

**DR. A.P.J. ABDUL KALAM TECHNICAL
UNIVERSITY LUCKNOW**



**Evaluation Scheme & Syllabus
for**

MCA (Integrated)

3rd Year

On

Choice Based Credit System

(Effective from the Session: 2019-20)

MCA (INTEGRATED) THIRD YEAR, 2019-20

SEMESTER-V

S.No.	Subject Code	Subject Name	L-T-P	ESE Marks	Sessional		Total	Credit
					CT	TA		
1.	RCAI-501	Design & Analysis of Algorithms	3-1-0	70	20	10	100	4
2.	RCAI-502	Programming with MATLAB	3-1-0	70	20	10	100	4
3.	RCAI-503	Java Programming	3-1-0	70	20	10	100	4
4.	RCAI-504	System Analysis & Design	3-1-0	70	20	10	100	4
5.	RCAI-505	Cyber Security	3-1-0	70	20	10	100	4
6.	RCAI-551	Programming with MATLAB Lab	0-0-3	50	30	20	100	2
7.	RCAI-552	Java Programming Lab	0-0-3	50	30	20	100	2
		Total					700	24

CT: Class Test

TA: Teacher Assessment

L/T/P: Lecture/ Tutorial/ Practical

SEMESTER-VI

S.No.	Subject Code	Subject Name	L-T-P	ESE Marks	Sessional		Total	Credit
					CT	TA		
1.	RCAI-601	Database Management Systems	3-1-0	70	20	10	100	4
2.	RCAI-602	Graph Theory	3-1-0	70	20	10	100	4
3.	RCAI-603	Artificial Intelligence	3-1-0	70	20	10	100	4
4.	RCAI-604	Introduction to Automata Theory & Languages	3-1-0	70	20	10	100	4
5.	RCAI-605	Universal Human Values & Professional Ethics	3-1-0	70	20	10	100	4
6.	RCAI-651	Database Management Systems LAB	0-0-3	50	30	20	100	2
7.	RCAI-652	Mini Project Lab	0-0-3	50	30	20	100	2
		Total					700	24

CT: Class Test

TA: Teacher Assessment

L/T/P: Lecture/ Tutorial/ Practical

Year-III (Semester-V)

RCAI-501 : DESIGN & ANALYSIS OF ALGORITHMS

UNIT-I

Introduction: Algorithms, Analysis of Algorithms, Design of Algorithms, Complexity of Algorithms, Asymptotic Notations, Growth of function, Recurrences and their solution methods.

Sorting in Linear Time: Counting sort, Radix Sort, Bucket Sort, Medians and order statistics.

Sorting in polynomial Time: Insertion sort, Merge sort, Heap sort, and Quick sort.

UNIT-II

Advanced Data Structure: Red Black Trees, Augmenting Data Structure, Binomial Heap, B-Tree, Fibonacci Heap, and Data Structure for Disjoint Sets, All kinds of Algorithms on these data structures, Dictionaries and priority Queues, mergeable heaps, concatenable queues.

UNIT-III

Advanced Design and Analysis Techniques: Dynamic programming, Greedy Algorithm, Backtracking, Branch-and-Bound, Amortized Analysis.

UNIT-IV

Graph Algorithms: Elementary Graph Algorithms, Breadth First Search, Depth First Search, Minimum Spanning Tree, Kruskal's Algorithms, Prim's Algorithms, Single Source Shortest Path, All pair Shortest Path, Maximum flow and Traveling Salesman Problem.

UNIT-V

Randomized Algorithms, String Matching, NP-Hard and NP-Completeness, Approximation Algorithms, Sorting Network, Matrix Operations, Polynomials and FFT, Number Theoretic Algorithms.

References:

1. Cormen Thomas H. and Leiserson, "Introduction to Algorithms", PHI.
2. Goodrich M. T., "Algorithms Design", John Wiley & Sons.
3. Aho, "The Design and Analysis of Computer Algorithms", Pearson Education.
4. Horowitz and Sahani, "Fundamentals of Computer Algorithms", Galgotia Publications.

RCAI-502 : PROGRAMMING WITH MATLAB

UNIT-1

Introduction: Features, basics of MATLAB, MATLAB workspace, MATLAB desktop , Creating and running scripting M-files, MATLAB as a calculator, Variables, Comments, Complex numbers, Arithmetic operations with scalars, Floating-point arithmetic, Mathematical functions, Elementary math built-in functions, Commands for managing variables, Relational and Logical operations, Applications in problem solving.

UNIT-II

Arrays and Matrices : One dimensional array, Array addressing and indexing, Array manipulation, Array sorting, Construction and manipulation of multi-dimensional arrays, Built-in functions for handling arrays, Matrix manipulation, Array and matrix operations,.

Character strings: String construction, string manipulation and string functions.

UNIT-III

Control Flow: Theif, if-else construction, switch-case construction, for loop, while loop, nested loops. try-catch block.

Functions: Function construction, Rules for constructing functions, Input-output arguments, Executing functions, Sub-functions, Nested functions, Function handles and anonymous functions, Command line functions, Using a function file.

UNIT-IV

Two-dimensional graphics: Basic plots, plot function, Style options, Multiple plots, Multiple figures, Overlay plots, Specialized 2-D plots.

Three-dimensional graphics: Line plots, mesh plots, Surface plots, Contour plots, Changing viewpoints, Specialized 3-D plots.

UNIT-V

Applications: Linear algebra- solving linear system, Finding Eigen values and Eigen vectors; Polynomials- roots, addition, multiplication, division, curve fitting; data analysis; Differentiation, Integration, Solving differential equations.

References:

1. PratapR., "Getting Started with MATLAB- A Quick Introduction for Scientists and Engineers", Oxford University Press.
2. Dukkipati R.V., "MATLAB- An Introduction with Applications", New Age International Publishers.
3. HanselmanD. and LittlefieldB., "Mastering MATLAB 8", Pearson Education.
4. Gilat A., "MATLAB: An Introduction with Applications", John Wiley & Sons.

RCAI-503 : JAVA PROGRAMMING

UNIT-1

Internet: Introduction, Connecting to Internet: Telephone, Cable, Satellite connection, Choosing an ISP, Introduction to Internet services, E-Mail concepts, Sending and Receiving secure Email, Voice and Video Conferencing.

UNIT-2

Core Java: Introduction, Operator, Data type, Variable, Arrays, Control Statements, Methods & Classes, Inheritance, Package and Interface, Exception Handling, Multithread programming, I/O, Java Applet, String handling, Networking, Event handling, Introduction to AWT, AWT controls, Layout managers, Menus, Images, Graphics.

UNIT-3

Java Swing: Creating a Swing Applet and Application, Programming using Panes, Pluggable Look and feel, Labels, Text fields, Buttons, Toggle buttons, Checkboxes, Radio Buttons, View ports, Scroll Panes, Scroll Bars, Lists, Combo box, Progress Bar, Menus and Toolbars, Layered Panes, Tabbed Panes, Split Panes, Layouts, Windows, Dialog Boxes, Inner frame.

JDBC: The connectivity Model, JDBC/ODBC Bridge, Java.sql package, connectivity to remote database, navigating through multiple rows retrieved from a database.

UNIT-4

Java Beans: Application Builder tools, The bean developer kit(BDK), JAR files, Introspection, Developing a simple bean, using Bound properties, The Java Beans API, Session Beans, Entity Beans, Introduction to Enterprise Java beans (EJB),

RMI (Remote Method Invocation): Introduction, a simple client-server application using RMI.

UNIT-5

Java Servlets: Servlet basics, Servlet API basic, Life cycle of a Servlet, Running Servlet, Debugging Servlets, Thread-safe Servlets, HTTP Redirects, Cookies, Introduction to Java Server pages (JSP).

References:

1. Young M.L., "The Complete Reference Internet", Tata McGraw Hill.
2. Thampi, "Object Oriented Programming in JAVA", Dreamtech Press.
3. Balagurusamy E., "Programming with JAVA", Tata McGraw Hill.
4. Holzner S., "Java2 Black book", dreamtech Press.
5. Deitel and Deitel, "Java™: How to Program", PEARSON education.
6. Malhotra S. and Choudhary S., "Programming in Java", Oxford University Press.
7. Arnold K., Gosling J. and Holmes D., "The Java Programming Language", Addison-Wesley.
8. Das R. K., "Core Java for Beginners", Vikas Publishing.
9. Krishnamoorthy R. and Prabhu S., "Internet & Java Programming", New Age International Publishers.

RCAI-504 : SYSTEM ANALYSIS & DESIGN

UNIT-I

System Concepts and Information Systems Environment: The System Concept: Definition, Characteristics of Systems, Elements of a System, Open and Closed System, Formal and Informal Information Systems, Computer based Information Systems, Management Information System, Decision Support System, General Business Knowledge, and Interpersonal Communicational System.

UNIT-II

The System Development Life Cycle: Recognition of needs, Impetus for System Change, Feasibility Study, Analysis, Design, Implementation, Post implementation & Maintenance.

The Role of the Systems Analyst: Historical Perspective, The War Effort, What Does it take to do System Analysis, Academic & Personal Qualifications, The Multifaceted role of the Analyst, The Analyst/User Interface, Behavioral issues.

UNIT-III

Systems Planning & Initial Investigation: Strategies for Determining Information Requirement, Problem Definition & Project initiation, Background Analysis, Fact Analysis, Review of Written Documents, Onsite Observations, Interviews & Questionnaires, Fact Analysis, Performance Analysis, Efficiency Analysis, Service Analysis.

UNIT-IV

Information Gathering: What Kind of Information do we need? Information about the firms, Information gathering tools, The art of Interviewing, Arranging the Interview, Guides to a Successful Interview, Types of Interviews and Questionnaires, The Structured and Unstructured Alternatives.

The Tools of Structured Analysis: The Dataflow Diagram (DFD), Data Dictionary, Decision Trees and Structured English.

UNIT-V

Feasibility Study: System performance, Economic Feasibility, Technical Feasibility, Behavioral Feasibility, Steps in Feasibility Analysis. H/W & S/W Selection and Maintenance: The Computer Industry, S/W Industry, a Procedure for H/W & S/W Selection, Major Phases in Selection, Criteria for S/W Selection, The Used Computer, The Computer Contract.

References:

1. Awad E. M., "Systems Analysis & Design", Galgotia Publication.
2. Mansoor A., "System Analysis & Design", Pragya Publication.
3. Hawryszkiewycz I., "System Analysis & Design", PHI.

RCAI-505: Cyber Security

UNIT I

Introduction to information systems, Types of information Systems, Development of Information Systems, Introduction to information security, Need for Information security, Threats to Information Systems, Information Assurance, Cyber Security, and Security Risk Analysis.

UNIT II

Application security (Database, E-mail and Internet), Data Security Considerations-Backups, Archival Storage and Disposal of Data, Security Technology-Firewall and VPNs, Intrusion Detection, Access Control. Security Threats - Viruses, Worms, Trojan Horse, Bombs, Trapdoors, Spoofs, E-mail viruses, Macro viruses, Malicious Software, Network and Denial of Services Attack, Security Threats to ECommerce- Electronic Payment System, e-Cash, Credit/Debit Cards. Digital Signature, public Key Cryptography.

UNIT III

Developing Secure Information Systems, Application Development Security, Information Security Governance & Risk Management, Security Architecture & Design Security Issues in Hardware, Data Storage & Downloadable Devices, Physical Security of IT Assets, Access Control, CCTV and intrusion Detection Systems, Backup Security Measures.

UNIT IV

Security Policies, Why Policies should be developed, WWW policies, Email Security policies, Policy Review Process-Corporate policies-Sample Security Policies, Publishing and Notification Requirement of the Policies. Information Security Standards-ISO, IT Act, Copyright Act, Patent Law, IPR. Cyber Laws in India; IT Act 2000 Provisions, Intellectual Property Law: Copy Right Law, Software License, Semiconductor Law and Patent Law.

References:

1. Charles P. Pfleeger, Shari LawerancePfleeger, "Analysing Computer Security", Pearson Education India.
2. V.K. Pachghare, "Cryptography and information Security", PHI Learning Private Limited, Delhi India.
3. Dr. Surya Prakash Tripathi, RitendraGoyal, Praveen kumarShukla , "Introduction to Information Security and Cyber Law" Willey Dreamtech Press.
4. Schou, Shoemaker, "Information Assurance for the Enterprise", Tata McGraw Hill.
5. Dr. K. K. Goyal, Amit Garg, "Cyber Security" , University Science Press.
6. Chander, Harish, "Cyber Laws And It Protection", PHI Learning Private Limited, Delhi, India

RCAI-551: PROGRAMMING WITH MATLAB LAB

1. WAP to demonstrate the use of elementary math built-in functions.
2. WAP to create a menu-driven program using switch-case statement.
3. WAP to demonstrate the use of various arithmetic and relational operators.
4. WAP to perform basic operations on an array.
5. WAP to perform basic operations on a matrix.
6. WAP to demonstrate the use of if and if-else statement.
7. WAP to demonstrate the use of while loop.
8. WAP to demonstrate the use of for loop.
9. WAP to demonstrate the use of nested loops.
10. WAP to sort a vector in ascending order.
11. WAP to swap elements of a vector using function.
12. WAP to create and access strings.
13. WAP to plot a 2-D plot with given specifications.
14. WAP to plot a 3-D plot with given specifications.
15. WAP to solve a given differential equation.
16. WAP to perform differentiation of given equation.
17. WAP to perform integration of given equation.
18. WAP to solve a given polynomial.
19. WAP to find Eigen values and Eigen vector.
20. WAP to demonstrate try-catch block.

Note: The Instructor may add/delete/modify/tune experiments, wherever he/she feels in a justified manner.

RCAI-552: JAVA PROGRAMMING LAB

1. WAP to find the number of arguments provided at runtime.
2. WAP to calculate the simple interest by entering input by the user.
3. WAP to create a simple class to find out the area and perimeter of rectangle and box using super and this keyword.
4. WAP to design a class account using the inheritance and static that show all function of bank (withdrawal, deposit).
5. WAP to design a string class that performs String method (equal, reverse the string, change case).
6. WAP that import the user define package and access the member variable of classes that contained by package.
7. WAP to create a class component that shows controls and event handling on controls (Math calc).
8. WAP to draw a line, rectangle, oval using the graphics method.
9. WAP to create a Menu using the frame.
10. WAP to implement the Grid Layout and Card Layout.
11. WAP to create Frame to display the student information.
12. WAP to process student information and marks sheet using method overloading.
13. WAP to create an employee class and calculate the Gross salary of employee using inheritance.
14. WAP to illustrate the inheritance and use of the Super key word.
15. WAP to create a new txt file in the disk.
16. WAP to read string data from the File.
17. WAP to read data from the File.
18. WAP to create a Notepad using Swing.
19. WAP to create a calculator.
20. WAP to maintain student database using JDBC.

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Year-III (Semester-VI)

RCAI- 601: Database Management Systems

UNIT I

INTRODUCTION:- The Evolution of Database Systems- Overview of a Database Management System-Outline of Database-System Studies-The Entity- RELATIONSHIP DATA MODEL: Elements of the E/R Model-Design Principles-The Modeling of Constraints-Weak Entity Sets.

UNIT II

THE RELATIONAL DATA MODEL & ALGEBRA: - Basics of the Relational Model-From E/R Diagrams to Relational Designs Converting Subclass Structures to Relations Functional Dependencies Rules About Functional Dependencies-Design of Relational Database Schemas - Multivalued Dependencies. RELATIONAL ALGEBRA: Relational Operations-Extended Operators of Relational Algebra- Constraints on Relations.

UNIT III

SQL:-Simple Queries in SQL-Sub queries-Full-Relation Operations-Database Modifications Defining a Relation Schema-View Definitions- Constraints and Triggers: Keys and Foreign Keys-Constraints on Attributes and Tuples Modification of Constraints-Schema-Level Constraints and Triggers -Java Database Connectivity- Security and User Authorization in SQL.

UNIT IV

INDEX STRUCTURE, QUERY PROCESSING:-Index Structures: Indexes on Sequential Files-Secondary Indexes- B-Trees-Hash Tables-Bitmap Indexes. QUERY EXECUTION: Physical-Query-Plan Operators-One-Pass, two-pass & index based Algorithms, Buffer Management, Parallel Algorithms Estimating the Cost of Operations-Cost-Based Plan Selection -Order for Joins-Physical- Query Plan.

UNIT V

FAILURE RECOVERY :-Issues and Models for Resilient Operation -Undo/Redo Logging-Protecting against Media Failures.

CONCURRENCY CONTROL: Serial and Serializable Schedules-Conflict Serializability-Enforcing Serializability by Locks-Locking Systems with Several Lock Modes-Concurrency Control by Timestamps, validation.

TRANSACTION MANAGEMENT: Serializability and Recoverability-View Serializability-Resolving Deadlocks-Distributed Databases: Commit and Lock.

References :

1. Hector Garcia-Molina, Jeff Ullman, and Jennifer Widom, "Database Systems: The Complete Book", Pearson Education, Second Edition, 2008.
2. Silberschatz, H. Korth and Sudarshan S., "Database System Concepts", 6th Edition, McGraw-Hill International, 2010.
3. Elmasri R. and Shamakant B. Navathe, "Fundamentals of Database Systems", 6th Edition, Addison Wesley , 2011.

RCAI-602 :GRAPH THEORY

UNIT-I

Graphs, sub-graphs, some basic properties, Walks, Path & circuits, Connected graphs, Disconnected graphs and component, Euler and Hamiltonian graphs, The traveling sales man problem, Various operation on graphs.

UNIT-II

Trees and fundamental circuits, distance diameters, radius and pendent vertices, rooted and binary trees, on counting trees, spanning trees, fundamental circuits, finding all spanning trees of a graph and a weighted graph, algorithms of primes, Kruskal's and Dijkstra Algorithms.

Cut-sets and cut vertices, some properties, All cut sets in a graph, Fundamental circuit and cut sets, Connectivity and seperatability, Network flows, mincut theorem, Planar graphs, Combinatorial and geometric dual, Kuratowski to graph detection of planarity, Geometric dual, Some more criterion of planarity, Thickness and Crossings.

UNIT-III

Vector space of a graph and vectors, basis vector, cut set vector, circuit vector, circuit and cut set verses subspaces, orthogonal vectors and subspaces, incidence matrix of graph, sub matrices of $A(G)$, circuit matrix, cut set matrix, path matrix and relationships among A_f , B_f , and C_f , fundamental circuit matrix and rank of B , adjacency matrices, rank-nullity theorem .

UNIT-IV

Coloring and covering partitioning of graph, Chromatic number, Chromatic partitioning, Chromatic polynomials, Matching, covering, Four color problem.

UNIT-V

Directed graph, Types of directed graphs, Directed paths and connectedness, Euler digraph, Trees with directed edges, Fundamental circuit in digraph, Matrices A , B , C of digraph adjacency matrix of digraph, Enumeration and its types, Counting of labeled and unlabeled trees, Polya's theorem, Graph enumeration with polyas theorem, Graph theoretic algorithm.

References:

1. Deo N., "Graph Theory", PHI.
2. Harary F., "Graph Theory-With Applications to Engineering and Computer Science", Narosa Publishing House.
3. Singh S. B., "Combinatorics and Graph Theory", Khanna Book Publishing.
4. Joshi K. D., "Foundations of discrete mathematics", New Age International.

RCAI-603: ARTIFICIAL INTELLIGENCE

UNIT-I

Introduction: Introduction to Artificial Intelligence, Foundations and History of Artificial Intelligence, Applications of Artificial Intelligence, Intelligent Agents, Structure of Intelligent Agents.
Computer vision, Natural Language Processing.

UNIT-II

Introduction to Search: Searching for solutions, Uniformed search strategies, Informed search strategies, Local search algorithms and optimistic problems, Adversarial Search, Search for games, Alpha - Beta pruning.

UNIT-III

Knowledge Representation & Reasoning: Propositional logic, Theory of first order logic, Inference in first order logic, Resolution, Unification, Forward & Backward chaining, Probabilistic reasoning, Utility theory, Hidden Markov Models (HMM), Bayesian Networks.

UNIT-IV

Machine Learning: Supervised and unsupervised learning, Decision trees, Statistical learning models, Learning with complete data - Naive Bayes models, Learning with hidden data - EM algorithm, Reinforcement learning,

UNIT-V

Pattern Recognition: Introduction, Design principles of pattern recognition system, Statistical Pattern recognition, Parameter estimation methods - Principle Component Analysis (PCA) and Linear Discriminant Analysis (LDA), Classification Techniques – Nearest Neighbor (NN) Rule, Bayes Classifier, K-means clustering algorithms.

References:

1. Russell S. and Norvig P., “Artificial Intelligence – A Modern Approach”, Pearson Education.
2. Rich E. and Knight K., “Artificial Intelligence”, Tata McGraw Hill.
3. Charniak E. and McDermott D., “Introduction to Artificial Intelligence”, Pearson Education.
4. Patterson D. W., “Artificial Intelligence and Expert Systems”, Prentice Hall of India.
5. Khemnai D., “A First Course in Artificial Intelligence”, McGraw Hill.
6. Winston P.H., “Artificial Intelligence”, Pearson Education.
7. Thornton C. and Boulay B., “Artificial Intelligence- Strategies, Applications and Models Through Search”, New Age International Publishers.

RCAI-604: Introduction to Automata Theory & Languages

Unit-I

Basic concepts of Automata Theory: Alphabets, Strings and Languages, Deterministic Finite Automata (DFA) and Nondeterministic Finite Automata (NFA) – Definition, Representation using Transition Tables and State Diagrams, Language of DFA and NFA. NFA with ϵ -transitions, Language of NFA with ϵ -transitions, Equivalence of NFA and DFA.

Unit – II

Regular Expressions and Languages: Introduction, Definition of regular expression, Kleen's Theorem, Equivalence of regular expression and Finite Automata, Pumping Lemma for regular Languages, Closure properties of Regular Languages, Decision properties of Regular Languages, Finite Automata with Output: Moore and Mealy Machine, Equivalence of Moore and Mealy Machines.

Unit – III

Non-Regular Grammars: Definition of Grammar, Classification of Grammars, Chomsky's Hierarchy. Context Free Grammars (CFG) and Context Free Languages (CFL) - Definition, Examples, Derivation trees, Ambiguous Grammars, Simplification of Grammars, Normal forms of CFGs: CNF and GNF, Closure properties of CFLs, Decision Properties of CFLs, Pumping lemma for CFLs. Push Down Automata (PDA): Definition and Description, Language of PDA and its applications.

Unit – IV

Turing Machines: Introduction, Basic Features of a Turing Machine, Language of a Turing Machine, Variants of Turing Machine: Multitapes, Nondeterministic Turing Machine, Universal Turing Machine. Turing Machine as Computer of Integer functions, Halting problem of Turing Machine, Church-Turing Thesis 10. 11.

Unit – V

Undecidability: Introduction, Undecidable problems about Turing Machines, Rice's Theorem, Post's Correspondence problem (PCP) and Modified PCP. Tractable and Intractable Problems: P and NP, NPC Complete Problems, Introduction to recursive function theory.

Text Books:

1. Introduction to Automata theory, Languages and Computation, J.E.Hopcraft, R.Motwani, and Ullman. 2nd edition, Pearson Education Asia.
2. Introduction to languages and the theory of computation, J Martin, 3rd Edition, Tata McGraw Hill.
3. Elements and Theory of Computation, C Papadimitrou and C. L. Lewis, PHI.
4. Mathematical Foundation of Computer Science, Y.N.Singh, New Age International.
5. Theory of Computation and Application: Automata Theory And Formal Languages, Dr. Anil Kumar Malviya and Dr. MalabikaDatta, BPB Publication
6. Mishra, K. L. P., Chandrasekaran, N. "Theory of Computer Science Automata, Languages and Computation" PHI.

RCAI-605 : UNIVERSAL HUMAN VALUES & PROFESSIONAL ETHICS

“Universal Human Values & Professional Ethics” syllabus mentioned in the university portal.

RCAI-651 : Database Management Systems Lab

Objectives:

1. Installing oracle.
2. Creating Entity-Relationship Diagram using case tools.
3. Writing SQL statements Using ORACLE/MYSQL:
 - a) Writing basic SQL SELECT statements.
 - b) Restricting and sorting data.
 - c) Displaying data from multiple tables.
 - d) Aggregating data using group function.
 - e) Manipulating data.
 - f) Creating and managing tables.
4. Normalization in ORACLE.
5. Creating cursor in oracle.
6. Creating procedure and functions in oracle.
7. Creating packages and triggers in oracle.

Note: The Instructor may add/delete/modify/tune experiments, wherever he/she feels in a justified manner.

RCAI-652 : MINI PROJECT

Guidelines to prepare Mini-Project :

The student is expected to take up any industry oriented application and develop a mini-project on this topic preferably on C, C++, JAVA, VB etc. The implementation should involving all the phases of software development life-cycle i.e. problem formulation, design, and testing and implementation phases with proper project report during the semester.

Note: The Instructor may add/delete/modify/tune experiments, wherever he/she feels in a justified manner.