – The complete reference – TMH /oracle press

List of Experiments (Assignment):

1) Assignment based on creating tables and DDL, DML, DTL commands
2) Assignment based on Select Query and use of Operators: Arithmetic Operators, Logical Operators and Set Operators, Like Clause, between…And, In, Concatenation.
3) Assignment based on Constraints and Date & Time functions.
4) Assignment based on String Functions and Aggregate Functions
5) Assignment based on Select Query with Distinct Keyword , NULL Values , Order By Clause

Where Clause, AND & OR Clauses , Expressions

6) Assignment based on Group By…Having Clause, Alias Syntax
7) Assignment based on Joins
8) Assignment based on Joins and Nested Sub-Query

Solve one Case Study (Study requirements from users, Draw ERD , Design Database & Write 20-25 queries)

9) Write Case study for any in house problem
10) Draw ERD Using Tools
11) Create Database of ERD model
12) Write comprehensive queries based on database created

Program:	MCA (First Year)			**Semester : I**			
Course :	Data Structure Lab			**Code :** MCA1406			
Teaching Scheme				**Evaluation Scheme**			
Lecture	**Practical**	**Tutorial**	**Credit**	**CE**	**MTE**	**ETE**	**Total**
-	2	-	1	-	-	-	-

Pre-requisite:

- Programming fundamentals
- Loops, Functions, Pointers, Arrays, Memory Allocation, Recursion

Objectives:

1. To build efficient programming skills in students.
2. To impart the basic concepts of data structure and algorithms.
3. To implement concepts about searching and sorting techniques
4. To build efficient programming skills in students.

Outcomes

After learning the course, the students should be able to:

1. Apply design principles and concepts for Data Structure.
2. Apply the concepts of Sorting and Searching Techniques.
3. Describe Stack, Queue and Linked List operations.
4. Demonstrate the concepts of Tree and Graph

Sr. No.	**Experiments**	**Duration**
1	**Unit 1 : Introduction to Data Structure** Assignment based on Array Data Structure, Operations of Array Data Structure, Searching and Sorting, Application of Array	**8**
2	**Unit 2 : Stack** Assignment based on operations on Stack, Application of Stack	**4**
3	**Unit 3 : Queue** Assignment based on operations of Queue	**2**
4	**Unit 4 : Linked List** Assignment based on Singly Linked List, Doubly Linked List, Dynamic implementation of Stack and Queue	**6**
5	**Unit 5 : Tree** Assignment-10 based on basic Binary Tree	**2**
6	**Unit 6 : Graph** Assignment-11 based on implementation of Graph Data Structure	**2**
	Total	**24**

Reference Books:

1. C++ Data Structures : A Laboratory Course work: Stefan Brandle, James Robergé, Jonathan Geisler, Jones and Bartlett publishers.
2. Magnifying Data Structures : Arpita Gopal
3. Practical Approach to Data Structures Hanumanthappa
4. Data Structure Using C++ Kasiviswanath N.

5.Principles of Data Structures Using C and C++ Das Vinu V.
6.Data Structure and Algorithms in C++ Joshi Brijendra Kumar
7. Data Structures and Algorithms in C++ Drozdek Adam
8. Data Structures Using C++ Malik D S, CENGAGE Learning Pub.
9 Data Structures with C++: Schaums Outlines Hubbard John
10. Data Structures: A pscudocode approach with C++ Gilberg R.F., Forouzan B.A.,Cengage
11. Data Structure Using C ++ Jayalakshmi
12.Data Structures Using C and C++ (Tenenbaum) Tenenbaum, Pearson Pub.
13.Data Structure through C++ Y.P. Kanetkar, BPB,2nd Ed.
14.Fundamental of DS using C++ Horowitz Sahani, Galgotia pub.
15.DS using C++ Abhyankar

List of Experiments

1. Write a program to perform insert and delete operations on Array.
2. Write a program to sort the data using bubble sort.
3. Write a program to sort the data using insertion sort.
4. Write a program to search the data using linear search.
5. Write a program to search the data using binary search.
6. Write a program to perform push and pop operations on stack.
7. Write a program to convert infix expression to postfix expression.
8. Write a program to perform insert and delete operations on queue.
9. Write a program to perform insert and delete operations on singly linked list.
10. Write a menu driven program to perform various operations on doubly linked list.
11. Write a program for stack representation using linked list.
12. Write a program for queue representation using linked list.
13. Write a program to search an element in BST.
14. Write a program to perform tree traversal in preorder.
15. Write a program to perform BFS and DFS on graph.

Course Syllabus
Semester II

Program: MCA (First Year)				**Semester : II**			
Course : Web Technology				**Code :** MCA2408			
Teaching Scheme				**Evaluation Scheme**			
Lecture	**Practical**	**Tutorial**	**Credit**	**IE-1**	**IE-2**	**ETE**	**Total**
3	-	-	3	20	30	50	100

Pre-requisite:

- Object Oriented Concepts
- C++ Programming
- Basics of Networking
- SQL

Objectives:

1. To give the basic overview of the different technologies related to website development
2. To develop the skill and knowledge of Client Side Programming
3. To develop the skill and knowledge of Server Side Programming
4. To make the students aware about web publishing

Outcomes:

After learning the course, the students should be able to:

1. Explain the concepts related to HTML, CSS, JavaScript, jQuery, Web Server and PHP technologies.
2. Use HTML tags to create the structure of web page.
3. Apply CSS properties to design the web page.
4. Use JavaScript and jQuery to perform the form validations and make the pages interactive (client side programming).
5. Build dynamic web pages with various features of PHP

Detailed Syllabus

Unit	Description	Duration
1	**HTML 5** Basic Terminologies and Tags Table, Link, Audio, Video Forms Canvas Geolocation	**05**
2	**CSS** Introduction and Types Basic Properties Selector, Class, ID, Pseudo Classes, Box Model Transformation Transition Animation	**05**
3	**JavaScript** Need of Javascript, Basic Syntax and Building Blocks Array, String, Date, Math, Global Objects DOM and DOM Manipulation	**07**

	Window, Location, History, Navigator, Screen Objects Event Handling Form Validations (using Regular Expressions)	
4	**jQuery** jQuery Need, Advantages, Downloading and Use in Web Page val, html, text, Bind and Ubind Handling various events using jQuery Disabling user actions (Cut, Copy, Paste, etc), Filtering jQuery Effects jQuery Animation jQuery Validations	**07**
5	**Basics of PHP** Working of Client Server, Role of HTTP, HTTP Header Introduction to Apache HTTP Server Side Technologies, PHP Introduction PHP Installation and Basic Syntax PHP Strings, Array, Functions Object Oriented Programming using PHP	**06**
6	Handling HTML Forms using PHP State Management using PHP Working with Files and Directories PHP and MySQL Sending Emails, Image Manipulations, Handling Date and Time	**06**
	Total	**36**

Reference Books:

- Pro HTML 5 Programming, Apress Publication
- Pro CSS3 Layout Techniques, Apress Publication
- Professional JavaScript for Web Developers, Wiley Publication
- Learning jQuery, Packt Publication
- PHP for Absolute Beginners, Apress Publication
- Professional PHP 6, Wiley Publication

Program:	MCA (First Year)			Semester :II			
Course :	Python Programming			Code :MCA2410			
Teaching Scheme				Evaluation Scheme			
Lecture	**Practical**	**Tutorial**	**Credit**	**IE-1**	**IE-2**	**ETE**	**Total**
3	–	--	3	20	30	50	100

Pre-requisite:

- Basic Programming Concepts
- C Programming
- Object Oriented Programming Using CPP
- Logical Thinking

Objectives:

1. To learn about the concepts and principles of Python Programming.
2. To Understand fundamentals of Data Structures in python programming
3. To learn object-oriented programming , including defining classes, invoking methods, using class libraries, etc. using python
4. To develop skills of finding solutions and building applications using python programming..

Outcomes:

After learning the course, the students should be able to:

1. Demonstrate the use of the built-in data structures like List, Tuples, Set and Dictionaries, Strings
2. Identify & Implement exception handling in Java.
3. Implement Object Oriented concepts.
4. Demonstrate the use of exception handling for given problem.
5. Execute various operations on Files.
6. Implement Database operations using python programming

Detailed Syllabus:

Unit	Description	Duration
1.	**Introduction to Python and Data Structures in Python** Introduction to Python. Different types of Python Why Python Setting up the Environment. Variables, Data Types, Decision Making, Loops, Numbers, Strings **Data Structures in Python** List Tuples Set Dictionaries	**8**
2.	**Functions and Modules** Built-in Functions User Defined Functions Importing modules	**5**

	DateTime Module Math Module String Module Random Module	
3.	**Exception Handling using Python** Introduction to Syntax, Errors, Exceptions Handling Exceptions User defined exceptions Clean up actions (Try … Catch…Finally) Predefined Clean up actions	**5**
4.	**I/O and File Handling using Python** Input functions Output Formatting Reading and Writing Files Reading and Writing to Binary Files Reading and Writing to CSV Files	**5**
5.	**Introduction to Object Oriented Concepts** Object Oriented concepts Python Scopes and Namespaces Classes and Objects Inheritance Polymorphism	**5**
6	**MySQL with Python** Installation of MySQLdb Database Connections Creating Database and Tables CRUD Operations Transactions	**8**
	Total	**36**

Reference Books:

1. Learning Python By Mark Lutz,O'Reilly Publication
2. Programming with python, A users Book, Michael Dawson, Cengage Learning
3. Python Essential Reference, David Beazley, Third Edition
4. Python Bible

Program:	MCA (First Year)			Semester : II			
Course :	Business Statistics			Code : MCA2202			
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial / Activity	Credit	CE	MTE	ETE	Total
3	-	1	4	20	30	50	100

Pre-requisite:

- Basic Mathematics
- Basic of Probability and Probability Distribution.

Objectives:

1. To learn the basics of business decision-analysis.
2. To summarize business data numerically and graphically.
3. To understand the importance of business sampling methods, and be able to describe different business sampling methods.
4. To understand the process associated with statistical decisions, defining and formulating problems, analyzing the data, and using the results in decision making.

Outcomes:

After learning the course, the students should be able to:

1. Understand the concepts of statistics
2. Apply the concept of Measures of Central Tendency and Dispersion
3. Know the association between the attributes.
4. Demonstrate understanding of the concepts of time series and its applications in different areas.
5. Apply the proper technique to find the solution for the problem, based on the acquired knowledge of sampling technique and testing.
6. Conduct basic statistical analysis of data.

Detailed Syllabus:

Unit	Description	Duration
1.	**Introduction to statistics** Importance of statistics in modern business environment Definition of statistics, importance, scope and applications Characteristics of statistics, Functions of Statistics, Limitations Need of Data, Types Of Data Principles of Measurement, Source of Data Data classification, Tabulation And presentation	5
2.	**Measures Of Central Tendency and Dispersion** Introduction, Objectives of Statistical average Requisites of a Good Average Statistical Averages- Arithmetic Mean Properties Of AM ,**range and standard deviation**	5
3	**Sampling, Sampling Distributions And Testing**	6

	Introduction ,Population And Sample-Universe of Population Types Of Population- Sample, Advantages of Sampling Sampling Theory- Types Of Sampling ,Central Limit Theorem	
4.	**Testing Of Hypothesis In case of Large and Small Samples** Introduction Testing Hypothesis Two Tailed Test with case study Classification Of Test statistics Testing of Hypothesis in case of Small samples t distribution, uses of 't' test F-Test and chi square proportion test, large and small testing, Sample mean with population , two sample mean and proportion	**7**
5.	**Simple Correlation And Regression** Introduction Correlation-Types of Correlation-measures of correlation- Properties Of Karl Pearson's correlation coefficient Spearman's Rank Correlation coefficient Regression- Regression analysis	**6**
6.	**Time Series Analysis** Introduction Utility of the time series Components of Time Series Methods of measuring trend Method of least squares Mathematical Models of Time series Forecasting methods using time series	**7**
	Total	**36**

Reference Books:

1.Business Statistics, J. K. Sharma, Pearson Education-2nd Edition
2. Business Statistics, Naval Bajpai, Pearson Education-2nd Edition
3. The Art of Computer systems Performance Analysis, Raj Jain, Wiley India Pvt Ltd,
4. Complete Business Statistics, Amir Aczel, Jayavel Sounderpandian, (Seventh Edition), Tata McGraw-Hill Education Pvt. Ltd - 2012
5. Business Statistics Theory and Applications, by Jani P.N , PHI
6. Probability and Statistics, J.L.Devore, 8th Edition, Brooks/Cole, Cengage Learning (2012)

Reference website :

https://atozmath.com/
https://www.analyticsvidhya.com/

List of Tutorials / Activities:

1. Tutorial on Importance of statistics
2. Tutorial on Measures Of Central Tendency
3. Tutorial on Sample Distribution
4. Tutorial on Testing Hypothesis
5. Tutorial on Simple Correlation and Regression
6. Tutorial on Time Series Analysis

Program:	MCA (First Year)			Semester : II			
Course :	Entrepreneurship Development			Code : MCA2302			
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial / Activity	Credit	IE-1	IE-2	ETE	Total
3	-	1	4	20	30	50	100

Pre-requisite:
PPMOB

Objectives:

1. To develop entrepreneurship awareness
2. To inculcate entrepreneurial mindset into the minds of young professionals
3. To identify entrepreneurial opportunities
4. To leverage managerial & leadership skills for founding, leading & managing startups

Outcomes:

After learning the course, the students should be able to:

1. Recognize traits and factors influencing development of entrepreneurship as a profession
2. Discuss the relevance of entrepreneurship as a means of management practice
3. Describe the financial support system for entrepreneurship
4. Summarize the role of Government and various support organizations in encouraging and supporting Entrepreneurship
5. Describe the skill sets required for successful Entrepreneurship

Detailed Syllabus:

Unit	Description	Duration
1	**Unit – 1: Introduction to Entrepreneurship** Meaning, Definition and concept of Enterprise, Entrepreneurship Development, Evolution of Entrepreneurship, Theories of Entrepreneurship, motivation theories- McClelland's Need Achievement Theory, Concepts of Intrapreneurship, Entrepreneur v/s Intrapreneur, Entrepreneur Vs. Manager, Role of Entrepreneurship in Economic Development, Factors affecting Entrepreneurship, Problems of Entrepreneurship	5
2	**Unit – 2: The Entrepreneur:** The skills required to be an entrepreneur, the entrepreneurial decision process, and role models, mentors and support system Women Entrepreneurs: Challenges to Woman Entrepreneurs, Achievements of Woman Entrepreneurs, Role Models of Woman Entrepreneurs. Concept of Social Enterprise and Social Entrepreneurship, Social Entrepreneurs, Rural Entrepreneurship, Family Business Entrepreneurship. Concepts of Entrepreneurship Failure, Issues of Entrepreneurial failure,	7

	Reasons of Entrepreneurial Failure, Essentials to Avoid Unsuccessful Entrepreneurship.	
3	**Unit – 3 Role of government and Institutional Support** Role of Government in promoting Entrepreneurship, MSME policy in India, Start up India, Make in India schemes Agencies for Policy Formulation and Implementation: District Industries Centers (DIC), Small Industries Service Institute (SISI), Entrepreneurship Development Institute of India (EDII), National Institute of Entrepreneurship & Small Business Development (NIESBUD) Role of Government in ED, various schemes - PMEGP, CGTMSE, PMKVY, Mudra loan Incubation, Role of Incubation Centers, Support from Incubation centers Role of Mentors , Role of consultancy organizations in promoting Entrepreneurs	6
4	**Unit – 4 The Financial Road Map:** Financial Support System: Forms of Financial support, Long term and Short term financial support, Sources of Financial support, Development Financial Institutions, Investment Institution Planning/Budgeting, Developing a financial roadmap, How to budget for startup success, sources of funding, Informal capital– Friends & Family, MPDA, SFURTI. Crowd funding, Venture capital, Private Equity, Financing Mix The Pitch, Preparing for your investor presentation, Elements of the perfect investment pitch Role of Commercial Banks - SIDBI, NABARD, EXIM Bank and Other Agencies; Institutional Assistance for Small Enterprises	6
5	**Unit – 5 Enterprise Promotion:** Creating Entrepreneurial Venture, Business Planning Process, The business plan as an entrepreneurial tool, Elements of Business Plan, Objectives, Market Analysis, Development of product / idea - Resources, Capabilities, and strategies, Opportunity Analysis, SWOT analysis, Internal and External Environment Analysis, Industry Analysis,	7

	Marketing management: 7 Ps of marketing	
6	**Unit – 6 Skills For Successful Entrepreneurs:** Communication Skills, Creativity and Problem solving, Innovation, Negotiation Skills, Risk management Case Study of Successful Entrepreneurs Cases of Tata, Birlas, Kirloskar and new generation entrepreneurs in India	5
	Total	**36**

Reference Books:

1. Dynamics of Entrepreneurship Development – Vasant Desai.
2. Entrepreneurship: New Venture Creation – David H. Holt
3. Entrepreneurship Development New Venture Creation – Satish Taneja, S.L.Gupta
4. Project management – K. Nagarajan.
5. Entrepreneurship Development and small business management – Poornima M. Charantimath
6. Innovation and Entrepreneurship – Peter F. Drucker

List of Activities:

1. Activity Based on Challenges of Entrepreneurship
2. Activity on Marketing Management
3. Activity on Development of Idea
4. Activity based on Skill set required for successful Entrepreneurship
5. Activity based on Financial Roadmap
6. Activity based on Creativity and Problem solving

Program:	MCA (First Year)			Semester : II			
Course :	Web Technology Lab			Code : MCA2409			
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	CE	MTE	ETE	Total
-	2	-	1	-	-	-	-

Pre-requisite:

- Object Oriented Concepts
- C++ Programming
- Basics of Networking
- SQL

Objectives:

1. To develop static web pages using HTML 5 and CSS 3
2. To perform form validations using JavaScript and Regular Expressions
3. To use various jQuery features to develop web pages
4. To perform CRUD operations using PHP

Outcomes:

After learning the course, the students should be able to:

1. Use HTML tags to create the structure of web page.
2. Apply CSS properties to design the web page.
3. Use JavaScript and jQuery to perform the form validations and make the pages interactive (client side programming).
4. Build dynamic web pages with various features of PHP

Detailed Syllabus:

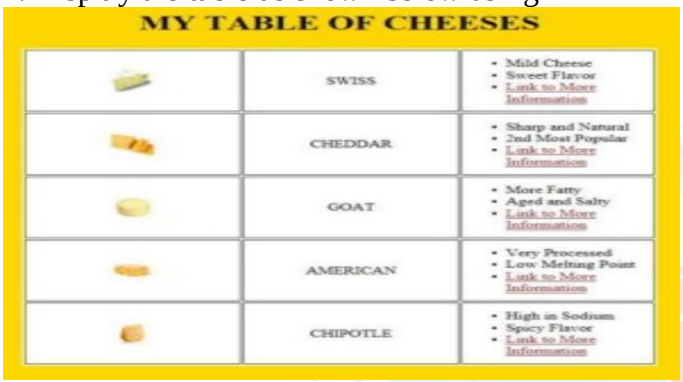
Unit	Description	Duration
1.	**HTML5** Assignments based on Table, Form, Audio and Video, Geolocation, Canvas	4
2.	**CSS** Assignments based on Border, Font, Text, Color, Position, Transition, Transformation	4
3.	**JavaScript** Assignments based on array, string, date, document, form validation	4
4.	**jQuery** Assignments based event handling, effects, animation, form validation	3
5.	**Basics of PHP** Assignments based form handling, object oriented concepts	4
6.	**Advanced PHP** File handling, database management, email, state management	5
	Total	24

Reference Books:

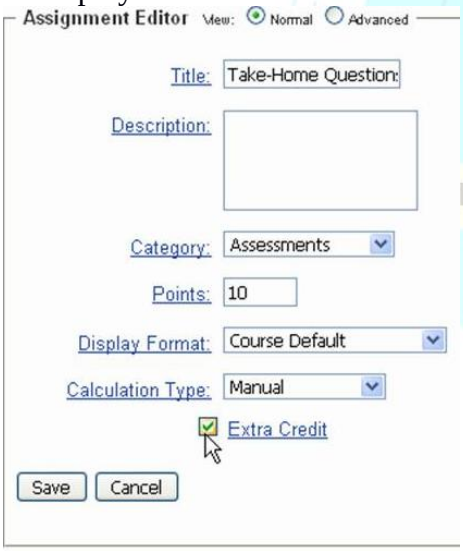
- Pro HTML 5 Programming, Apress Publication
- Pro CSS3 Layout Techniques, Apress Publication
- Professional JavaScript for Web Developers, Wiley Publication
- Learning jQuery, Packt Publication
- PHP for Absolute Beginners, Apress Publication
- Professional PHP 6, Wiley Publication

List of Experiments:

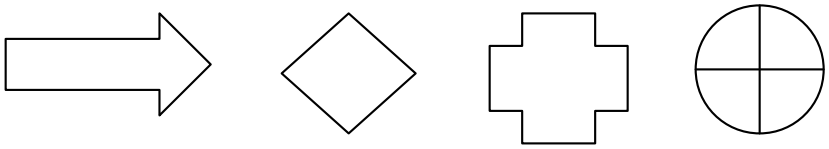
1. Display the table as shown below using HTML



2. Display the form as shown below

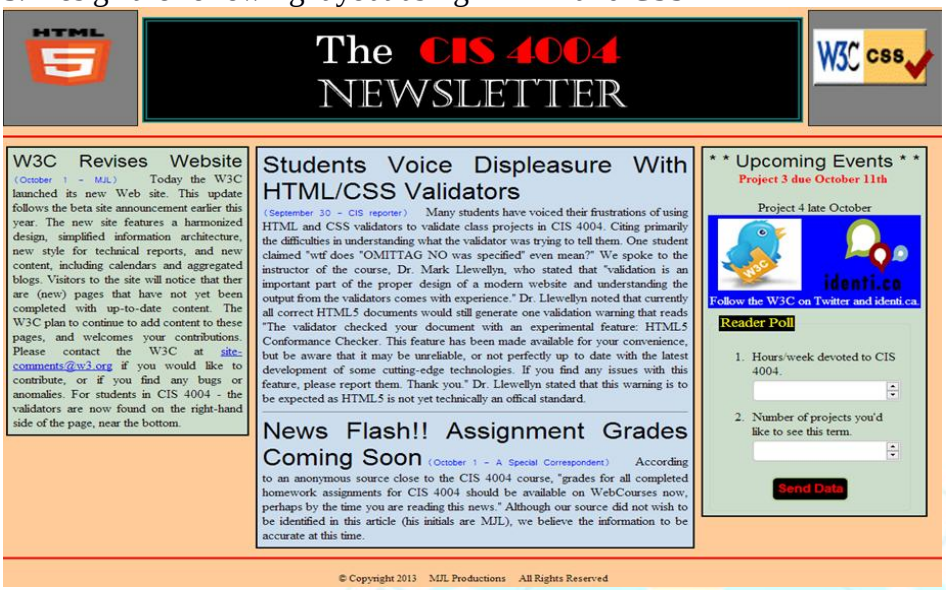


3. Write program to display following shapes on Canvas



4. Write program to display user location on map.

5. Design the following layout using HTML and CSS



6. Demonstrate transition, transformation and animation using CSS.

7. Write a program in JS to count the number of images in a document.

8. Write JS program to change background color of element of your choice.

9. Write a JavaScript code for accepting name and mobile number from user. (use validations). Required Validations are : Name text field should not accept numbers, special characters, alphanumeric characters, length should be 20 characters. Mobile number text field should not accept characters, special characters, alphanumeric characters, length should be 10 digits.

10. Write a program do design registration form and validate the details using regular expression (Assume at-least five different validation criteria for the entire form).

11. Write program using jQuery to toggle background color of an element on double click.

12. Write jQuery code to find the position of the mouse pointer relative to the left and top edges of the document.

13. Convert three headers and content panels into an accordion. Initialize the accordion and active the second option.

14. Create a simple jQuery UI Datepicker. Now pick a date and store it in a textbox.

15. Write PHP scripts for insert the record into database. Assume suitable data.

16. Write PHP scripts for Retrieve the record from the database. Assume suitable data.

17. Write PHP scripts for update specific record in database. Assume suitable data.

18. Write PHP scripts for Delete specific record from database. Assume suitable data.

19. Design registration form and write PHP scripts to display the details on different page using $_GET or $_POST.

20. Write a PHP scripts for following operation
- Create a Test.txt file.
- Insert contents in the file
- Read and display the contents from the file.

Program: MCA				**Semester :**			**II**
Course : Python Programming Lab				**Code :**			MCA2411
Teaching Scheme				**Evaluation Scheme**			
Lecture	**Practical**	**Tutorial**	**Credit**	**IE-1**	**IE-2**	**ETE**	**Total**
-	2	-	1	-	-	-	-

Pre-requisite:

- Basic Programming Concepts
- C Programming
- Object Oriented Programming Using CPP
- Logical Thinking

Objectives:

1. To learn about the concepts and principles of Python Programming.
2. To Understand fundamentals of Data Structures in python programming
3. To learn object-oriented programming , including defining classes, invoking methods, using class libraries, etc. using python
4. To develop skills of finding solutions and building applications using python programming.

Outcomes:

After learning the course, the students should be able to:

1. Demonstrate the use of the built-in data structures like List, Tuples, Set and Dictionaries, Strings
2. Identify & Implement exception handling in Java.
3. Implement Object Oriented concepts.
4. Demonstrate the use of exception handling for given problem.
5. Execute various operations on Files.
6. Implement Database operations using python programming.

Detailed Syllabus:

Unit	Description	Duration
1.	**Unit 1 : Introduction to Python and Data Structures in Python** Assignment Based on Basic Python Programming Assignment Based on Data Structures	4
2.	**Unit 2 : Functions and Modules** Assignment based on Functions Assignment based on Modules	4
3.	**Unit 3 : Exception Handling using Python** Assignment based on Exception Handling	4
4.	**Unit 4 : I/O and File Handling using Python** Assignment based on IO and File Handling	4
5.	**Unit 5 : Introduction to Object Oriented Concepts** Assignment based on Object Oriented Concepts	4
6.	**Unit 6 : MySQL with Python** Assignment based on MySQL	4
	Total	**24**

Reference Books:

1. Learning Python By Mark Lutz,O'Reilly Publication
2. Programming with python, A users Book, Michael Dawson, Cengage Learning
3. Python Essential Reference, David Beazley, Third Edition
4. Python Bible

List of Experiments :

1. Write a python program to find the square root of the entered number.
2. Write a Python Program to find Armstrong number
3. Python Program To Display Powers of 2 Using Anonymous Function
4. Python Program to Convert Decimal to Binary Using Recursion
5. Write a Python Program which will Generate a randomly selected element from range(start, stop, step)
6. Write a program which will find all such numbers which are divisible by 7 but are not a multiple of 5, between 2000 and 3200 (both included). The numbers obtained should be printed in a comma-separated sequence on a single line.
7. Write a Python program to count the number of characters (character frequency) in a string.
8. Write a Python program to get a string made of the first 2 and last 2 chars from a given string. If the string length is less than 2, return instead of the empty string.
9. Write a Python program to get a string from a given string where all occurrences of its first char have been changed to '$', except the first char itself.
10. Write a Python program to add 'ing' at the end of a given string (length should be at least 3). If the given string already ends with 'ing' then add 'ly' instead. If the string length of the given string is less than 3, leave it unchanged.
11. Write a Python program to sum all the items in a list.
12. Write a Python program to get the largest and smallest number from a list.
13. Write a Python program to count the number of strings where the string length is 2 or more and the first and last character are the same from a given list of strings.
14. Write a Python program to get a list, sorted in increasing order by the last element in each tuple from a given list of non-empty tuples.
15. Write a Python program to convert a tuple to a string.
16. Write a Python program to get the 4th element and 4th element from last of a tuple.
17. Write a Python program to reverse a tuple.
18. Write a Python program to find maximum and the minimum value in a set.
19. Write a Python program to use of frozensets.
20. Write a Python program to create a shallow copy of sets.
21. Write a Python program to create a union of sets
22. Write a Python program to convert a dictionary to OrderedDict.
23. Write a Python program to replace dictionary values with their sum.
24. Write a Python program to sort Counter by value.
25. Write a Python program to get the top three items in a shop.
26. Write a Python program to perform CRUD operations on data in a file.

27. Write a Python program to copy the contents of a file to another file .
28. Write a Python class to reverse a string word by word.
29. Write a Python class named Rectangle constructed by a length and width and a method which will compute the area of a rectangle.
30. Write a Python class named Circle constructed by a radius and two methods which will compute the area and the perimeter of a circle.
31. Write a Python class named Circle constructed by a radius and two methods which will compute the area and the perimeter of a circle.
32. Write a Python Program to perform CRUD Operation using SQLite Database.

Program Elective Course – 1

Program: MCA (First Year)				**Semester : II**			
Course : Design and Analysis of Algorithm				**Code :** MCA2501			
Teaching Scheme				**Evaluation Scheme**			
Lecture	**Practical**	**Tutorial**	**Credit**	**IE-1**	**IE-2**	**ETE**	**Total**
3	-	-	3	20	30	50	100

Pre-requisite:

- Programming fundamentals and elementary data structures
- Summation formula and recurrences in mathematics

Objectives:

1. To learn an algorithms and methods used in computer science to create strong logic and problem solving approach in students.
2. To Reinforce basic design concepts (e.g., pseudo code, specifications, top-down design) knowledge of algorithm design strategies familiarity with an assortment of important algorithms.
3. To analyze time and space complexity of an algorithm.
4. To understand the applications of various design strategies of algorithms.

Outcomes: After learning the course, the students should be able to:

1. Apply design principles and concepts to algorithm design
2. Have the mathematical foundation in analysis of algorithms
3. Understand different algorithmic design strategies
4. Analyze the efficiency of algorithms using time and space complexity theory.

Detailed Syllabus

Unit	**Description**	**Duration**
1	**Foundations:** Principles of Algorithm Design, Asymptotic complexity, Analysis of Algorithms, Heap and Heap Sort Algorithm.	**6**
2	**Divide and Conquer:** Control Abstraction of Divide and Conquer Strategy, Binary Search Techniques, Algorithm of Quick Sort and Merge Sort.	**6**
3	**Greedy Method:** Control Abstraction of Greedy Method, Knapsack problem using Greedy Method, Minimal Spanning Trees-Prim's and Kruskal's Algorithm, Single Source shortest path algorithm-Dijkstra's algorithm.	**8**
4	**Dynamic Programming :**Control Abstraction of Dynamic Programming, Applications of Dynamic Programming in Traveling Salesperson Problem, 0/1 Knapsack, Multistage Graph Problem.	**8**
5	**Backtracking:** Strategy of Backtracking**,** 0/1 Knapsack, N- Queen's problem, Graph Coloring Problem.	**5**
6	**Introduction to complexity theory**: Tractable and intractable problems, classes P and NP, NP-completeness, standard NP-complete problems.	**3**
	Total	**36**

Reference Books:

1. Bressard, "Fundamental of Algorithm." PHI
2. Horowitz/Sahani, "Fundamentals of computer Algorithms", Galgotia.
3. Magnifying Data Structures, Arpita Gopal : PHI Publications
4. Thomas H Cormen and Charles E.L Leiserson, "Introduction to Algorithm" PHI
5. A. V. Aho and J.D. Ullman, "Design and Analysis of Algorithms", Addison Wesley
6. Herbert Edelsbrunner Design and Analysis of Algorithms.
7. Parag H. Dave Design and Analysis of Algorithms, Pearson Education India

Program:	MCA (First Year)			Semester : II			
Course :	Web Development with Java			Code : MCA2502			
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	CE	MTE	ETE	Total
3	-	-	3	20	30	50	100

Pre-requisite:

- Java Programming
- Database Management System
- HTML

Objectives:

1. To apply concepts of Java Programming to write and develop web application
2. To apply java programming constructs like Networking and RMI to write and develop application.
3. To develop web application using Servlet and JSP.

Outcomes:

After learning the course, the students should be able to:

1. **Describe** Programming Constructs and features of Java like Networking and RMI.
2. **Use** the programming constructs and features like Networking and RMI to write a Java Program.
3. **Develop** the Java application by applying the programming constructs and features like Networking and RMI.
4. **Describe** the features of Servlet and JSP using Java.
5. **Develop** the web application based on JSP, Servlet with Data base connectivity.

Detailed Syllabus

Unit	Description	Duration
1	**Networking with Java & Remote Method Invocation:** Networking basics, Java.net package with classes and interfaces, Client Server Applications. Connection Oriented and Connection less communication. Creating TCP/IP based Client Server Application using Java. Creating UDP based Client Server Application Using Java.	6
2.	**Java Database Connectivity:** Introduction, JDBC Architecture, Types of JDBC Drivers, Steps to create JDBC application, Types of Statements: Statement, PreparedStatement, CallableStatement. Types of ResultSet: Scrollable & Updateable. Inserting, Updating, Selecting, Deleting data from database. Creating GUI JDBC applications.	6
3.	**Java Servlet:** Introduction, Servlet Life Cycle, HTTP protocols and HTTP methods,	6

	Web Server and Web container, Types of Servlets: Generic and HTTP, Writing and Execution Simple Servlets. Session Tracking using Servlet. Servlet Config and Servlet context. Introduction to Beans, using beans component with Servlet.	
4.	**Data base application using Servlet:** Handling Request and Response of Servlet, Handling Get(), Post() methods through Servlet. Creating Servlet Application which handling Client Requests. Creating data base application using Servlet. HTTP Sessions, Cookies	**6**
5.	**Java Server Pages (JSP):** Introduction, JSP programming structures, JSP Directives, JSP Actions, Writing Simple JSP Applications with HTML. Default objects of JSP. Handling Default objects through JSP applications.	**6**
6.	**Data base application using JSP:** Session Tracking in JSP, Handling request and response objects of JSP, Creating JSP application with data base operations, Creating JSP-Servlet Applications.	**6**
	Total	**36**

Reference Books:

1. Complete Reference- J2EE Jim Keogh, TMH
2. Inside Servlets Dustine R. Callway, Pearson pub.
3. Complete reference JSP, TMH.
4. Inside Servlets Dustine R. Callway, Pearson pub.
5. JDBC, Servlet and JSP, Black Book, Santosh Kumar K. Dremtech publication

Program: MCA (First Year)					**Semester: II**		
Course : Data warehouse and Data Mining					**Code: MCA2503**		
Teaching Scheme				**Evaluation Scheme**			
Lecture	**Practical**	**Tutorial**	**Credit**	**IE-1**	**IE-2**	**ETE**	**Total**
3	-	-	**3**	**20**	**30**	**50**	**100**

Pre-requisite: DBMS, Data Structure

Objectives:

1. To Study data warehouse architectures, OLAP and the project planning aspects in building a data warehouse
2. To introduce the concepts, techniques, design and applications of data warehousing and data mining.
3. To enable students to understand and implement classical algorithms in data mining
4. To understand how to analyze the data, identify the problems, and choose the relevant algorithms to apply

Outcomes: After completion of this course, the students would be able to

1. Understand techniques of preprocessing various kinds of data.
2. Describe Data warehouse concepts and organize data in multidimensional schema models.
3. Apply Association Mining Techniques on large dataset
4. Apply various classification Techniques on large dataset
5. Apply various Clustering Techniques on large dataset

Detailed Syllabus:

Unit	Description	Duration
1	**Data Pre-processing:** Data Objects, attribute types, descriptions of data, Measuring Data similarity and dissimilarity. Data Pre-processing- Data cleaning: Missing values, Noisy Data, Data Cleaning as a process , Data Integration: Entity identification problem, Redundancy – correlation analysis, Tuple duplications, Data value conflict detection & resolution , Data reduction and Data Transformation	**6**
2	**Data Warehouse Fundamentals:** Define Data Warehouse, OLTP Systems; Differences between OLTP Systems and Data Warehouse, Architecture of Data warehouse, Characteristics of Data Warehouse, Top- Down and Bottom-Up Development Methodology. Applications of Data Warehouse.	**6**
3	**Dimensional Modeling:** Dimensional Modeling: E-R Modeling vs Dimensional Modeling, Data Warehouse Schemas: Star Schema, Snowflake Schema, and Fact Constellation Schema. OLAP and operations on Multidimensional Database: Roll-Up , Roll-Down, Dice, Slice and Pivot	**6**
4	**Introduction to Data Mining and Association Rules** Concept of Data Mining, Predictive & Descriptive	**6**

	Mining,KDD,Architecture for Data Mining. Applications of Data Mining. Define Association Rule, Representations of Items for Association Mining, Metrics to Evaluate the Strength of Association Rules**:** Support, Confidence and Lift, Apriori Algorithm and Frequent-pattern Tree Algorithm to find frequent item set and strong association rules.	
5	**Classification :** Introductions to classification and Prediction, Types of Classification,Input and Output Attributes, Guidelines for Size and Quality of the Training Dataset Building Decision Tree using Gini Index Method, Naïve Bayes Classification, k-Nearest-Neighbor Classifiers (Lazy Learners), Metrics to Assess the Quality of Classifiersin terms ofTrue Positive, False Positive, True Negative and False Negative, Precision, Recall and F-Measure. A case study to classify a sample data set.	**6**
6	**Clustering :** Introduction to Cluster Analysis, Applications of Cluster Analysis, Desired Features of Clustering, **Distance Metrics:**Euclidean distance, Manhattan distance and Chebyshev distance. Major Clustering Methods/Algorithms-**Partition Clustering** : k-means clustering, Issues with the k-means algorithm, **Hierarchical clustering:** Agglomerative clustering and Divisive clustering, **Density-Based Methods**: DBSCAN Algorithm ,Strengths and Weakness of DBSCAN Algorithm Outlier Analysis, A case study on finding efficient Clusters on sample data set.	**6**
	Total	**36**

Recommended Books:

1. Data Mining Concepts and Techniques By J. Han, M. Kamber , Morgan Kaufmann
2. Data Warehousing Fundamentals ByPaulrajPonnian,John Willey.
3. Data Mining Techniques By Arun K pujari,Universities Press
4. Introduction to Data Mining with Case Studies By G.K.Gupta, PHI
5. Data Mining: Concepts and Techniques By Han,Elsevier
6. Data Mining and Data Warehousing : Principles and Practical Techniques By Parteek Bhatia

Program:	MCA (First Year)			**Semester : II**			
Course :	Design Thinking and Problem Solving			**Code :** MCA2504			
Teaching Scheme				**Evaluation Scheme**			
Lecture	**Practical**	**Tutorial**	**Credit**	**IE-1**	**IE-2**	**ETE**	**Total**
3	-	-	3	20	30	50	100

Pre-requisite:

- Problem solving skill
- New idea generation skill

Objectives:

1. To understand the notions of Design Thinking and People Centered Design.
2. To initiate a new working culture based on a user-centric approach, empathy, ideation, prototyping, and playful testing.
3. Understand the terminology and conceptual models used in design disciplines
4. Expand students' thinking about design and innovation beyond the design and development of new products
5. Strengthen students' individual and collaborative capabilities to identify customer needs,

Outcomes: After learning the course, the students should be able to:

1. Understand how the design thinking process is.
2. Apply design thinking to the problems in order to generate innovative and user-centric solutions.
3. Make use of practical design thinking methods in every stage of the problem,
4. Generate and develop design ideas through different techniques
5. Generate and develop design ideas through different technique
6. Participate in and lead innovation in creative and collaborative settings

Detailed Syllabus

Unit	**Description**	**Duration**
1	**Introduction :** Introduction to design thinking and creativity, Team project framing	**6**
2	**Overview of design thinking framework**: Rapid collaboration and rapid prototyping, Reframing problems and creating human centered design challenges.	**6**
3	**Wicked Problems in Design :**The Ethics of Design Interventions ,Design Needs in Education, Health & Society	**8**
4	**Interpretation:** Point of View & Problem Reframing , Developing Grounded Theory	**8**
5	**Ideation:** Generating and Developing Ideas, Creativity as Teaching and Learning	**5**
6	**Evolution and Documenting Design:** Express, Test, Cycle: Iterate Without Starting Over **Cycles of Design Learning**, **Representing design knowledge**	**3**
	Total	**36**

Reference Books:

1. John.R.Karsnitz, Stephen O'Brien and John P. Hutchinson, "Engineering Design", Cengage learning (International edition) Second Edition, 2013.
2. Yousef Haik and Tamer M.Shahin, "Engineering Design Process", Cengage Learning, Second Edition, 2011.
3. Cross, Nigel. Design Thinking: Understanding How Designers Think and Work. Oxford: Berg, 2011. On reserve at the Bio-Med Library.
4. Bennett, Kevin. "Design Thinking: Creating a Better Understanding of Today to Get to a Better Tomorrow."
5. Martin, Roger L. "The innovation catalysts." *Harvard Business Review* 89(6) (2011): 82-87. Available online through the U of M libraries.

Program:	MCA (First Year)			**Semester : II**			
Course :	Design and Analysis of Algorithm Lab			**Code :** MCA2505			
Teaching Scheme				**Evaluation Scheme**			
Lecture	**Practical**	**Tutorial**	**Credit**	**IE-1**	**IE-2**	**ETE**	**Total**
-	2	-	1	-	-	-	-

Pre-requisite:

- Programming fundamentals
- Loops, Functions, Pointers, Arrays, Memory Allocation, Recursion

Objectives:

1. To analyze the asymptotic performance of algorithms.
2. To demonstrate a various algorithms and data structures.
3. To apply algorithmic design paradigms and methods of analysis.
4. To build efficient programming skills in students

Outcomes : After learning the course, the students should be able to:

1. To analyze the asymptotic performance of algorithms.
2. To demonstrate a various algorithms and data structures.
3. To apply dynamic programming algorithmic design paradigms on various applications.

To apply the Greedy method and Backtracking for problem solving.

Detailed Syllabus:

Unit	**Description**	**Duration**
1	**Foundations:** Concepts of Linear Sorting, Demonstration and Assignment based on Sorting.	**4**
2	**Divide and Conquer:** Concept of Quick, Merge sort and Searching. Demonstration and Assignment based on Sorting and Searching.	**4**
3	**Greedy Method:** Concept of Knapsack problem using Greedy Method, Minimal Spanning Trees-Prim's and Kruskal's Algorithm, Single Source shortest path algorithm-Dijkstra's algorithm. Demonstration and Assignment based on Greedy method.	**4**
4	**Dynamic Programming :**Concept of Traveling Salesperson Problem, 0/1 Knapsack, Multistage Graph Problem. Demonstration and Assignment based on Dynamic Programming.	**4**
5	**Backtracking:** Concept of 0/1 Knapsack, N- Queen's problem, Graph Coloring Problem. Demonstration and Assignment based on Backtracking	**4**
6	**Introduction to complexity theory**:. Concept of complexity and Assignment based on Backtracking as Graph Coloring Problem with complecity.	**4**
	Total	**24**

Sr.No.	**Experiments**	**Duration**
1	Assignment based on Linear Sorting Techniques	**2**
2	Assignment based on Divide and conquer methods (Quick and Merge Sort)	**2**

3	Assignment based on Sequential Search and Binary Search	**2**
4	Assignment based on Greedy strategy (Knapsack Problem and Spanning Tree)	**2**
5	Assignment based on Greedy strategy (Knapsack Problem and Spanning Tree)	**2**
6	Assignment based on Greedy strategy(Single Source shortest path algorithm-Dijkstra's algorithm)	**2**
7	Assignment based on Dynamic Programming(0/1 Knapsack)	**2**
8	Assignment based on Dynamic Programming(TSP)	**2**
9	Assignment based on Dynamic Programming(Multistage Graph Problem)	**2**
10	Assignment based on Backtracking(Tic Tac Toe)	**2**
11	Assignment based on Backtracking(N- Queen's problem)	**2**
12	Assignment based on Backtracking(Graph Coloring Problem.)	**2**
	Total	**24**

Reference Books:

1. Bressard, "Fundamental of Algorithm." PHI
2. Horowitz/Sahani, "Fundamentals of computer Algorithms", Galgotia.
3. Magnifying Data Structures, Arpita Gopal : PHI Publications
4. Thomas H Cormen and Charles E.L Leiserson, "Introduction to Algorithm" PHI
5. A. V. Aho and J.D. Ullman, "Design and Analysis of Algorithms", Addison Wesley
6. Herbert Edelsbrunner Design and Analysis of Algorithms.
7. Parag H. Dave Design and Analysis of Algorithms, Pearson Education India

Program:	MCA (First Year)			Semester : I			
Course :	Web Development with Java Lab			Code : MCA2506			
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	IE-1	IE-2	ETE	Total
-	2	-	1	-	-	-	-

Pre-requisite:

- Java Programming
- Database Management System
- HTML

Objectives:

1. To apply concepts of Java Programming to write and develop web application
2. To apply java programming constructs like Networking and RMI to write and develop application.
3. To develop web application using Servlet and JSP.

Outcomes:

After learning the course, the students should be able to

1. **Use** the programming constructs and features like Networking and RMI to write a Java Program.
2. **Develop** the Java application by applying the programming constructs and features like Networking and RMI.
3. **Develop** the web application based on JSP, Servlet with Data base connectivity.

Detailed Syllabus:

Unit	Description	Duration
1	**Unit-1: Networking with Java & Remote Method Invocation** Demonstration of Network programming and Remote Method Invocation Programming with Client Server Application. Assignment based on Networking and Remote Method Invocation	4
2	**Unit-2: Java Database Connectivity** Demonstration of Java Database connectivity. Assignment based on Java Database connectivity	4
3	**Unit-3: Java Servlet** Demonstration of Java Servlet programs. Assignment based on Java Servlet.	4
4	**Unit-4: Data base application using Servlet** Demonstration of Database application using Servlet. Assignment based on data base application using Servlet.	4
5	**Unit-5: Java Server Pages (JSP)** Demonstration of JSP Application based on JSP	4

6	**Unit-6: Data base application using JSP** Demonstration of JSP with data base handling. Application based on JSP with database handling.	4
	Total	**24**

Reference Books:

1. Complete Reference- J2EE Jim Keogh, TMH
2. Inside Servlets Dustine R. Callway, Pearson pub.
3. Complete reference JSP, TMH.
4. Inside Servlets Dustine R. Callway, Pearson pub.
5. JDBC, Servlet and JSP, Black Book, Santosh Kumar K. Dremtech publication

List of Experiments:

1. Programs based on Java Networking
2. Programs based on RMI
3. Programs based on Java Database Connectivity
4. Programs based on creating simple Servlet.
5. Programs based on creating Servlet with data base connectivity
6. Programs based on creating Servlet with Session handling
7. Programs based on creating beans component with Servlet
8. Programs based on creating simple JSP applications.
9. Programs based on creating JSP application with Default Objects
10. Programs based on Request and Response objects of JSP
11. Programs based on data base application with JSP
12. Programs based on session handling with JSP.

Program: MCA (First Year)				**Semester : II**			
Course : Data Warehouse and Data Mining Lab				Code: MCA2507			
Teaching Scheme				**Evaluation Scheme**			
Lecture	**Practical**	**Tutorial**	**Credit**	**IE-1**	**IE-2**	**ETE**	**Total**
-	2	-	1	-	-	-	-

Pre-requisite:

DBMS and Basic SQL Queries

Objectives:

1. To design database for a mini warehouse system
2. To learn various data mining techniques to analyze the data for decision making.

Outcomes:

After learning the course, the students should be able to:

1. Use Data warehouse and Data Mining Tools- Tableau, MS Excel, Oracle and Weka for data Analysis
2. Design Multidimensional database and perform various OLAP Operations
3. Apply Association Mining, Clustering and Classification Algorithms to a given dataset.

Detailed Syllabus:

Unit	Description	Duration
1	Working with a Dataset using Data warehouse and Data Mining Tools : Tableau, R / Weka / Orange, Oracle , MS Excel	4
2	**Multidimensional Database :** Create multi-dimensional database for a mini data warehouse problem using Star Schema Model or Snowflake Schema Model.	4
3	**OLAP and Operations On OLAP** Perform various operations onMultidimensional Database: Roll-up, Roll-Down, Dicing, Slicing, Pivot, Ad-hoc Queries.	4
4	**Association Rule Mining:** Implementing Association Mining with Weka, Applying the Apriori Algorithm in Weka on a Real World Dataset, Rules Generation, Applying the Apriori Algorithm on a Numeric Dataset/ Categorical Dataset. Setting Support Count and Confidence to find strong Association Rules	3
5	**Clustering** Implementing Clustering with Weka , Clustering Fisher's Iris Dataset with the Simple k-Means Algorithm , Results Analysis after Applying Clustering, Identification of centroids for each cluster, Concept of within cluster sum of squared error, Identification of the optimum number of clusters using within cluster sum of squared error , Apply J48 on the clustered dataset.	5
6	**Classification** Implementing Classificationusing Weka, Understanding the decision tree, Interpreting results, Using rules for prediction, Applying Naïve Bayes algorithm to a sample dataset. Creating the Testing Dataset.	4
	Total	24

Reference Books:

1) Bulding the Data Warehouse 4 Edition By W. H. Inmon
2) Data Mining and Data Warehousing : Principles and Practical Techniques By Parteek Bhatia
3) Data Mining Practical Machine Learning Tools and Techniques By Ian H. Witten
4) Data Mining Practical Machine Learning Tools and Techniques By Morgan Kaufmann

Program: MCA (First Year)						**Semester : II**	
Course : Design Thinking and Problem Solving Lab						Code: MCA2508	
Teaching Scheme				**Evaluation Scheme**			
Lecture	**Practical**	**Tutorial**	**Credit**	**IE-1**	**IE-2**	**ETE**	**Total**
-	2	-	1	-	-	-	-

Pre-requisite:

- Problem solving skill
- New idea generation skill

Objectives:

1. To recognize situations where a need is not being met and where something suboptimal can be made better by a design intervention
2. To point directly to the problem
3. To conduct a deep analysis to get a better understanding of the problem.

Outcomes:

After learning the course, the students should be able to:

1. Develop a design theory from observations.
2. Participate in and lead innovation in creative and collaborative settings
3. Undertake complex and unstructured problem-solving challenges in unfamiliar domains

Detailed Syllabus:

Unit	Description	Duration
1	What are you trying to solve? How you define the challenge will shape what you do next. Be precise with your words, and continue to reframe your questions.	4
2	How might you discover the needs of those for whom you are innovating? Gain understanding and empathy by observing, listening, and studying the world around you.	4
3	How do you come up with new ideas? Collaborative creativity is at the heart of innovation. You need a clear and visual process, expert facilitation, and the permission to fail on the way to success.	4
4	How might you best evaluate your ideas? Prototype often, and embrace both failure and success as unique learning opportunities. "Thinking by doing" is a great way to accelerate the development of new ideas.	3
5	How might you best communicate your ideas and concepts? A good story is essential to engage colleagues and customers, and to elicit valuable feedback for the road ahead.	5
6	How might you learn and improve? Pausing for reflection creates opportunities for insight, and for making new connections between ideas. Take time to reflect: it will be the best investment you make.	4
	Total	**24**

Reference Books:

1.Basics of Design Thinking, Gavin Ambrose Design Paul HarrisPublished by AVA Publishing SA
2. “Designing for growth: A design thinking tool kit for managers”, by Jeanne Liedtka and Tim Ogilvie., 2011, ISBN 978-0-231-15838-1
3.“The design thinking playbook: Mindful digital transformation of teams, products, services, businesses and ecosystems”, by Michael Lewrick, Patrick Link, Larry Leifer., 2018, ISBN 978-1-119-46747-2

Program Elective Course - 2

Program: MCA (First Year)				**Semester :** I			
Course : Introduction to Data Science				**Code :** MCA2511			
Teaching Scheme				**Evaluation Scheme**			
Lecture	**Practical**	**Tutorial**	**Credit**	**IE-1**	**IE-2**	**ETE**	**Total**
3	-	-	3	20	30	50	100

Pre-requisite:

- Basic of Python Programming.
- Basic of Statistics

Objectives:

1. Student should able to learn basic of statics, python data structures.
2. Student should able to learn python libraries and data visualization techniques.
3. Student should able to learn Machine learning algorithms of regression and classification and its implementation in python

Outcomes:

After learning the course, the students should be able to:

1. Use python data structures and control structures.
2. Use basic statistics operations and python libraries with python programming.
3. Implement data visualization techniques with python programming.
4. Use data visualization techniques and python libraries for data analysis
5. Implement machine learning algorithms regression and classification using python programming.

Detailed Syllabus

Unit	Description	Duration
6.	**Unit-1: Python for Data Science** Introduction to Python, Data Structures: List, Tuple, Set & Dictionary Control structures: If-else, while and for statements	**4**
2.	**Unit-2: Statistics for Data Science** Types of Analysis: Qualitative & Quantitative. Descriptive and Inferential Statistics. Mean, Mode, Median, Probability, Distribution, Variance, Correlation, Standard Deviation	**6**
3.	**Unit-3: Python Libraries** Numpy: Numerical Python functions Pandas: python for data analysis	**6**

4.	**Unit-4: Data Visualization in Python** Basic of data visualization, MatPlotLib and Seaborn libraries. Plot, SubPlot, Ploting graphs for given data.	**8**
5.	**Unit-5: Introduction to Machine Learning** Machine Learning, Supervised & Unsupervised Learning, Data Preprocessing operations	**4**
6.	**Unit-6: Machine Learning Algorithms** Regression: Linear and Multiple Classification: Logistic and Decision Tree	**8**
	Total	**36**

Reference Books:

1. Python for Data Analytics with Pandas, Numpy and MatPlotLib, Fabio Nelli, Apress Publication
2. Python for Data Analysis, Wes McKinney, O'Reilly publication
3. Business Statistics, Naval Bajpai, Pearson Publication

Program: MCA (First Year)				**Semester : II**			
Course : Information and Security Audit				**Code :** MCA2512			
Teaching Scheme				**Evaluation Scheme**			
Lecture	**Practical**	**Tutorial**	**Credit**	**IE-1**	**IE-2**	**ETE**	**Total**
3	-	-	3	20	30	50	100

Pre-requisite:

- Internet concepts and Applications.
- Fundamentals of computers and Networking.

Objectives:

1. To understand the fundamental concepts of information security and value of information.
2. To gain basic understanding of Information security framework.
3. To understand need and importance of security Models required in IT companies worldwide.
4. To gain a basic understanding of security controls.
5. To gain the understanding of information security audit and IT governance frameworks for information security.

Outcomes:

After learning the course, the students should be able to:

1. Describe different threats to information assets in the organization. (BL2: Understand)
2. Explain concept of ISMS framework. (BL2: Understand)
3. Design security policy using security control concepts (BL3: Apply)
4. Explain different Information security Controls in the organization. (BL2: Understand)
5. Describe information security audit and understand information security IT governance framework. (BL2: Understand)

Detailed Syllabus

Unit	Description	Duration
1.	**Overview of Information Security System** Basic concept & Need of Information Security Components of IS Threats to information security & cyber crime Classification of threats & Attacks	**5**
2.	**Information Security Management System** Information Security Life Cycle Risks to Information System The 3 pillar concepts of Information Security (Confidentiality, Integrity, Availability) Components of ISMS & ISMS Conceptual Framework Steps for developing ISMS Information Classification, Risk Analysis & Management	**5**
3.	**Information Security Policy and Standards** Information Security Policy, Standards and Procedures PDCA Cycle Policy design life cycle Types of Information security policies	**7**

	Security policy standards and practices - BS7799, ISO/IEC 17799, ISO 27001. Examples of Policy writing (Based on Types)	
4.	**Information Security Controls** Control : An Introduction, Need of Control Types of IS controls – Based on security incident Types of Controls- Based on Nature Other types of Control- database, network, Internet access, digital signature BCP and DRP	**6**
5.	**Information Security Audit** Security Audits what are they? Need for Security audits in organizations & The Audit Process Responsibilities & functions of IS Auditor Types of Audits & approaches to Audits Technology based Audits vulnerability scanning and penetration testing , Key success factors for Security Audits Case study on IS Audit	**7**
6.	**Information Security Governance and Issues** What is IT Governance, Benefits IT Governance Best Practices IT governance framework- COBIT- key differences between COBIT 5 and COBIT 2019, ITIL-ITIL V1 to V4 Foundation • Concept • Model • Definitions IT governance maturity model.	**6**
	Total	**36**

Reference Books:

1. Information Systems Security: Security Management, Metrics, Frameworks And Best Practices (With Cd) : Nina Gobole
2. The complete reference Information Security by Mark Rhodes
3. Information security Theory and practices By Dhiren R Patel
4. Information Security Management Principles. By Taylor, Andy Alexander, David, Finch, Amanda Sutton, David
5. M. Stamp, "Information Security: Principles and Practice," Wiley
6. Information security policies, procedures and standards by Thomas Pettier.
7. Information security Management Hand book- 5th Edition-HAROLD F. TIPTON
8. Information systems control and Audit by Ron Weber, Pearson Pub.
9. Implementing Effective IT Governance And IT Management By Gad J. Selig, Published by Van Haren
10. Executive's Guide to IT Governance: Improving Systems Processes with Service Management, COBIT, and ITIL by Robert R. Moeller, Wiley Publication

Program: MCA (First Year)				**Semester : II**			
Course : ASP.NET using C#				**Code : MCA2513**			
Teaching Scheme				**Evaluation Scheme**			
Lecture	**Practical**	**Tutorial**	**Credit**	**IE-1**	**IE-2**	**ETE**	**Total**
3	-	-	3	20	30	50	100

Pre-requisite:

- Object Oriented Programming (C++ / Core Java)
- HTML
- CSS
- JavaScript
- SQL
- Basics of Computer Network

Objectives:

1. To understand the ASP.NET web application execution model
2. To introduce visual studio IDE
3. To enable students to create and modify multi-page Web Form applications that involve and demonstrate features such as flow control, the use of style sheets, state management, data access, data binding, security, and data verification and validation.
4. To introduce ASP.NET MVC model

Outcomes:

After learning the course, the students should be able to:

1. Acquire the knowledge of different terminologies and concepts associated with C#, ASP.Net and MVC
2. Use server controls to design user interface, perform form validations
3. Perform Add-Update-Delete-View operations on database using Connected or Disconnected Architecture of ADO.Net
4. Implement security features in Web Application using Login Controls

Detailed Syllabus

Unit	**Description**	**Duration**
1.	**ASP.NET Introduction** How to create and run the first ASP.NET application Understanding the code generated by VS.NET Types of Server Controls Page Life Cycle Understanding AutoPostBack Understanding ViewState Navigation / Redirection Methods	**03**
2.	**ASP.Net Controls** Common Controls Validation Controls Navigation Controls	**10**

	Login Controls Common AJAX Controls Creating User Control Introduction to Master Pages Web.config	
3.	**State Management in ASP.NET** Need of State Management Viewstate Control State QueryString Cookies Session Application	**05**
4.	**Introduction to ADO.NET** Introduction ADO.NET Architecture Data Providers ADO.NET Objects (Connection, Command, DataReader, DataAdapter, DataSet, DataTable, DataView etc)	**04**
5.	**Databound Controls** Rendering Table using SqlDataAdapter and SqlCommandReader SqlDataSource GridView DetailsView FormsView DataList Repeater ListView	**10**
6.	**Introduction to ASP.NET MVC** Overview Architectural Elements Controllers Views Models	**04**
	Total	**36**

Reference Books:

1. Beginning ASP.Net 4.5 in C#, Apress, Mathew McDonald
2. ASP.Net 4.5 Unleashed, Sams, Stephen Walther
3. Pro ASP.Net MVC 4, Apress, Adam Freeman

Program:	MCA (First Year)			Semester :			II
Course :	Business Process Domain			Code :			MCA2514
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	IE-1	IE-2	ETE	Total
3	-	-	3	20	30	50	100

Pre-requisite:
PPMOB, Entrepreneurship Development

Objectives:

1. To learn & understand the processes and practices in business and their applications
2. To make students understand the necessity and importance of Marketing in business Environment.
3. To Develop understanding about business management concepts for applying these to applicatio development

Outcomes:

After learning the course, the students should be able to:

1. Explain marketing mix concept along with product life cycle
2. Describe various Human Resource functions and processes
3. Explain the key concepts of Supply Chain Management
4. Define the key terms associated with Business Process Reengineering.

Detailed Syllabus

Unit	Description	Duration
1.	**Introduction to Marketing:** Definition & Functions of Marketing- Scope of Marketing, Evolution of Marketing, Core concepts of marketing-Need, Want, Demand, Customer Value, Exchange, Customer Satisfaction, Customer Delight, Customer loyalty, Company orientation towards market place, Selling versus marketing. Segmentation, Target Marketing & Positioning Impact of Globalization, Technology and Social Responsibility on Marketing Functions of Marketing Manager. Linkage of Marketing functions with all functions in the organization. Marketing Myopia.	**6**
2.	**Marketing Mix:** Origin & Concept of Marketing Mix, 7P's - Product, Price, Place, Promotion, People, Process, Physical evidence. Product Life Cycle: Concept & characteristics of Product Life Cycle (PLC)	**7**
3.	**Human Resource** Recruitment, selection Processes, Employee Appraisal, Leave Types, Salary calculation, Income Tax calculation, PF, Gratuity, Bonus.	**5**
4.	**Customer Relationship Management (CRM)** Consumer Behavior: Meaning & importance of consumer behavior, Buying roles, Five steps consumer buyer decision process – Problem Recognition,	**6**

	Information Search, Evaluation of Alternatives, Purchase Decision, Post Purchase behavior. What is CRM? , Why we need CRM?, Customer Life Cycle, Use of CRM in Business, CRM Applications in various industries.	
5.	**Introduction to Business Process Reengineering (BPR):** Definition of business processes – Concept of BPR - Definition of business process redesign, BPR - Evolution, Definition, Need for reengineering, Benefits, Role of leader & manager, Breakthrough reengineering model, BPR guiding principles, Business process reengineering & performance improvement, Key targets of BPR, Myths about BPR , What reengineering isn't , BPR and other management concepts: TQM, Quality function deployment, ISO standards, BPR and Process Simplification, BPR and Continuous Improvement	**7**
6.	**Supply Chain Management (SCM)** what is supply chain, Major drivers of Supply chain, Value in Supply Chain- quality, delivery, flexibility, Make Vs Buy, Managing Inventory in Supply chain- definition of inventories, Role of Inventory, Inventory control techniques (ABC Analysis, VED Analysis), Transportation– Modes of transportation, Transportation Management system (TMS)	**5**
		36

Text Books:

Reference Books:

1. Marketing Management: A South Asian Perspective, 14th Edition (English), Philip Kotler, K. Keller, Abraham Koshy and Mithileshwar Jha
2. Supply Chain Management - Strategy, Planning & Operation by Sunil Chopra, Peter Meindl, D. V. Kalra, Pearson Education.
3. Human Resource Management by J. John Bernardin, Tata McGraw Hill Publishing, 4thEdition
4. E-Commerce concept-model-strategies, C.S.V. Murthy, Himayalaya Publication House
5. Customer Relationship Management by Kristin Anderson and Carol Kerr, TMGH
6. Management of banking and Financial Services, by Padmalatha Suresh & Justin Paul, Pearson India Ltd, New Delhi
7. Hammer, M. and Champy, J, Re-engineering the Corporation: A Manifesto for Business Revolution, Harper Business
8. R. Radhakrishnan S.Balasubramanian, Business Process Reengineering, PHI
9. Vikram Sethi and William R. King, Organisational Transformation through Business Process Reengineering, Pearson
10. K. Shridhara Bhatt, Business Process Reengineering, Himalaya Publication

Program: MCA (First Year)				**Semester :** II			
Course : Introduction to Data Science Lab				**Code :** MCA2515			
Teaching Scheme				**Evaluation Scheme**			
Lecture	**Practical**	**Tutorial**	**Credit**	**IE-1**	**IE-2**	**ETE**	**Total**
-	2	-	1	-	-	-	-

Pre-requisite:

- Basic of Python Programming.
- Basic of Statistics

Objectives:

1. Student should able to learn basic of statics, python data structures.
2. Student should able to learn python libraries and data visualization techniques.
3. Student should able to learn Machine learning algorithms of regression and classification and its implementation in python

Outcomes:

After learning the course, the students should be able to:

1. Use basic statistics operations and python libraries with python programming.
2. Use data visualization techniques and python libraries for data analysis
3. Implement machine learning algorithms using python programming.

Detailed Syllabus:

Unit	Description	Duration
1	**Unit-1: Python for Data Science** Demonstration of Python programming, Demonstration of Python Data Structures: List, Tuple, Set, Dictionary, Control structures: If-else, while and for statements. Assignment based on Python Programming.	**2**
2	**Unit-2: Statistics for Data Science** Demonstration of Qualitative & Quantitative Analysis methods. Assignment based on Mean, Mode, Median, Probability, Distribution, Variance, Correlation and Standard Deviation.	**2**
3	**Unit-3: Python Libraries** Demonstration of Numpyand Pandas Libraries Assignment based on Numpy and Pandas Library	**2**
4	**Unit-4: Data Visualization in Python** Demonstration of data visualization using MatPlotLib and Seaborn libraries. Assignment based on data visualization.	**6**
5	**Unit-5: Introduction to Machine Learning** Demonstration of Machine Learning Algorithms (Supervised & Unsupervised) Assignment based on Algorithms.	**6**
6	**Unit-6: Machine Learning Algorithms**	**6**

	Demonstration of Regression and Classification Algorithm. Assignment based on Algorithm.	
	Total	**24**

Reference Books:

1. Python for Data Analytics with Pandas, Numpy and MatPlotLib, Fabio Nelli, Apress Publication
2. Python for Data Analysis, Wes McKinney, O'Reilly publication
3. Business Statistics, Naval Bajpai, Pearson Publication

List of Experiments:

1. Programs based on Data Structure and Control structure using Python.
2. Programs based on basic of Statistics and its methods.
3. Programs based on Python libraries NumPy and Pandas
4. Programs based on data visualization using Python libraries
5. Programs based on Data Preprocessing.
6. Programs based on Machine Learning algorithms (Regression and Classification).

Program: MCA (First Year)				**Semester : II**			
Course : Information & Security Audit Lab				**Code :** MCA2516			
Teaching Scheme				**Evaluation Scheme**			
Lecture	**Practical**	**Tutorial**	**Credit**	**IE-1**	**IE-2**	**ETE**	**Total**
-	2	-	1	-	-	-	-

Pre-requisite:

- Internet concepts and Applications.
- Fundamentals of computers and Networking.

Objectives:

1. To understand the various security threats & attacks
2. To gain basic understanding of writing security policy.
4. To gain a basic understanding of security audit.
5. To understand IT governance frameworks for information security.

Outcomes:

After learning the course, the students should be able to:

1. Describe different threats to information assets in the organization. (BL2: Understand)
2. Design security policy using security control concepts (BL3: Apply)
3. Describe information security audit and understand information security IT governance framework. (BL2: Understand)

Unit	Description	Duration
1	**Information Security Threat** Case study based on security threats	4
2	**Cyber Attack** Case study based on security attacks	4
3	**IS Policy** Case study based on policy writing	4
4	**IS Controls** Case study based on policy writing with Security controls	4
5	**IS Audit** Case study based on IS Audit.	4
6	**IT Governance** Presentation on different IT Governance Frameworks.	4
	Total	24

Reference Books:

1. Information Systems Security: Security Management, Metrics, Frameworks And Best
a. Practices (With Cd) : Nina Gobole
2. The complete reference Information Security by Mark Rhodes
3. Information security Theory and practices By Dhiren R Patel
4. Information Security Management Principles. By Taylor, Andy Alexander, David, Finch, Amanda Sutton, David
5. M. Stamp, "Information Security: Principles and Practice," Wiley
6. Information security policies, procedures and standards by Thomas Pettier.
7. Information security Management Hand book- 5th Edition-HAROLD F. TIPTON
8. Information systems control and Audit by Ron Weber, Pearson Pub.
9. Implementing Effective IT Governance And IT Management By Gad J. Selig, Published by Van Haren
10. Executive's Guide to IT Governance: Improving Systems Processes with Service Management,
11. COBIT, and ITIL by Robert R. Moeller, Wiley Publication

Program: MCA (First Year)				**Semester : II**			
Course : ASP.NET using C# Lab				**Code : MCA2517**			
Teaching Scheme				**Evaluation Scheme**			
Lecture	**Practical**	**Tutorial**	**Credit**	**IE-1**	**IE-2**	**ETE**	**Total**
-	2	-	1	-	-	-	-

Pre-requisite:

- Object Oriented Programming (C++ / Core Java)
- HTML
- CSS
- JavaScript
- SQL
- Basics of Computer Network

Objectives:

1. To understand the ASP.NET web application execution model
2. To introduce visual studio IDE
3. To enable students to create dynamic interactive web pages using ASP.NET.
4. To make students understand about implementation of state management

Outcomes:

After learning the course, the students should be able to:

1. Use server controls to design user interface, perform form validations
2. Perform Add-Update-Delete-View operations on database using Connected or Disconnected Architecture of ADO.Net
3. Implement security features in Web Application using Login Controls
4. Perform partial page updates using AJAX controls

Detailed Syllabus:

Unit	Description	Duration
1.	**Common Controls** Assignmetsn based on Buttons, Checkbox, radio Button, List, TextBox etc	**6**
2.	**Validation, Navigation, Login, AJAX** Assignments based on various validation controls, Navigation Controls, Login controls, AJAX control	**5**
3.	**Master Pages, User Control** Assignments based on creation web page layout, creating user controls	**3**

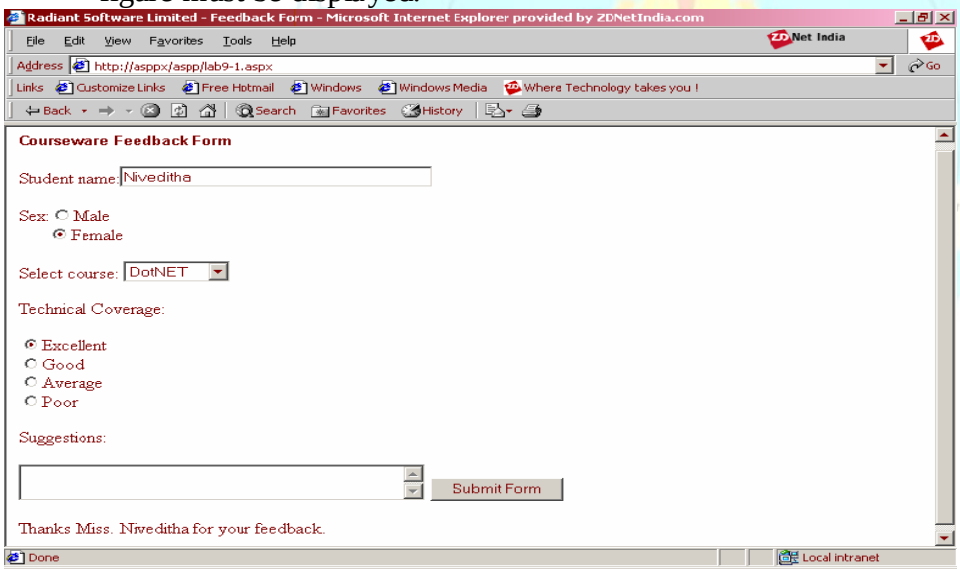
4.	**State Management** Assignments based on state management in ASP.NET	**4**
5.	**ADO.NET** Assignments based on data management	**5**
6.	**Databound Controls** Assignments based on GridView, DetailsView, SqlDataSource etc	**7**
	Total	**30**

Reference Books:

- Beginning ASP.Net 4.5 in C#, Apress, Mathew McDonald
- ASP.Net 4.5 Unleashed, Sams, Stephen Walther
- Pro ASP.Net MVC 4, Apress, Adam Freeman

List of Experiments:

- Write a program to display the following feedback form. The different options for the list box must be ASP-XML, DotNET, JavaPro and Unix,C,C++. When the Submit Form button is clicked after entering the data, a message as seen in the last line of the above figure must be displayed.



- Write a program that displays a button in green color and it should change into yellow when the mouse moves over it.

- Write a program containing the following controls:
  - A ListBox
  - A Button
  - An Image
  - A Label

The listbox is used to list items available in a store. When the user clicks on an item in the listbox, its image is displayed in the image control. When the user clicks the button, the cost of the selected item is displayed in the control.

- Write code that displays two advertisements alternately. When the user clicks on one of the advertisements, he/she is redirected to "www.amazon.com", and the other advertisement redirects the user to "www.fabmart.com". The weightage of the amazon advertisement is 50 and that of the other one is 40. The advertisement should be centered horizontally and should cover 60% of the width of the screen. Its height should be 80 units. The width of the border should be 5 units.

- Write a program to get a user input such as the boiling point of water and test it to the appropriate value using Compare Validator.

- Write a program that uses a textbox for a user input name and validate it for RequiredField Validation.
- Write a prgoram that gets user input such as the user name, mode of payment, appropriate credit card. After the user enters the appropriate values the Validation button validates the values entered.
- Create a Form that receives the user name, address, date, nationality, country preferred for working and skill sets from the user and stores the user name in the client using cookies. The country preferred data should appear in a drop down list whereas, others should be entered in a textbox. Validate all the controls. The Form is named "formexp.aspx". The date should appear between "1/1/1900" and "1/1/2090".

- Write a program to create a table **emp** in the **master** database with the following fields:

Field Name	Datatype
eno	Integer
ename	Varchar(20)
salary	Float

Suppose the emp table contains the following records:

Eno	Ename	Salary
98	Shalini	9200
99	Ramesh	7800
100	Rishab	7000
101	Dharani	7800
102	Vijay	8500
103	Yamuna	9500

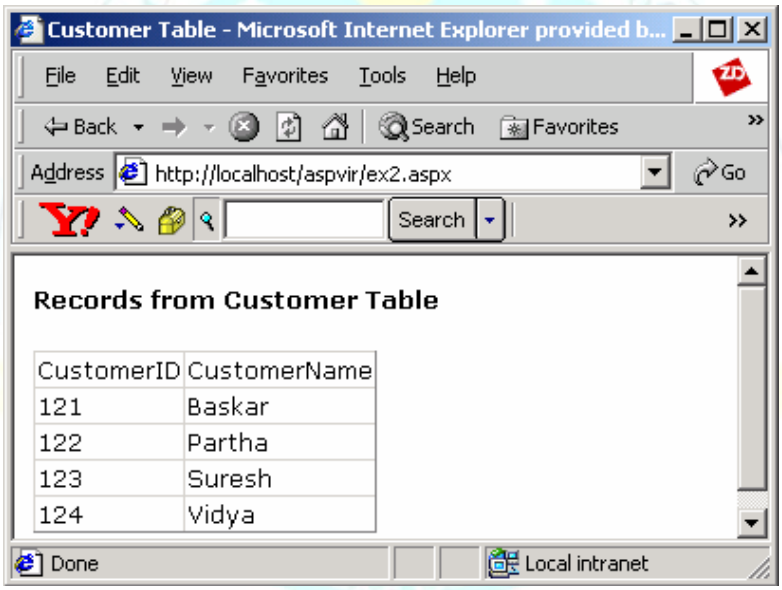
- Select the names of the employees from the **emps** table. Retrieve the result in a DataSet

and display it in a CheckBoxList.

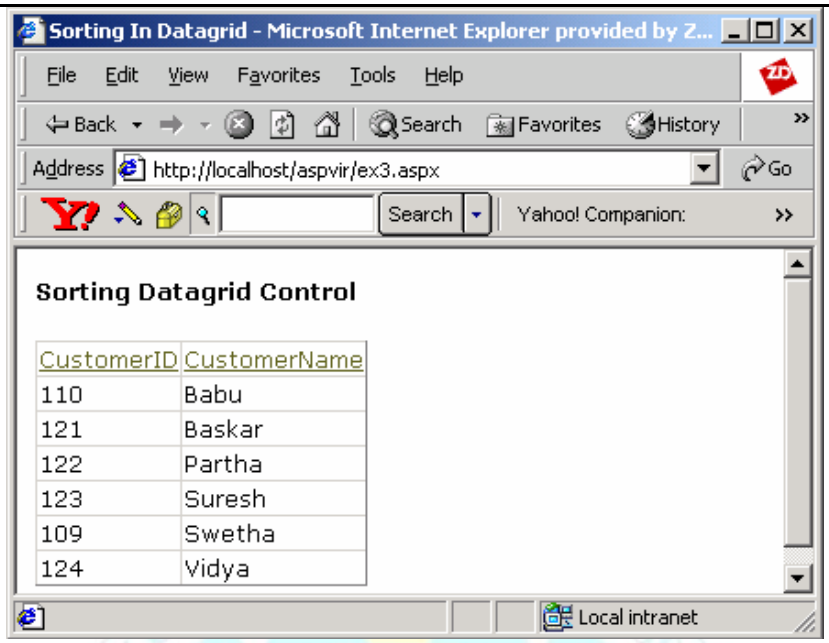
- Select names from the **emps** table. Retrieve the result in a DataSet. Bind the DataSet to a RadioButtonList and display the result in three diferent forms as follows:
    - The RepeatDirection property of the RadioButtonList is set to horizontal and its RepeatLayout property is set to Table.
    - The RepeatDirection property of the RadioButtonList is set to Vertical and its RepeatLayout property is set to Table.
    - The RepeatLayout property of the RadioButtonList is set to flow.

- Create a RadioButtonList that displays the names of some flowers in two columns. Bind a label to the RadioButtonList so that when the user selects an option from the list and clicks on a button, the label displays the flower selected by the user.

- Write a program to display the records from the database as shown in the figure:



- Write a program to implement the sorting feature in the customer table as shown in the figure:



- Create a user control that contains a list of colors. Add a button to the Web Form which when clicked changes the color of the Form to the color selected from the list.
- Create a user control that displays the current date and time. Include it in a Web Form and refresh it each time a button is clicked.
- Create a component that receives two numbers from the user through a Web Form, and based on the user's selection it adds or subtracts the two numbers and returns the result to the Web Form. The result should be displayed in the Web Form.

Program: MCA (First Year)				**Semester :** II			
Course : Business Process Domain Lab				**Code :** MCA2518			
Teaching Scheme				**Evaluation Scheme**			
Lecture	**Practical**	**Tutorial**	**Credit**	**IE-1**	**IE-2**	**ETE**	**Total**
-	2	-	1	-	-	-	-

Pre-requisite:

PPMOB, Entrepreneurship Development

Objectives:

1. To learn & understand the processes and practices in business and their applications
2. To make students understand the necessity and importance of Marketing in business Environment.
3. To Develop understanding about business management concepts for applying these to application development

Outcomes:

After learning the course, the students should be able to:

1. Explain marketing mix concept along with product life cycle
2. Describe various Human Resource functions and processes
3. Explain the key concepts of Supply Chain Management
4. Define the key terms associated with Business Process Reengineering.

Detailed Syllabus:

Unit	Description	Duration
1	**Introduction to Marketing:** Core concepts of marketing Functions of Marketing Manager.	**3**
2	**Marketing Mix:** Origin & Concept of Marketing Mix, 7P's	**5**
3	**Human Resource** Recruitment, selection Processes, Employee Appraisal, Leave Types, Salary calculation, Income Tax calculation, PF, Gratuity, Bonus.	**5**
4	**Customer Relationship Management (CRM)** Consumer Behavior: Buying roles, Five steps consumer buyer decision process CRM Applications in various industries.	**3**
5	**Introduction to Business Process Reengineering (BPR):** BPR TQM, BPR and Continuous Improvement	**4**
6	**Supply Chain Management (SCM)** Major drivers of Supply chain, Value in Supply Chain- quality, delivery, flexibility,	**4**

	Make Vs Buy, Managing Inventory in Supply chain Transportation Management system (TMS)	
	Total	**24**

Reference Books:

1.Marketing Management: A South Asian Perspective, 14th Edition (English), Philip Kotler, K. Keller, Abraham Koshy and Mithileshwar Jha
2. Supply Chain Management - Strategy, Planning & Operation by Sunil Chopra, Peter Meindl, D. V. Kalra, Pearson Education.
3. Human Resource Management by J. John Bernardin, Tata McGraw Hill Publishing, 4thEdition
4. E-Commerce concept-model-strategies, C.S.V. Murthy, Himayalaya Publication House
5. Customer Relationship Management by Kristin Anderson and Carol Kerr, TMGH
6. R. Radhakrishnan S.Balasubramanian, Business Process Reengineering, PHI
7. Vikram Sethi and William R. King, Organisational Transformation through Business Process Reengineering, Pearson
8. K. Shridhara Bhatt, Business Process Reengineering, Himalaya Publication

List of Activities:

1. Activity Based on Marketing
2. Activity Based on Marketing Mix
3. Activity based on Recruitment and Selection
4. Activity Based on Customer Relationship Management
5. Activity for Business Process Reengineering
6. Activity based on concept of Supply Chain Management

Program:	MCA (First Year)			Semester : II			
Course :	Mini Project-I			Code : MCA2701			
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	CE	MTE	ETE	Total
-	2	-	1	-	-	-	-

Guidelines for Mini Project-I

- **About Course :** The mini project is designed to help students develop practical ability and knowledge about practical tools/techniques in order to solve real life problems related to the industry, academic institutions and computer science research.
- The course Mini Project is one that involves practical work for understanding and solving problems in the field of computing. This course will also develop investigative, research and report writing skills and will provide an opportunity to investigate a chosen topic in considerable depth.
- Mini Project provides the opportunity for students to demonstrate the application of their programming and research skills, and to apply their knowledge to computing problems.

- **Objectives**
  - To develop practical ability and knowledge about tools/techniques in order to solve the real world problems
  - To expose the students to use software engineering approach to analyze and formulate the real world problem
  - To gain deeper understanding in specific functional areas
  - To inculcate the skills of team work
  - To enhance communication skill
  - To gain the insight of technical writing

- **Course Outcome :** After learning the course, the students should be able to:
  - Identify, analyze software projects problem with systematic approach
  - Design the real world software problem with systematic approach
  - Apply practical knowledge within the chosen area of technology for project development

- Develop communication skills for presentation of project related activities and project report writing

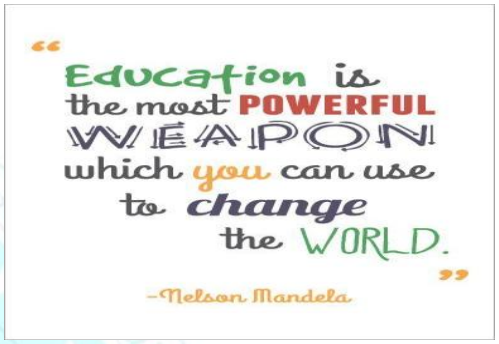
- **Guidelines**
  - Students are not restricted for software development only. They have the flexibility to Carry-out/perform/opt/achieve either of the following work during the semester, as a fulfillment of requirement of mini project:
    - Industry Internship
    - Interdisciplinary Project
    - Startup Idea with Proof of Concept (POC)
    - Paper Publication
    - Copyright
    - Achievement in Hackthon
    - Achievement in National/International Project competition
    - Social Activity (performed with the use of technologies)
    - Any other activity fulfilling need and objectives of Mini Project with the prior permission of internal academic panel

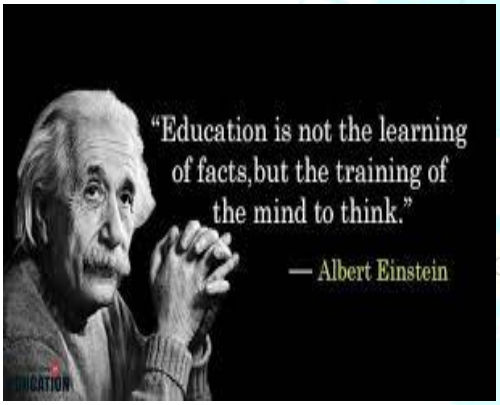
  - A candidate is required to present the progress of the Mini Project work during the semester as per the schedule provided by the Project Coordinator.

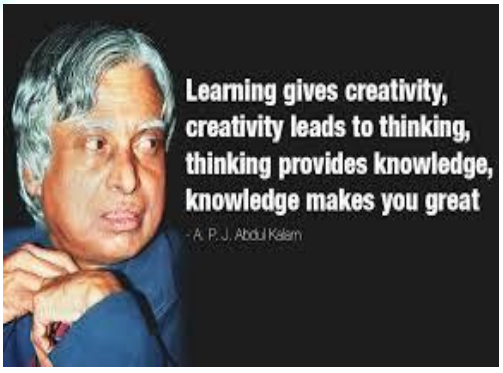
  - Evaluation of mini project shall be done for 25 marks. This evaluation shall be based on 3 (three) review with the necessary guidelines.

  - At the end of semester, student shall submit necessary records of the project work as applicable.


An investment in knowledge pays the best interest.
Benjamin Franklin
EVERYDAY POWER


Education is the most POWERFUL WEAPON which you can use to change the WORLD.
-Nelson Mandela


"Education is not the learning of facts,but the training of the mind to think."
— Albert Einstein


Learning gives creativity, creativity leads to thinking, thinking provides knowledge, knowledge makes you great
- A. P. J. Abdul Kalam