

# **MASTER OF COMPUTER APPLICATIONS (MCA)**

**LATEST CURRICULUM FOLLOWING  
CHOICE BASED CREDIT SYSTEM (CBCS)  
AND  
OUTCOME BASES LEARNING**

**APPLICABLE FOR MCA REGULAR ENTRY BATCH 2019-2022  
& LATERAL ENTRY FROM BATCH 2019-2021**

**DEPARTMENT OF COMPUTER SCIENCE AND APPLICATIONS**



**MAKHANLALCHATURVEDI NATIONAL UNIVERSITY  
OF JOURNALISM AND COMMUNICATIONS  
B-38, PRESS COMPLEX, M.P. NAGAR, ZONE-I, BHOPAL-462011**

## About the Department of Computer Science & Applications

The Department of Computer Science and Applications was established in the year 1993 with the aim of developing professionals in main stream of Computer Science and Applications.

The Department offers PhD and postgraduate degree courses through UTD. The Department studies market trends and new developments in the area, conducts massive brainstorming with leading academia and industry professionals to develop the curricula.

The Department is committed to provide excellence in teaching. It has a rich knowledge pool of well-trained faculty and a modern computer lab enabled to impart all required knowledge, a long with its own library with latest books on various advanced areas in computers. Regular hands-on workshops are conducted to update students with the latest technology.

Many of the alumni are working in top companies including IBM, MicroSoft, American Express Bank, Wipro, Infosys, Samsung, Microsoft, WorldPay, CISCO, HCL, Jindal, Web Dunia and more in India as well as abroad, apart from few also being entrepreneurs and some other, in academics with prestigious institutions.

### About The Masters of Computer Application (MCA) Program

Master of Computer Applications (MCA) is a three/ two years post graduate programme. The curriculum of MCA is designed to meet the growing demand of qualified professionals in the field of ICT. It comprises of the core subjects like database, networking, data structure, core programming languages like C, C++, .NET and Java. Students also get exposure to advanced topics like cyber security, mobile software, IOT, data science etc. Elective papers help students to have an exposure in Cloud Computing, Big Data and Information Security related subjects.

#### Regular Entry Mode:

Level - Postgraduate Duration - MCA - 3 years (6 semesters) Seats - 60

Eligibility Criteria - Graduate degree from recognised University with minimum 50% marks, and must have studied mathematics at Graduation or Senior Secondary level.

Approved by : AICTE

#### Lateral Entry Mode:

Level - Postgraduate

Duration - 2 years (4 semesters)

Seats - 35

Eligibility Criteria- BCA, B.Sc. (IT/Comp. Sc.) from recognised University with minimum 50% marks (45% for SC/ST) at graduate level. Must have Mathematics at 10+2 level or at Graduate Level.

Approved by : AICTE

#### Program Objectives

To empower students with basic skills of various technologies.

To develop the ability to identify, analyse, formulate and develop computer applications.

To enable the students to select modern computing tools and techniques and use them with dexterity.

If you are looking for challenging roles in the IT industry, computer science research, web and mobile development, data analysis, information security etc., this programme is for you.

#### Career Path after Completing the Programme

- Software Developer
  - Programmer
  - Systems Analyst
  - Computer Support Engineer
  - Database Administrator
  - Systems Administrator
  - Web Designer & Developer
  - Network Administrator
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# MakhanlalChaturvedi National University of Journalism & Communication, Bhopal

## MCA &MCA (Lateral Entry) CBCS Scheme July 2019

Semester	Core Courses(Compulsory)		Core Courses (Elective)	Open Electives
	4 Papers of 5 Credits	2 labs of 2 Credits	Choose 1 Paper of 5 Credits	Choose 1 Paper of 3 Credits From University Open Electives for PG in Each Semester
I (Regular Entry)	Principles of Programming Languages Digital Organization Programming in C Office Automation Using PC Package	C Programming Lab Office Automation Lab	Multimedia Applications E-Commerce and E-Governance	Advanced Excel Oracle and SQL Programming Python Programming
II	Numerical Methods Object Oriented Programming with C++ Database Management Systems Networked Knowledge Society	C++ Lab DBMS Lab	Communicative English Information System Analysis and Design	Angular Java Script Programming with R
III (Lateral Entry)	Web Technologies Data Structures and Algorithm Advance DBMS Operating Systems	Data Structure Lab Linux Lab	Discrete Mathematics Professional Communication Skills Microprocessor and Assembly Language Programming	Software Testing and Quality Assurance Cyber Crime & Laws
IV	Java Programming Computer Networks Cloud Computing Data Mining and Business Intelligence	Java Programming Lab IoT Lab	Computer Graphics Theory of Computation Management Theory & Practices	Soft Computing MATLAB Programming
V	Software Engineering Dot Net Technology  Information and Network Security  Artificial Intelligence & Machine learning	Dot Net Lab Mobile Application Development Lab	Compiler Design Big Data Analytics Linux Server Administration	
VI (Major Project)	Project Analysis & Planning Project Design & Development Project Testing & Validation Project Documentation Project Presentation & Viva			

## Semester I

Subject Code	Subject Name	L	T	P	Credits	Theory Marks	Internal Marks	Practical Marks	Total Marks
1MCA1	Principles of Programming Languages	5	0	0	5	80	20	0	100
1MCA2	Digital Organization	5	0	0	5	80	20	0	100
1MCA3	Programming in C	5	0	0	5	80	20	0	100
1MCA4	Office Automation Using PC Package	5	0	0	5	80	20	0	100
1MCA5(P)	C Programming Lab	0	0	4	2	0	10	40	50
1MCA6(P)	Office Automation Lab	0	0	4	2	0	10	40	50
Elective 1MCA7(A) 1MCA7(B)	Multimedia Applications E-Commerce and E-Governance	5	0	0	5	80	20	0	100
	Open Elective				3				50
<b>Semester Total Marks and Credits</b>					<b>32</b>				<b>650</b>

## Semester II

Subject Code	Subject Name	L	T	P	Credits	Theory Marks	Internal Marks	Practical Marks	Total Marks
2MCA1	Numerical Methods	5	0	0	5	80	20	0	100
2MCA2	Object Oriented Programming with C++	5	0	0	5	80	20	0	100
2MCA3	Database Management Systems	5	0	0	5	80	20	0	100
2MCA4	Networked Knowledge Society	5	0	0	5	80	20	0	100
2MCA5(P)	C++ Lab	0	0	4	2	0	10	40	50
2MCA6(P)	DBMS Lab	0	0	4	2	0	10	40	50
Elective 2MCA7(A) 2MCA7(B)	Communicative English Information System Analysis and Design	5	0	0	5	80	20	0	100
	Open Elective				3				50
<b>Semester Total Credits and Marks</b>					<b>32</b>				<b>650</b>

Key : L-Lecture hours, T- Tutorial hours , P-Practical hours, C-Credits

Instructions: For passing the subject examination minimum 40% marks must be separately scored in Theory Paper, Practical Exams and Internal Evaluation for the subject.  
Please refer concerned regulation for details

## Semester III

Subject Code	Subject Name	L	T	P	Credits	Theory Marks	Internal Marks	Practical Marks	Total Marks
3MCA1	Web Technologies	5	0	0	5	80	20	0	100
3MCA2	Data Structures and Algorithm	5	0	0	5	80	20	0	100
3MCA3	Advance DBMS	5	0	0	5	80	20	0	100
3MCA4	Operating Systems	5	0	0	5	80	20	0	100
3MCA5(P)	Data Structure Lab	0	0	4	2	0	10	40	50
3MCA6(P)	Linux Lab	0	0	4	2	0	10	40	50
Elective 3MCA7(A)	Discrete Mathematics	5	0	0	5	80	20	0	100
3MCA7(B)	Professional Communication Skills								
3MCA7(C)	Microprocessor and Assembly Language Programming								
	Open Elective				3				50
<b>Semester Total Credits and Marks</b>					<b>32</b>				<b>650</b>

## Semester IV

Subject Code	Subject Name	L	T	P	Credits	Theory Marks	Internal Marks	Practical Marks	Total Marks
4MCA1	Java Programming	5	0	0	5	80	20	0	100
4MCA2	Computer Networks	5	0	0	5	80	20	0	100
4MCA3	Cloud Computing	5	0	0	5	80	20	0	100
4MCA4	Data Mining and Business Intelligence	5	0	0	5	80	20	0	100
4MCA5(P)	Java Programming Lab	0	0	4	2	0	10	40	50
4MCA6(P)	IOT Lab	0	0	4	2	0	10	40	50
Elective 4MCA7(A)	Computer Graphics	5	0	0	5	80	20	0	100
4MCA7(B)	Theory of Computation								
4MCA7(C)	Management Theory & Practices								
	Open Elective				3				50
<b>Semester Total Credits and Marks</b>					<b>32</b>				<b>650</b>

Key : L-Lecture hours, T- Tutorial hours , P-Practical hours, C-Credits

- Instructions:
1. For passing the subject examination minimum 40% marks must be separately scored in Theory Paper, Practical Exams and Internal Evaluation for the subject.
  2. For passing the semester, minimum aggregate marks must be 45% in the semester.

## Semester V

Subject Code	Subject Name	L	T	P	Credits	Theory Marks	Internal Marks	Practical Marks	Total Marks
5MCA1	Software Engineering	5	0	0	5	80	20	0	100
5MCA2	Dot Net Technology	5	0	0	5	80	20	0	100
5MCA3	Information and Network Security	5	0	0	5	80	20	0	100
5MCA4	Artificial Intelligence & Machine learning	5	0	0	5	80	20	0	100
5MCA5(P)	Dot Net Lab	0	0	4	2	0	10	40	50
5MCA6(P)	Mobile Application Development Lab	0	0	4	2	0	10	40	50
Elective 5MCA7(A)	Compiler Design								
5MCA7(B)	Big Data Analytics	5	0	0	5	80	20	0	100
5MCA7(C)	Linux Server Administration								
	Open Elective				3				50
<b>Semester Total Credits and Marks</b>					<b>32</b>				<b>650</b>

## Semester VI

Subject Code	Subject Name	L	T	P	Credits	Theory Marks	Internal Marks	Practical Marks	Total Marks
Major Project 6MCA1	Project Analysis & Planning Project Design & Development Project Testing & Validation Project Documentation Project Presentation & Viva	0	0	50	25	0	200	300	500
<b>Semester Total Credits and Marks</b>					<b>25</b>	<b>0</b>	<b>200</b>	<b>300</b>	<b>500</b>

Key : L-Lecture hours, T- Tutorial hours , P-Practical hours, C-Credits

- Instructions:
1. For passing the subject examination minimum 40% marks must be separately scored in Theory Paper, Practical Exams and Internal Evaluation for the subject.
  2. For passing the semester, minimum aggregate marks must be 45% in the semester.

**Open Electives** : In accordance with the CBCS system implemented in the University, students are given a choice to choose subjects from different departments for a more versatile

choice offer. Students can Choose 1 Paper of 3 Credits in Each Semester From any Department of the University Open PG Electives offered..

The electives offered by CSA Department are listed below:

Subject Code	Subject Name	L	T	P	Credits	Theory Marks	Internal Marks	Practical Marks	Total Marks
COP(A)	Advanced Excel	2	0	1	3	25	10	15	50
COP(B)	Oracle & SQL Programming	2	0	1	3	25	10	15	50
COP(C)	Python Programming	2	0	1	3	25	10	15	50
COP(D)	Angular Java Script	2	0	1	3	25	10	15	50
COP(E)	Programming with R	2	0	1	3	25	10	15	50
COP(F)	Software Testing and Quality Assurance	3	0	0	3	40	10	0	50
COP(G)	Cyber Crime & Laws	3	0	0	3	40	10	0	50
COP(H)	Soft Computing	3	0	0	3	40	10	0	50
COP(I)	MATLAB Programming	2	0	1	3	25	10	15	50

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***Outcome Based Learning Basics : Course Outcomes (COs) & Program Outcomes (POs):***

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In accordance with the lightest teaching paradigms, this MCA program has been designed on the basis of outcome based learning. At the end of the MCA program, all the students are expected to fulfill the following Programme Outcomes.

PO1 :	Domain Knowledge
PO2 :	Problem Analysis
PO3 :	Design/Development of Solutions
PO4 :	Conduct Investigations of Problems
PO5 :	Modern Tool Usage
PO6 :	Professionals and Society
PO7 :	Environment and Sustainability
PO8 :	Ethics
PO9 :	Individual and Team Work
PO10 :	Communication
PO11 :	Project Management and Entrepreneurship
PO12 :	Life-long Learning

To successfully implement and ensure that these POs are implemented, they have been divided into different courses of the six semesters. Each of this course has been designed to fulfil specific Course Outcomes (COs) indicated in every course (subject). Further a metrics of mapping between the COs & POs have been given with every course, to ensure that the desired outcomes are successfully met. The Mapping Metrics also indicates the level of

understanding or mastering the subject numerically from 1 to 5. These correspond to the levels as indicated in the following table:

<b>S N</b>	<b>Level Meaning &amp; Reference</b>	<b>Skill Demonstrated</b>	<b>Question Ques / Verbs for tests</b>
1	Remember :1	Ability to Recall of Information Like, Facts, Conventions, Definitions, Jargon, Technical Terms, Classifications, Categories, and Criteria Ability to Recall Methodology and Procedures, Abstractions, Principles, and Theories in the Field	List, Define, Tell, Describe, Recite, Recall, Identify, Show, Label, Tabulate, Quote, Name, Who, When, Where, etc.
2	Understand :2	Knowledge of Dates, Events, Places	Describe, Explain, Paraphrase, Restate, Associate, Contrast, Summarize, Differentiate Interpret, Discuss
3	Apply :3	Mastery of Subject Matter	Calculate, Predict, Apply, Solve, Illustrate, Use, Demonstrate, Determine, Model, Experiment, Show, Examine, Modify
4	Analyse:4	Understanding Information	Classify, Outline, Break Down, Categorize, Analyze, Diagram, Illustrate, Infer, Select
5	Evaluate :5	Grasp Meaning	Assess, Decide, Choose, Rank, Grade, Test, Measure, Defend, Recommend, Convince, Select, Judge, Support, Conclude, Argue, Justify, Compare, Summarize, Evaluate



## SEMESTER I

### 1MCA1- PRINCIPLES OF PROGRAMMING LANGUAGES

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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#### *Course Objectives:*

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- The Purpose of this Subject is to cover the Underlying Concepts and Techniques Used in Programming Languages.
- Provide Conceptual Understanding of High Level Language Design and Implementation.
- It Provides a General Idea Related to the Programming Environment.
- To Introduce the Major Programming Paradigms, Principles and Techniques Involved in Design and Implementation of Modern Programming Languages.
- It Introduce Frameworks for Specifying and Reasoning About Programming Languages.

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#### *Course Outcome:*

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1. Describe Syntax and Semantics of Programming Languages and Understand the Key Concepts and Features of Programming Languages.
2. Trace Out the Error and Resolve it Using Debugging it also develop the Logical and Analytical Thinking.
3. Ability to Program in Different Language Paradigms and Evaluate Their Relative Benefits.
4. Analyze, and Compare Programs Written in the Various Programming Paradigms and Choose an Appropriate Programming Language Solution for a Given Programming Task.

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#### *Unit-wise Syllabus :*

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##### **UNIT-I**

Criteria for the Design of a Good Programming Language, Defining Syntax- the Character Set, BNF, Syntax Graphs, Syntax and Program Reliability, Variables, Expressions and Statements - Variables and the Assignment Statements, Binding Time & the Storage Allocation, Constants and Initialization, Conditional Statements, Iterative Statements, The Goto Statements and Labels.

##### **UNIT- II**

Data Types and Typing, Enumerated Data Types, Elementary Data Types, Type Coercion, Type Equivalence, Binding Scope and Extent Revisited.

##### **UNIT- III**

Procedures- General Features, Parameter Evaluation and Passing, Call-by-Name, Call by Value, Call by Reference, Call by Text, Specifications of Objects in a Procedure, Aliasing, Overloading, Generic Functions, co Routine, Data Abstraction.

#### UNIT- IV

Concurrency- Basic Concepts, Monitors, Message Passing, Concepts of Input - Output. Functional Programming - the Basics of LISP, the LISP Interpreter, Funargs and Fexprs, the Prog Features, Data Flow, Programming Languages, the Data Flow Model, and Language Design Goals.

#### UNIT- V

Object Oriented Programming Language – Object Oriented Programming Concepts, Object Oriented Programming Compared to Traditional Programming, Objects, Messages, Methods and Classes. Control Structures, Classes Compared to Abstract Data Type, Inheritance and Polymorphism.

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#### Reference Books :

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1. Ellis Horowitz-Fundamental of Programming Language-Galgotia Publication.
2. Allen B. Tucker Programming Languages, TMH Publication.
3. Robert W. Sebesta-Concepts of Programming Language-Tenth Edition, Addison Wesley, 2012.
4. Robert W. Sebesta-Concepts of Programming Languages- Low Priced Edition
5. CavloGhezzi& Mehdi Jazayeri " Programming Languages Concepts", Willey India
6. Terrance W Pratt, "Programming Languages: Design and Implementation" Pearson Edu.
7. Louden, "Programming Languages: Principles & Practics",Cengage Learning
8. Tennant. -Principles of Programming Languages. -PHI, 1981.
9. Michael Scott, Morgan Kaufmann-Programming Language Pragmatics- 2000.
10. Friedman, Wand and Haynes-Essentials of Programming Languages-Prentice-Hall International (PHI), 1998.

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3			2	1					1		1
2	3	3	2	3	2							1
3	3	3		2								1
4	3	3	2	3								1

# 1MCA2-DIGITAL ELECTRONIC AND COMPUTER ORGANIZATION

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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### *Course Objectives:*

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- To Understand Data Representation for Digital Logic
- To Understand the Basic Blocks of Digital Logic
- To Understand the Fundamental Organization of a Digital Computer
- To Design Simple Combination & Sequential Circuits
- To Examine the Basics of General Programming
- To Learn the Microprogrammed Controls
- To Learn the Memory and I/O Organization.

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### *Course Outcome:*

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1. Understand and Represent Data in Different Binary Formats
2. Design, Simplify and evaluate Boolean Equations and Circuits
3. Explain and Analyze Basic Building Blocks of Digital Electronics and Computer
4. Design and Analyze Simple Combination & Sequential Circuits
5. Analyze the Basic Computer Organisation and Programming
6. Understand the Organisation of I/O Devices and Computer Memory Mapping:

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### *Unit-wise Syllabus :*

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#### **UNIT-I**

Data Representation Data Types and Number Systems, Binary Number System, Octal & Hexa-Decimal Number System, Fixed Point Representation, 1's & 2's Complement, Binary Fixed- Point Representation, Arithmetic Operation on Binary Numbers, Overflow & Underflow, Floating Point Representation, Codes, ASCII, EBCDIC Codes, Gray Code, Excess-3 & BCD, Error Detection & Correcting Codes Binary Storage and Registers.

#### **UNIT- II**

Boolean Algebra and Digital Logic Circuits -Logic Gates, and, OR, NOT Gates and Their Truth Tables, NOR, NAND & XOR Gates, Boolean Algebra, Basic Definition and Properties, Basic Boolean Law's, Demorgan's Theorem Map Simplification, Minimization Techniques, K Map – Two, Three and More Variables Maps, Sum of Product & Product of Sums, Don't Care Conditions, Combination Circuits, Half Adder & Full Adder, Full Subtractor, Full Subtractor and Decimal Adder, Code Conversion, Multilevel NAND and NOR Circuits, Multiplexers and Demultiplexers, RAM and ROM, Working & Circuit

### UNIT- III

Sequential Circuits, Flip-Flops - RS, D, JK& T Flip-Flop, Triggering in Flip Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Flip Flop Excitation Tables, Registers, Counters and the Memory Unit, Shift Registers, Ripple Counters and Synchronous Counters, Design of Counters. Common Bus System, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Complete Computer Description

### UNIT- IV

Design of Basis Computer, Control Logic Gates, Control of Registers and Memory, Design of Accumulator Logic, Control of Ac Register, Adder and Logic Circuit, Multiple Bus Organization of Computer, Memory Addressing, Micro Program, Programming the Basis Computer, Machine Languages, Assembly Language.

### UNIT- V

Input-Output Organizations- I/O Interface, I/O Devices, Isolated Vs Memory-Mapped I/O, Synchronous & Asynchronous Data Transfer. Memory Organization - Auxiliary Memory, Magnetic Drum, Disk & Tape, Semi-Conductor Memories, Direct Memory Access (DMA), Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Address Space & Memory Space, Address Mapping, Page Table, Page Replacement, Segmentation, Cache Memory, Hit Ratio, Mapping Techniques, Memory Management Hardware .

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### Reference Books

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1. Computer System Architecture, Revised Third Edition, M. Morris Mano, Pearson.
2. Morris Mano -Digital Logic and Computer Design

Cos	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2								1		1
2	3	3	3	2								1
3	2	3	2	3						2		2
4	3	3	3									1
5	3	3	3	1	1		1					1
6	3	3			2							1

## 1MCA3 -PROGRAMMING IN C

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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### *Course Objectives:*

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- To Make the Student Learn a C Programming Language.
- To Learn Problem Solving Techniques using C .
- To Teach the Student to Write Programs in C and to Solve the Problems.
- To Teach the Concepts of C Programming Like Control Structures, Functions, Learn About Arrays, Structures, and Union .

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### *Course Expected Outcome:*

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1. Explain the Basic Terminology Used in Computer Programming.
2. Explain the Process of Problem Solving Using C Programming Language.
3. Write, Compile and Debug Programs in C Language.
4. Analyze and Solve Complex and Real Life Problems by Developing Application Programs using C Programming Language.

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### *Unit-wise Syllabus :*

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#### **UNIT-I**

Problem Identification, Analysis, Design, Coding, Testing & Debugging, Implementation, Modification & Maintenance; Algorithms & Flowcharts; Characteristics of a Good Program; Top Down Design; Bottom-up Design.

#### **UNIT- II**

History of C; Structure of a C Program; Data Types; Constant & Variable, Naming Variables, Operators & Expressions, Priority & Associativity of Operators; Control Constructs; Case Switch Statement; Arrays and its Types; Formatted & Unformatted I/O; Type Modifiers & Storage Classes; Ternary Operator; Type Conversion & Type Casting.

#### **UNIT- III**

Functions Basics; Arguments; Return Value; Parameter Passing Techniques – Call By Value, Call By Reference; Return Statement; Scope, Visibility and Life-Time Rules for Various Types of Variable; Calling a Function; Recursion: Basics, Comparison with Iteration, Types of Recursion- Direct, Indirect, Tree and Tail Recursion, When to Avoid Recursion.

#### **UNIT- IV**

Special Constructs: Break, Continue, Exit(), Goto & Labels; Pointers: & and \* Operators, Pointer Expression, Pointer Arithmetic, String; Pointer v/s Array; Pointer to Pointer; Array of Pointer & its Limitation; Function Returning Pointers; Pointer to Function, Function as Parameter; Structure: Basics, Pointer to Structure, Referential Operator, Self Referential Structures, Structure Within Structure, Array

in Structure, Array of Structures; Union: Basics, Declaration and use; Difference B/W Structure and Union.

**UNIT- V**

DMA: Dynamic Memory Management Concept and its Functions; File Handling: File Handling Concept and its Related Functions; Types of File and Differences b/w Them; Command Line Argument; File as Command Line Argument; C Preprocessor: Basics; Various Preprocessor Directives and their use.

**Reference Books:**

1. Kerninghan& Ritchie “The C Programming Language”, PHI
2. Schildt “C:the Complete Reference”, 4th Ed TMH.
3. Kanetkar Y. “Let Us C”, BPB.
4. Kanetkar Y.: “Pointers in C”,BPB
5. Gottfried : “Problem Solving in C”, Schaum Series
6. Balagurusami “Programming in ANSI C”,7<sup>th</sup>edMcGraw Hill Education.

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	1							2		1
2	3	3	2	1						2		1
3	3	3	3	3	2							1
4	3	3	3	2	2						1	1

# 1MCA4 -OFFICE AUTOMATION USING PC PACKAGES

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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## *Course Objectives:*

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- To Provide an In-depth Training of office Packages.
- To Understand the Basics of Windows Operating Systems
- To Understand uses Software Packages in Day to Day Activities

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## *Course Outcome:*

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1. Creating Word Documents for office use, Knowledge of Mail Merge.
2. Use of Formatting Techniques and Presentation Styles.
3. Provide Professional Services to the Society.
4. Create Presentation Using Animation and Transition and other features.
5. Construct Formulas, Including the use of Built-in Functions, and Relative and Absolute References and Create and Modify Charts and Preview and Print Worksheets.

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## *Unit-wise Syllabus:*

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### **UNIT-I**

**MS Windows:** Introduction to MS-Windows; Features of Windows; Various Versions of Windows & its use; Working with Windows; My Computer & Recycle Bin ; Desktop, Icons and Windows Explorer; Screen Description & Working Styles of Windows; Dialog Boxes & Toolbars; Working with Files & Folders; Simple Operations Like Copy, Delete, Moving of Files and Folders from One Drive to Another, Shortcuts & Auto starts; Accessories and Windows Settings Using Control Panel- Setting Common Devices Using Control Panel, Modem, Printers, Audio, Network, Fonts, Creating Users, Internet Settings, Start Button & Program Lists; Installing and Uninstalling New Hardware & Software Program on Your Computer.

### **UNIT- II**

**Office Packages:** Office Activates and their Software Requirements, Word-Processing, Spreadsheet, Presentation Graphics, Database, Introduction and Comparison of Various office Suites Like Ms-Office, Lotus-Office, Star-office, Open-Office etc.

**MS Word Basics:** Introduction to MS-Office, Introduction to MS-Word, Features & Area of use. Working with MS-Word, Menus & Commands, Toolbars & Buttons, Shortcut Menus, Wizards & Templates, Creating a New Document, Different Page Views and Layouts, Applying Various Text Enhancements, Working with -Styles, Text Attributes, Paragraph and Page Formatting, Text Editing Using Various Features ; Bullets, Numbering, Auto Formatting, Printing & Various Print Options

### UNIT- III

**Advanced Features of MS-Word:** Spell Check, Thesaurus, Find & Replace; Headers & Footers, Inserting - Page Numbers, Pictures, Files, Auto Texts, Symbols etc., Working with Columns, Tabs & Indents, Creation & Working with Tables Including Conversion to and from Text, Margins & Space Management in Document, Adding References and Graphics, Mail Merge, Envelops & Mailing Labels. Importing and Exporting to and from Various Formats.

### UNIT- IV

**Ms Excel:** Introduction and Area of use, Working with Ms Excel, Concepts of Workbook & Worksheets, Using Wizards, Various Data Types, Using Different Features with Data, Cell and Texts, Inserting, Removing & Resizing of Columns & Rows, Working with Data & Ranges, Different Views of Worksheets, Column Freezing, Labels, Hiding, Splitting etc., Using Different Features with Data and Text; Use of Formulas, Calculations & Functions, Cell Formatting Including Borders & Shading, Working with Different Chart Types; Printing of Workbook & Worksheets with Various Options.

### UNIT- V

**MsPowerPoint:** Introduction & Area of use, Working with MsPowerPoint, Creating a New Presentation, Working with Presentation, Using Wizards; Slides & its Different Views, Inserting, Deleting and Copying of Slides; Working with Notes, Handouts, Columns & Lists, Adding Graphics, Sounds and Movies to a Slide; Working with PowerPoint Objects, Designing & Presentation of a Slide Show, Printing Presentations, Notes, Handouts with Print Options.

**Outlook Express:** Features and Uses, Configuration and Using Outlook Express for Accessing E-Mails in office.

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#### Reference Books :

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1. Windows XP Complete Reference. BPB Publications
2. MSOffice XPComplete BPB Publication
3. MS Windows XP Home Edition Complete, BPB Publication.
4. Joe Habraken, Microsoft Office 2000, 8 in 1, -Prentice Hall of India
5. A. Mansoor I.T .Tools and Applications-Pragya Publications, Matura

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	2		3					1		2
2	2	1	1		2					2		2
3	2	2	2		2	3	1			2		1
4	3	3	3	2	2				1	2		1
5	2	2	1	3	2							1



## 1MCA5(P)-C PROGRAMMING LAB

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
0	0	4	2	-	40	10	50

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### Course Objectives:

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- To Provide the Knowledge of Programming Language to Students.
- To Prepare Students for Role of Professional Programmers.
- To Learn About Programming Methodology, Concepts of C Programming Like Control Structures, Functions, Learn About Arrays, Structures, and Union etc.

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### Course Outcome:

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1. Analyze the Problem and Write, Compile and Execute the Program and Verify the Outcome
2. Explain and apply a Various features of IDE of C / C++ Compiler .
3. Read, Understand and Trace the Execution of Programs Written in C language.
4. Write the C Code for a Given Algorithm Using Coding Guidelines .
5. Implement Programs with Pointers and Arrays to Manage the Memory.
6. Develop Small Applications and Utility in C in Group / Team .

### C Programming Lab:

1. Write a Program in C to Calculate Simple Interest When the Values of Principal, Rate and Time are given.
2. Write a Program in C to Calculate Area of a Circle When its Radius is Input from Keyboard.
3. Write a Program in C to Calculate Temperature in Centigrade When Temperature in Fahrenheit is Input from Keyboard.
4. Write a Program in C to Calculate Area of a Triangle When its Three Sides are Input from Keyboard (by Hero's Formula).
5. Write a Program in C to Determine Whether an Input Year is Leap Year Or Not.
6. Write a Program in C to Display the Table of a Number Input from Keyboard in the Following Format:  
N X 1 = N  
Eg: 5 X 1 = 5  
i. 5 X 2 = 10
7. Write a Program in C to Display the Table of Tables from 1 to 10.
8. Write a Program in C to Display the Following Patterns
9. Write a Program to Calculate the Factorial of a Number Input from Keyboard Using Recursive Method.
10. Write a Program in C to Show How to Pass an Array to a User Defined Function.

11. Write a Program in C to Display Largest Element of an Array When the Elements of the Array are Input from Keyboard.
12. Write a Program in C to Calculate Area of a Circle in a User Defined Function.
13. Write a Program in C to Swap Two Numbers Using Call By Value and Call By Address.
14. Write a Program in C to Reads Name, Roll No, Percentage of Five Students and Display Them Using Array of Structures.
15. Write a Program in C to Show How to Pass an Structure to a User Defined Function.
16. Write a Program to Calculate Total Marks, Percentage and Grade of a Student. Marks Obtained in Each of the Five Subjects are to Be Input by the User. Assign Grades According to the Following Criteria:
  - a. Grade a: Percentage  $\geq 80$                       Grade B: Percentage  $\geq 70$  and  $< 80$
  - b. Grade C: Percentage  $\geq 60$  and  $< 70$         Grade D: Percentage  $\geq 40$  and  $< 60$
  - c. Grade E: Percentage  $< 40$
17. Write a Menu-Driven Program, Using User-Defined Functions to Find the Area of Rectangle, Square, Circle and Triangle by Accepting Suitable Input Parameters from User.
18. Write a Program in C to Display the First N Terms of Fibonacci Series.
19. Write a Program in C to Calculate the Sum of Two Compatible Matrices.
20. Write a Program in C to Calculate the Product of Two Compatible Matrices.
21. Group Assignment 1. Design Simple Calculators 2. Design Marksheet for MCA 3. Design Ludo Game

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	3	3	2							1
2	3	2	2		3					2		1
3	2	2	1	3	3							1
4	3	3	3	3	3			2				1
5	2	2	2	2								1
6	3	3	3	3	3				2	2	2	2

## 1MCA6(P)- OFFICE AUTOMATION TOOLS LAB

L	T	P	C	TheoryPaper	PracticalExams	InternalEvaluation	Total Marks
0	0	2	2	-	40	10	50

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### *Course Objectives:*

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- To Provide the Knowledge of Microsoft Office Package.
- To Prepare Students to make use of Ms-Office Package Professionally.
- To Learn About Word Processing, Ms Excel, Power Point Presentation etc.

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### *Course Objectives*

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1. Use Microsoft Office Programs to Create Personal, Academic and Business Documents Using Current Professional and/or Industry Standards.
2. Perform Calculations in Microsoft Excel Using Formulas and Built-in Functions.
3. Prepare Datasheet and Graphs to Describe and analyze the Data in Microsoft Excel.
4. Create Effective Presentation Using Various Features of Ms PowerPoint

### **Experiment on Windows**

1. Starting the Windows, Starting a Program, Running a Program, Running Multiple Programs and Switching Between Windows, Customizing the Task Bar, Recycle Bin, Restoring the Deleted Files
2. Creating and Removing Folders, Making the Taskbar Wider, Arranging Icons on the Desktop, Displaying and Hiding the Taskbar Clock, Controlling the Size of Start Menu Options, Creating Shortcuts.
3. Installing a Screen Saver, Assigning a Wallpaper to Desktop, Adding a Program to the Start Menu, Adding a Program Shortcut in the Desktop, Customizing the Mouse Settings. Expanding and Collapsing a Folder, Recognizing File Types Using Icons, Running a Program from Explorer, Renaming a File or Folder, Sorting a Folder
5. Displaying the Properties for a File or Folder, Using Cut and Paste Operations to Move a File, Using Copy and Paste Operations to Copy a File, Moving and Copying Files with Mouse, Searching a File or Folder by Using Search Command, Finding a File or Folder, by Name, Defragmenting the Disk, Using Disk Defragmenter, Controlling the Speaker Volume, Recording and Saving an Audio File, Connecting a Printer to the Pc

## Experiment on Word Processing:

1. Type the Following Paragraph as Given.

“My Dream Career”

My Ambition of Life is to Become a Doctor. I Have Taken Up Science and Hygiene as Optional Subjects. When I Joint College, I Shall Take UP Medical Group. I Shall Appear in the P.M.T. Examination to Qualify for Joining a Medical College. After Passing the P.M.T., I Shall Join the Medical College to Become a Doctor.

I Would Like to Be a Doctor. My Country Has Become Free from Diseases, Government Has Decided to Uproot the Diseases from the Country and Improve the Health of the People. Hospitals are Being Opened for This Purpose. There is Great Demand for Doctor. Taking All These Things into Consideration I Have Made Up Mind to Become a Doctor.

I Do Not Want to Be Clerk. This Line Does Not Suit Me. I Do Not Want to Be a Teacher. Law is Not a Paying Profession These Days So Becoming Lawyer is Not My Goal.

2. Correct any Spelling Errors Displayed in the Given Text.
3. Save the Document as <My Dream >\_W01.
4. Change the Layout of the Page as Given Below.  
>Page Size: A4 (8.27" X 11.69") >Page Orientation: Landscape
5. Change the Page Margins as Follows:  
>Top: 1.25">Bottom: 1.25">Right: 1.25">Left: 1.25"
6. Format the Entire Document as Given Below.  
>Line Spacing: 1.15" >Font: Times New Roman >Font Size: 14  
>Align: Justify
7. Select the Heading “Academy Award” and Format It as Given Below.  
>Font Color: Blue >Style: Bold and Underline >Align: Center  
>Change All the Letters to Uppercase
8. Make the First Letter of the Paragraph Larger and Fall into Three Lines (Drop Cap).
9. Format the Heading “My Dream Career” with Style: Heading 2.
10. Create a Bulleted List for the Last Paragraph Lines of Document.
11. Enter “My Document Tutorial” Text as the Heading of the Table and Format It to Get the Following Output Using a Word Art. (Font: Arial Black, Font Size: 16, Align: Center)
12. Insert Footer with the Following Formatting Options.  
>Caption: <My First Document>>Font: Times New Roman >Font Size: 12
13. Insert the W01 Image Given in the "Resources" Directory, to the Right Hand Side of the Bulleted List of the Document.
14. Prepare Your Class Time Table Using and Format the Entire Table as Given Below.  
> Change the Cell Size of the Table to Auto Fit to Contents. >Align: Center
15. Select the Heading Row and Format It as Given Below.  
> Convert All Text in to Capital Letters >Style: Bold >Align: Center

16. Insert a New Row Just Below the Last Row of the Table and Enter the Following Information into the New  
 Row: >Saturday: Special Lecture on Cloud Computing > Merging All the Column.
17. Send a Call Letter for All Applicants to Inform Interview Details Using Mail Merge Base
18. Preparing a Govt. Order / official Letter / Business Letter / Circular Letter  
 Covering Formatting Commands - Font Size and Styles - Bold, Underline, Upper Case, Lower Case, Superscript, Subscript, Indenting Paragraphs, Spacing Between Lines and Characters, Tab Settings etc.
19. Preparing a News Letter:  
 To Prepare a Newsletter with Borders, Two Columns Text, Header and Footer and Inserting a Graphic Image and Page Layout.
20. Creating and Using Styles and Templates  
 To Create a Style and Apply That Style in a Document  
 To Create a Template for the Styles Created and Assemble the Styles for the Template.
21. Creating and Editing the Table  
 To Create a Table Using Table Menu  
 To Create a Monthly Calendar Using Cell Editing Operations Like Inserting, Joining, Deleting, Splitting and Merging Cells  
 To Create a Simple Statement for Math Calculations Viz. Totalling the Column.
22. Creating Numbered Lists and Bulleted Lists  
 To Create Numbered List with Different Formats (with Numbers, Alphabets, Roman Letters)  
 To Create a Bulleted List with Different Bullet Characters.
23. Printing Envelopes and Mail Merge.  
 To Print Envelopes withfrom Addresses and to Addresses  
 To use Mail Merge Facility for Sending a Circular Letter to Many Persons  
 To use Mail Merge Facility for Printing Mailing Labels.
24. Using the Special Features of Word
25. To Find and Replace the Text
26. To Spell Check and Correct.
27. To Generate Table of Contents for a Document
28. To Prepare Index for a Document.
29. Create an Advertisement
30. Prepare a Resume.
31. Prepare a Corporate Circular Letter Inviting the Share Holders to Attend the Annual Meeting

### **Spreadsheet Experiment:**

1. Create a Blank Spreadsheet in and Save It as "<Your Index No>\_E01".
2. Create a Table with 7 Rows and 8 Columns in the Cell Range A3:H9.
3. Insert a Title "Vivekananda College " and a Sub Title "Mark Sheet for a/L Biology- Class a", by Centering It with the Table, Making the Text Bold, and Changing the Font Size 16 for Main Title and 14 for Subtitle.
4. Enter Data of 6 Students Under the Columns, "Roll No", "Name", "Physics", "Chemistry", "Biology", and "English".
5. Use the Relevant Formula to Calculate the Total Marks and Average and Copy the Formula to the Relevant Cells.
6. Format the "Average" Column with Two Decimal Places.
7. Use Conditional Formatting to Change the Color of the Cells of Which the Average Mark is More Than 60, into Green.
8. Select the Columns, "Roll No", "Physics", "Chemistry", "Biology", and "English" Column and Draw a Column Chart.
9. Insert the Title, "Vivekananda College ", and the Sub Title, "Mark Sheet for a/L Biology - Class a" to the Top of the Chart.
10. Set the X Axis Labels with the Index Numbers.
11. Label the X Axis Title as, "Roll No" and Y Axis Title as, "Marks".
12. Label the Legends for 4 Subjects, "Physics", "Chemistry", "Biology" and "English".
13. Make Sure to Get a Graph Similar to the One Given Below.
14. Sorting Data, Filtering Data and Creation of Pivot Tables.
15. Operating on the Sheets: Finding, Deleting and Adding Records, Formatting Columns, Row Height, Merging, Splitting Columns etc. Connecting the Worksheets and Enter the Data.

### **Presentation Experiments**

- Create a Presentation with Four Blank Slides.
- Modify the Presentation as Follows.
  - a. Insert a Suitable Design Template.
  - b. Insert a Footer to Show Your Name and Your Student Id.
  - c. Insert Today's Date as a Fixed Date in the Date Area.
  - d. Make Necessary Changes to Appear Slide Numbers in the Slide Number Area.
  - e. Make Necessary Changes So That the Footer, Date and the Slide Number Do Not Appear on the Title Slide (First Slide).
- Add Content to the Title Slide (First Slide) by Following the Instruction Given Below.
  - a. Type "River" as the Slide Title and It's Format Should Be Font Type: Arial, Style: Bold, Size:96, Color: Black [10 Marks]
  - b. Type "Our Life Support" as the Sub Title and Insert an Image from the Resources Directory to a Suitable Location.
- Add Content to the Second Slide by Following the Instruction Given Below.

- Type the Slide Title as, "Rivers of North India" and Format It as,  
Font Type: Arial, Style: Bold, Size: 44, Color: Black

Insert the Following Content as Shown Below.

- a. The Ganga
- b. The Indus
- c. The Brahmaputra
- In the Third Slide, Add the Following Components.
  - a. Type the Slide Title as, "Tributaries"
  - b. Insert Rivers and Their Tributaries of Slide 2 in a Table.
  - c. Insert Few More Important Rivers of India with Their Regions.
- Add the Following Animation Effects to Your Presentation.
  - a. Apply Emphasis Animation Effect to Each Main Point and Sub Point in the Second Slide.
  - b. Apply Sound Effect When the Second Slide Appears in the Slideshow.
  - c. Hide the Fourth Slide from the Slide Show.

Save Your Presentation with the Following File Name <Rivers of \_North India>\_ P01.

Next Practicals

1. Creating a New Presentation Based on a Template – Using Auto Content Wizard, Design Template and Plain Blank Presentation.
2. Creating a Presentation with Slide Transition – Automatic and Manual with Different Effects.
3. Creating a Presentation Applying Custom Animation Effects –
4. Applying Multiple Effects to the Same Object and Changing to a Different Effect and Removing Effects.
5. Creating and Printing Handouts.

Cos	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	3		2				2			1
2	3	3	2	2	2							1
3	3	3	2	2	2					1		1
4	2	2	2	1	2					2		2

# 1MCA7(A) - MULTIMEDIA APPLICATIONS

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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## ***Course Objectives:***

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- To Provide Students with a Basic Understanding of Multimedia Systems and its Components.
- This Course Focuses on Topics in Multimedia Information Representation and Multimedia Standards in the Components of Multimedia – Text, Audio, Image, Video and Animation.
- To Provide Information about the Standards Tools and Techniques Used in Development of Multimedia Components for Productions
- To Create Simple Multimedia Applications and Products for Using Standalone, Networked Or Web Based Computers.

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## ***Course Outcomes:***

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1. Develop Understanding of Technical Aspect of Multimedia Systems.
2. Understand and explain the storage mechanism and applicability of Various File Formats for Audio, Video and Text Media.
3. Develop Various Multimedia Systems Applicable in Real Time.
4. Create a Multimedia Component Using Various Tools and Techniques.
5. Apply the Guidelines and Standards of Multimedia Systems and to Analyzethe performance of Multimedia System.

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## ***Unit-wise Syllabus :***

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### **UNIT-I**

Introduction to Multimedia, Needs and Areas of use, Development Platforms for Multimedia Identifying Multimedia Elements Text, Images, Sound, Animation and Video, Making Simple Multimedia with PowerPoint.

Concepts of Plain & Formatted Text, RTF& HTML Texts, Using Common Text Preparation Tools, Conversion to and from of Various Text Formats, Using Standard Software, Object Linking and Embedding Concept.

### **UNIT-II**

Sound - Sound and its Attributes, Sound and its Effects in Multimedia, Frequency, Sound Depth, Channels and its Effects on Quality and Storage, Size Estimation of Space of a Sound File, Sound Card Standard – FM Synthesis Cards, Waves Table Cards, Midi and MP3 Files and Devices, 3D Sounds, Recording and Editing Sound Using Sound Editors Like Audacity, Sound Forge etc.

Importance of Images Graphics in Multimedia, Vector and Raster Graphics, Regular Graphics Vs. Interlaced Graphics, Image Capturing Methods - Scanner, Digital Camera etc. Color Models- RGB, CYMK, HUE, Saturation, and Brightness, Various Attributes of Images Size, Color, Depth etc, Various



Image File Format BMP, DIB, CIF, PIC, and TIF Format Their Features and Limitations, Image Format Conversion, Various Effects on Images. Create Images Using Photoshop, Coreldraw and Apply Various Effects, Using Layers, Channels and Masks in Images.

### UNIT-III

Video- Basic of Video, Analog and Digital Video Type of Video, Digitization of Analog Video, Video Standard – NTSC, PAL, HDTV, Video Capturing Media /Instruments Videodisk Camcorder Compression Techniques, File Formats AVI, JPG, MPEG, Video Editing and Movie Making Tools, Converting Formats of Videos, Recording and Editing Videos Using Video Editing Software Like Adobe Premiere or Sony Vegas.

### UNIT-IV

Animation and its Basic – Principals of Animation and its use in Multimedia, Computer System Configuration and Peripherals Requirements, Software for Animation, Effects of Resolution, Pixel Depth, Image Size, on Quality and Storage, Types of Animation and Applications.

Authoring Tools for Multimedia – Introduction to Various Types of Multimedia Authoring Tools, CD/DVD Based and Web Based Tools, Features and Limitations, Creating Multimedia Package Using All Components.

### UNIT-V

Introduction to Virtual Reality and its Applications, Virtual Reality Terminology Head Mounts Display (HMD), Boom, Cave, Input Devices and Sensual Technology, Characteristic If Immersive vs. Shared, Augmented and Mixed Reality

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#### **Reference Books:**

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1. Ramesh Bangia-Introduction to Multimedia-Laxmi Publications Pvt. Ltd.
2. Tay Vaughan-Multimedia: Making It Work,TataMc-Graw Hill.
3. Bhatnager G. Elsevie-,Introduction to Multimedia Systems,
4. Satish Jain O Level Introduction to Multimedia (M4.2-R4), BPB Publications.

Cos	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	2		1							1
2	3	3	2	1	1							1
3	3	3	3	2	2	1						1
4	3	3	3	1	3							1
5	3	3	3	2	2		1	2		1	1	1

## 1MCA7(B)-E-COMMERCE AND E-GOVERNANCE

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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### *Course Objectives:*

---

- To Develop Skills in Understanding Strategic Issues Related to E- Commerce and E- Governance
- To Develop a Broad Knowledge of E-Governance and E-Commerce Activities in India
- To Understand the Electronic Payment Systems
- To Develop Knowledge of How the Government May Contribute in Moving the Country Towards E-Commerce and E- Governance

---

### *Course Outcome:*

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1. Explain and demonstrate E-Governance Initiatives at the National Level in India
2. Make Classification of E-Commerce and E- Governance
3. Students Able to Think Critically and Analytically to New Successful Business Ideas.

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### *Unit-wise Syllabus :*

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#### **UNIT-I**

Introduction to E-Commerce: Definition, History of E-Commerce, E-Business Models B2B, B2C, C2C, C2B, Environment of E-Commerce, Dimensions of E-Commerce, Ethical Issues, Electronic Data Interchange, Value Chain and Supply Chain, E-Commerce Marketing, E-Commerce Strategy, E-Commerce Infrastructure, Advantages and Disadvantages of E-Commerce.

#### **UNIT- II**

Electronic Payment Systems: Payment Gateways, Payment Cards, Credit Cards, Debit Cards, Smart Cards, E-Credit Accounts, E-Money, Marketing on the Web, Categories of E-Commerce, Edi, Marketing Strategies, Advertising on the Web, Customer Service and Support, Internet Banking, Introduction to M-Commerce, Case Study: E-Commerce in Passenger Air Transport, Element of E-Commerce, Issues of E-Commerce

#### **UNIT- III**

E-Government, Theoretical Background of E-Governance, Issues in E-Governance Applications, Evolution of E-Governance, its Scope and Content, Benefits and Reasons for the Introduction of E-Governance, E-Governance Models- Broadcasting, Critical Flow, Comparative Analysis, Mobilization and Lobbying, Interactive Services / G2C,C2G

#### UNIT- IV

E-Readiness, E-Government Readiness, E- Framework, Step & Issues, Application of Data Warehousing and Data Mining in E-Government, Case Studies: NICNET-Role of Nationwide Networking in E-Governance, E-Seva. Origins in India E-Governance Projects in India Measures to Be Considered Before Going for E-Governance, Workplan and Infrastructure

#### UNIT- V

E-Government Systems Security: Challenges and Approach to Security of E-Government, Security Concern in E-Commerce, Security for Server Computers, Communication Channel Security, Security for Client Computers. E-Security Network and Web Site Risk for E-Business, Information Technology ACT 2000 and its Highlights Related to E-Commerce, E-Security, Firewalls, Electronic Market / E- Shop, Introduction to Security, Types of Securities, Security Tools, Network Security.

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#### *Reference Books*

---

1. Gary P. Schneider, "E-Commerce", Cengage Learning India.
2. C.S.R. Prabhu, "E-Governance: Concept and Case Study", PHI Learning Private Limited.
3. P. Tjoseph, S.J., "E-Commerce an Indian Perspective", Prentice-Hall of India.
4. V. Rajaraamn, "Essentials of E-Commerce Technology", PHI Learning Private Limited.
5. Amir Manzoor " E-Commerce: an Introduction", Lambert.

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	2	1	1	1	2	2	1	1		1		1
2	2	2	1	2	2	2		2				2
3	2	3	3	2	2	2				1		1

## SEMESTER II

### 2MCA1-NUMERICAL METHODS

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

---

#### *Course Objectives:*

- To make aware to the Student's about need of Numerical Methods.
- Cover the Classical Fundamental Topics in Numerical Methods Such as Approximation, Numerical Integration, Numerical Linear Algebra, Solution of Nonlinear Algebraic Systems and Solution of Ordinary Differential Equations
- To Make aware to the Student's about Numerical Analysis Software and Computer Facilities

---

#### *Course Outcomes:*

1. Understand and analyze the real problems and formulate them into linear and non-linear equations
2. Gain the knowledge of various Optimization Techniques for finding the solutions of Non-Linear and Linear Equations.
3. Apply Numerical Differentiation and Integration techniques for finding the solutions of Ordinary and Partial Differential Equations.
4. Optimize the solutions by iteratively carrying out Error Analysis for Arithmetic Operations.
5. Understand and explain the Propagation of Errors with the help of Complex Numerical Algorithms.
6. Understand the usage of Interpolation techniques for Numerical Differentiation and Integration.

---

#### *Unit-wise Syllabus :*

##### **UNIT-I**

Solving Nonlinear Equations- Computer & Arithmetic Errors, Method of Bisection, the Secant Method, Newton- Raphson Method, Newton's Method for Polynomial, Horner's Method, Muller's Method Order of Convergence of other Method

##### **UNIT-II**

Solving Sets of Equations- Matrix Notation, Determinants and Matrix Inversion, Norms, the Elimination Method, Gauss and Gauss-Jordan Method, Iterative Method

##### **UNIT-III**

Interpolation - Forward Differences, Lagrangian Polynomial, Divided Differences for a Polynomial Error of Interpolation, Least Square Approximation

##### **UNIT-IV**

Numerical Differentiation and Integration - Derivatives from Difference Table, Extrapolation Techniques, Newton Cotes Integration Formula, The Trapezoidal Rule, Simpson's Rule

## UNIT-V

Numerical Solution of Ordinary Differential Equations – the Taylor-Series Method, Euler and Modified Euler Methods, Runge-Kutta Method

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### Reference Books:

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1. B.S. Grewal, "Numerical Methods in Engineering & Science", Khanna Publication, Ed. 9th.
2. E. Balagurusamy, "Numerical Method", Tata McGraw Hill Publication.
3. S.S. Sastry, "Introductory Methods of Numerical Analysis", PHI Learning Pvt. Ltd.
4. F. Gerald, Pitrick O. Wheatley. Applied Numerical Analysis,
5. J. Stoer and R. Bulirsch, Introduction to Numerical Analysis, Springer-Verlag, ISBN 0-387-90420-4
6. L.N. Trefethen and D. Bau, Numerical Linear Algebra, Society of Industrial and Applied Mathematics
7. C.T. Kelley, Iterative Methods for Linear and Nonlinear Equations, Society of Industrial and Applied Mathematics

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	2	2	1	1						2
2	3	3	3	2	2							2
3	3	3	3	2	1							2
4	3	3	3	2	2							2
5	3	3	2	3	2					2		2
6	2	2	2	3	2							2

## 2MCA2- OBJECT ORIENTED PROGRAMMING WITH C++

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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### *Course Objectives:*

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- To Understand how C++ Improves C with Object-Oriented Features.
- To Learn how to Write Inline Functions for Efficiency and Performance.
- To Learn the Syntax and Semantics of the C++ Programming Language.
- To Learn how to Design C++ Classes For Code Reuse.
- To Learn how to Implement Copy Constructors and Class Member Functions.
- To Learn how to Overload Functions and Operators in C++.
- To Learn how Containment and Inheritance Promote Code Reuse in C++.
- To Learn how to Use Exception Handling in C++ Programs.

---

### *Course Outcomes:*

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1. Explain Concepts and Advantages of Object Oriented Programming.
2. Apply and implement the concepts of the Object-Oriented paradigms to analyze, design and develop the solutions of real world problems using the Principles of information Hiding, Localization and Modularity.
3. Design, Develop and maintain the small applications, system utility for societal and academic problems using reusability concepts in team spirit.
4. Demonstrate the Advanced Features of C++ Specifically Stream I/O, Templates and Operator Overloading and overriding.

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### *Unit-wise Syllabus :*

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#### **UNIT-I**

Overview of C++: Object Oriented Programming, Concepts, Advantages, Usage, Program Development Environment, C++ Language Standards, Introduction to Various C++ Compilers, C++ Standard Libraries, Main Function in C++, Meaning of Empty Argument List, Function Prototyping, Default Arguments and Argument Matching, User Defined Data Types, Classes & Objects : Structure, Union & Classes, Inline Function, Scope Resolution Operator, Static Class Members: Static Data Member, Static Member Function, Passing Objects to Function, Returning Objects, Object Assignment, Friend Function, Friend Classes

#### **UNIT- II**

Array, Pointers References & the Dynamic Allocation Operators: Array of Objects, Pointers to Object, Type Checking C++ Pointers, This Pointer, Pointer to Derived Types, Pointer to Class Members, References: Reference Parameter, Call by Reference and Return by Reference Passing References to Objects, Returning Reference, Independent Reference, C++'S Dynamic Allocation Operators, Initializing Allocated Memory, Allocating Array, Allocating Objects. Constructor & Destructor: Introduction,

Constructor, Access Specifiers for Constructors, and Instantiation, Parameterized Constructor, Multiple Constructor in a Class, Constructor with Default Argument, Copy Constructor, Destructor

**UNIT- III**

Overloading as Polymorphism, Function & Operator Overloading, Function Overloading, Overloading Constructor Function Finding the Address of an Overloaded Function, Operator Overloading: Creating a Member Operator Function, Creating Prefix & Postfix Forms of the Increment & Decrement Operation, Overloading the Shorthand Operation (I.E. +=, -= etc.), Operator Overloading Restrictions, Operator Overloading Using Friend Function, Overloading New & Delete, Overloading Some Special Operators, Overloading [ ], ( ), -, Comma Operator, Overloading << and . Namespaces: Global Namespace and Namespace Standard, Nested Namespaces

**UNIT- IV**

Inheritance: Base Class Access Control, Protected Base Class Inheritance, Inheriting Multiple Base Classes, Constructors, Destructors & Inheritance, When Constructor & Destructor Function are Executed, Passing Parameters to Base Class Constructors, Granting Access, Virtual Base Classes, Virtual Functions & Polymorphism: Virtual Function, Pure Virtual Functions, Early Vs. Late Binding.

**UNIT- V**

Exception Handling, Exception Handling in C++, Try, Throw, Catch Sequence, Multiple Catch Blocks, Uncaught Exceptions, Catch-All Exception Handler, the C++ I/O System Basics: C++ Streams, the Basic Stream Classes C++ Predefined Streams, Formatted I/O: Formatting Using the IOS Members, Setting the Formal Flags, Clearing Format Flags, an Overloaded Form of Setf(), Using Width() Precision() and Fill(), Using Manipulators to Format I/O, Creating Your Own Manipulators.

**Reference Books :**

1. B.S. Gottfried – Programming with C – Schaum's Outline Series – Tata McGraw Hill 2<sup>nd</sup> Edition – 1998.
2. E. Balagurusamy – Programming in C– TataMcGraw Hill 3<sup>rd</sup> Edition– 2004.
3. K.R. Venugopal, Sudeep R. Prasad – Programming with C – Tata McGraw Hill - 2002.
4. YashavantKanetkar – Let Us C – BPB Publications- 5<sup>th</sup> Edition - 2004.

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	2	2	2					2		2
2	3	3	3	3	2	1		1				2
3	3	3	3	2	2	2		1	2	2	2	2
4	3	2	2	2								1

## 2MCA3-DATABASE MANAGEMENT SYSTEM

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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### *Course Objectives:*

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- To Understand the Fundamentals of Data Models and Conceptualize and Depict a Database System Using ER Diagram.
- To Make a Study of Relational Database Design.
- To Know about Data Storage Techniques and Query Processing.
- To Acquire the Knowledge of Query Evaluation to Monitor the Performance of the DBMS.
- To Impart Knowledge in Transaction Processing, Concurrency Control Techniques and Recovery Procedures.

---

### *Course Outcome:*

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1. Understand and describe the basic concepts and terminology of Database Management System.
2. Analyze and Design the database of applications using ER modeling and Normalization.
3. Evaluate business information problem and find out the data requirements of organization.
4. Demonstrate the database schema, data modeling and normalization process with the help of example.
5. Implement the database design using appropriate database tools.
6. Describe the transaction processing system, locking techniques and data recovery.

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### *Unit-wise Syllabus :*

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#### **UNIT-I**

Introduction : File Systems Versus Database Systems, Data Models, DBMS Architecture, Data Independence, Data Modeling Using Entity – Relationship Model, Enhanced E-R Modeling.

#### **UNIT-II**

Relational Model and Query Evaluation : Relational Model Concepts, Structure of Relational Database, Database Schema, Key, Relational Operations, Formal Relational Query Languages, Relational Algebra, Relational Calculus, Tuple Relational Calculus, Domain Relational Calculus, Overview of Commercial RDBMS, Database Design, Functional Dependencies, Normal Forms 1NF, 2NF, 3NF, BCNF, 4NF, 5NF, Algorithms for Executing Query Operations, Cost Estimation

#### **UNIT-III**

Transaction Processing: Transaction Processing, Locking Techniques, Time Stamp Ordering, Validation Techniques, Recovery Concepts, Shadow Paging, Log Based Recovery, Database Security Issues, Access Control, Statistical Database Security



#### UNIT-IV

Files and Indexing:File Operations, Hashing Techniques, Indexing, Single Level and Multi-Level Indexes, B+ Tree, Static Hashing, Indexes on Multiple Keys.

#### UNIT- V

Special Purpose Databases:OODBMS-Object-Based Databases, OO Data Model, OO Languages, Persistence, Object, Relational Databases, XML, Structure of XML, Temporal Databases, Mobile Databases, Spatial Databases

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#### Reference Books:

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1. Abraham Silberschatz, Henry F.Korth and S.Sundarshan “Database System Concepts”, Sixthedition, McGraw Hill
2. C.J. Date, “an Introduction to Database Systems”, Eight Edition, Pearson Education Delhi
3. Ramezelamassri and Shankant B-Navathe, “Fundamentals of Database Systems”, Sixthedition, Pearson Education Delhi
4. Raghu Ramakrishnan, Johannes Gehrke, “Database Management Systems” McGraw Hill
5. Peter Rob, Carlos Coronel, “Database System Concepts”, Cengage Learning
6. Frank. P. Coyle, “XML, Web Services and the Data Revolution”, Pearson Education
7. Lee Chao, “Database Development and Management”, Auerbach Publications
8. Peter Rob, Carlos Coronel, “Data Base System Concepts”, Ceange Learning

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	2	2	2					2		2
2	3	3	3	3	2					2		2
3	3	3	3	2	2					2		2
4	3	3	2	2	1					2		2
5	3	3	3		2							2
6	3	3	2							2		2

## 2MCA4 – NETWORKED KNOWLEDGE SOCIETY

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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### *Course Objective:*

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- Provide the Understanding of the Characteristics of Knowledge Societies.
- Learn about Major Factors Affecting Transition to a Knowledge Society
- Focus on Changes Occurred in the Various Sectors of Society Due to Digitalization.

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### *Course Outcomes :*

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1. Understand and explain the concept of Knowledge Society.
2. Apply the Knowledge of various societies to solve the problems.
3. Identify and manage the risk Human Security in Knowledge Societies.
4. Practice and facilitate the lifelong learning concept through e-learning distance learning, and Knowledge processing Outsourcing.
5. Explore and exploited Cashless Banking, Digi Locker, Net Banking, Mobile Banking etc

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### *Unit-wise Syllabus :*

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#### **UNIT-I**

Knowledge Society - Introduction, Definition, Knowledge Society Vs Information Society, from the Information Society to Knowledge Societies, Characteristics of Knowledge Society, Example of Knowledge Society, Knowledge Societies as a Source of Development, Knowledge Society and its Dimensions, Features of Knowledge Society, Characteristics of Knowledge Based Society, Advantages of Knowledge Society, Digital Solidarity, Freedom of Expression as the Touchstone of Knowledge Societies.

Network Societies, Knowledge and the New Technologies - Knowledge Economy in Network, the Impact of the New Technologies on Knowledge Network, from Memory-Based Societies to Knowledge Societies Learning Societies- Towards a Culture of Innovation, Learning, a Key Value of Knowledge Societies, the Availability of Knowledge

#### **UNIT-II**

Towards Lifelong Education for All - Basic Education for All, Lifelong Education for All, New Inputs for Education: Institutional Reform, Pedagogical Research, Teacher Training and Quality of Education, “E-Learning”: New Technologies and Distance Education, University Networks  
a Research Revolution, New Research Locations, the New Frontiers of Science, Research and Development, Future Challenges

Science, the Public and Knowledge Societies - Good Governance for Science and Technology, Crisis in Science Education, Fostering a Scientific Culture

#### **UNIT-III**

Risks and Human Security in Knowledge Societies - Knowledge as a Risk Panacea, Foresight and Disaster Anticipation, Knowledge Societies, Global Risks, Strategic Risks and New Forms of Criminality, Knowledge Societies, Human Security, Human Rights and the Fight Against Poverty,

Towards Sustainable Development Societies Local and Indigenous Knowledge, Linguistic Diversity and Knowledge Societies - Preserving Local and Indigenous Knowledge, Linguistic Diversity and Knowledge Societies, Pluralism, Translation and Knowledge Sharing from Access to Participation: Towards Knowledge Societies for All - from the Knowledge Divide to Knowledge Sharing, Women in Knowledge Societies, Universal Access to Knowledge: Knowledge Sharing and Intellectual Property Protection, the Renewal of Democratic Public Forums in Knowledge Societies.

#### UNIT-IV

Introduction to Digital India Program, Introduction and Services to Following Projects Starts Under the Digital India Initiative Digi Locker, Mygov.in, Esign Framework - Aadhaar, Swach Bharat Mission Mobile App, National Scholarship Portal, Ehospital, Digitize India Platform, Bharat Net, Wi-Fi Hotspots, Next Generation Network, Electronics Development Fund, Centre of Excellence on Internet of Things (IoT)

#### UNIT-V

Digital Banking and Cashless Societies – Introduction to Digital Banking, Digital Banking Journey, Advantages, Current Scenario in Digital and Online Banking Services, Risks, Approaches in a New Generation of Financial Services, Introduction to Various Modes of Digital Payments in India - Banking Cards, USSD, Aadhar Card, AEPS, UPI, Mobile Wallets, Banks Pre-Paid Cards, Point of Sale, Internet Banking, Mobile Banking & Micro ATMS.

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#### Reference Books:

1. Towards Knowledge Societies- Unesdoc– Unesco– Available Online At [Http://Unesdoc.Unesco.Org/Images/0014/001418/141843e.Pdf](http://Unesdoc.Unesco.Org/Images/0014/001418/141843e.Pdf).
2. Debal K. Singha Roy, Towards a Knowledge Society: New Identities in Emerging India Cambridge University Press.
3. Digitalindia.Gov.in/
4. [Http://Www.CMAI.Asia/Digitalindia/](http://Www.CMAI.Asia/Digitalindia/)
5. Projects You Should Know About Under the Digital India Initiative - [Https://Www.Thebetterindia.Com/27331/12-Projects-You-Should-Know-About-Under-the-Digital-India-Initiative/](https://Www.Thebetterindia.Com/27331/12-Projects-You-Should-Know-About-Under-the-Digital-India-Initiative/)
6. Digital Banking- New Horizons in a Cash-Light India Available At [Http://Ficci.in/Sector/3/Add\\_Docs/Financial-Foresights-April-2017.Pdf](http://Ficci.in/Sector/3/Add_Docs/Financial-Foresights-April-2017.Pdf)
7. [Https://Swayam.Gov.in/Course/3894-Knowledge-Society](https://Swayam.Gov.in/Course/3894-Knowledge-Society)

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	2	2	2	2	2	2	2	2		2
2	3	3	3	3	2	3	2	3	2	2		2
3	3	3	3	2	2	3	2	2	2	2		2
4	3	3	2	2	1	2	3	2	2	2		2
5	3	3	3	3	2	3	2	3	2	2		2

## 2MCA5(P) - OBJECT ORIENTED PROGRAMMING LAB

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
0	0	4	2	-	40	10	50

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### Course Objectives:

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- To learn the characteristics of an object-oriented programming language: data abstraction and information hiding, inheritance, and dynamic binding of the messages to the methods.
- To enhance problem solving and programming skills in C++ with extensive programming
- Learn syntax, features of, and how to utilize the Standard Template Library. Learn other features of the C++ language including templates, exceptions, forms of casting, conversions, covering all features of the language.

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### Course Outcomes:

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1. Explain the Basic Terminology Used in Object Oriented Programming.
2. To Explain the Process of Problem Solving Using C++ Programming Language.
3. To Write, Compile, Debug, and trace the Programs written in C++ Language.
4. To Analyze and Solve Complex and Real Life Problems by Developing Application Programs Using C++ Programming Language.

### LIST OF EXPERIMENTS ON C++

1. Write a Program That Just Outputs `Hello, World`
2. Write a Program to Find Maximum and Minimum of Given 3 Numbers.
3. Write a Program That Output Value as Number and as Character.
4. Implementation of the Function That Calculates the Cross Sum of an Integer.(123 as 1+2+3).
5. Determine Number of Characters in a String.
6. Raising a Number N to a Power P is the Same as Multiplying N by Itself P Times. Write a Function Called Power ( ) That Takes a Double Value for N and an INT Value for P, and Returns the Result as Double Value. use a Default Argument of 2 for P, So That If This Argument is Omitted, the Number Will Be Squared. Write a Main ( ) Function That Gets Values from the User to Test This Function.
7. Write a C++ Program to Sort an Array of Integer in Ascending Order Using a Function Called Exchange( ) Which Accepts Two Integer Arguments by Reference.
8. Write a C++ Program to Implement Function Overloading in Order to Compute.
9. Write a C++ Program to Implement Power(M,N) Where
  - I) M is Double and N is Int
  - II) M and N are Int.
10. Write a Program That Uses a Structure Called Point to Model a Point. Define Three Points, and Have the User Input Values to Two of Them. Then Set the Third Point Equal to the Sum of the Other Two, and Display the Value of the New Point. Interaction with the Program Might Look Like This:  
Enter Coordinates for P1: 3 4  
Enter Coordinates for P2: 5 7  
Coordinates of P1 + P2 are: 8, 11

11. Create the Equivalent of a Four Function Calculator. the Program Should Request the User to Enter a Number, an Operator, and Another Number. It Should Then Carry Out the Specified Arithmetical Operation: Adding, Subtracting, Multiplying, Or Dividing the Two Numbers. (It Should use a Switch Statement to Select the Operation). Finally It Should Display the Result. When It Finishes the Calculation, the Program Should Ask If the User Wants to Do Another Calculation. the Response Can Be Y Or N . Some Sample Interaction with the Program Might Look Like This.  
Enter First Number, Operator, Second Number: 10/ 3  
Answer = 3.333333  
Do Another (Y/ N)? Y  
Enter First Number, Operator, Second Number 12 + 100  
Answer = 112  
Do Another (Y/ N) ? N
12. Create a 'Distance' Class with :
  - Feet and Inches as Data Members
  - Member Function to Input Distance
  - Member Function to Output Distance
  - Member Function to Add Two Distance Objects
  - Write a Main Function to Create Objects of Distance Class. Input Two Distances and Output the Sum.
13. Create a Class Called 'Time' That Has
  - Three Integer Data Members for Hours, Minutes and Seconds
  - Constructor to Initialize the Object to Zero
  - Constructor to Initialize the Object to Some Constant Value
  - Member Function to Add Two Time Objects
  - Member Function to Display Time in Hh:Mm:Ss Format
  - Write a Main Function to Create Two Time Objects, Add Them and Display the Result in Hh:Mm:Ss Format.
14. Create a Class Called 'Employee' That Has
  - Empcode and Empname as Data Members
  - Member Function GetData( ) to Input Data
  - Member Function Display( ) to Output Data
  - Write a Main Function to Create Emp, an Array of Employee Objects. Accept and Display the Details of At Least 6 Employees.
15. Create a Class Rational Which Represents a Numerical Value by Two Double Values- Numerator & Denominator. Include the Following Public Member Functions: Constructor with No Arguments (Default). Constructor with Two Arguments.
  - Void Reduce( ) That Reduces the Rational Number by Eliminating the Highest Common Factor Between the Numerator and Denominator.
  - Overload + Operator to Add Two Rational Number.
  - Overload >> Operator to Enable Input Through Cin.
  - Overload << Operator to Enable Output Through Cout.
  - Write a Main ( ) to Test All the Functions in the Class.
16. Create a Class 'Complex' to Hold a Complex Number. Write a Friend Function To add Two Complex Numbers. Write a Main Function to Add Two Complex Objects.
17. Create a 'Matrix' Class of Size M X N. Overload the '+' Operator to Add Two matrix Objects. Write a Main Function to Implement It.
18. Create a 'String' Class Which Overloads '=' Operator to Compare Two String objects.
19. Create a Base Class Called 'Shape' Having
  - Two Data Members of Type Double.
  - Member Function *Get-Data*( ) to Initialize Base Class Data Members.

- Pure Virtual Member Function *Display-Area( )* to Compute and Display the Area of the Geometrical Object.
- Derive Two Specific Classes 'Triangle' and 'Rectangle' from the Base Class.
- Using These Three Classes Design a Program That Will Accept Dimension of a Triangle/Rectangle Interactively and Display the Area.

20. Consider the Following Class Definition

```

Class Father {
Protected :Int Age;
Public;
Father (Int X) {Age = X;}
Virtual Void Iam ( )
{ Cout<< I Am the Father, My Age is : << Age<< Endl;}
};

```

- Derive the Two Classes Son and Daughter from the Above Class and for Each, Define Iam ( ) to Write Our Similar But Appropriate Messages. You Should Also Define Suitable Constructors for These Classes.
- Now, Write a Main ( ) That Creates Objects of the Three Classes and Then Calls Iam ( ) for Them. Declare Pointer to Father. Successively, Assign Addresses of Objects of the Two Derived Classes to This Pointer and in Each Case, Call Iam ( ) Through the Pointer to Demonstrate Polymorphism in Action.

21. Write a C++ Program That Displays the Size (in Bytes) of a Given File. the Name of the File is Specified as Command Line Argument.

22. Design Your own Manipulator to Provide the Following Output Specification For printing Money Value:

- a. 10 Columns Width
- b. The Character '\$' At the Beginning
- c. Two Digits Precision
- d. Filling of Unused Spaces with ' \* '
- e. Trailing Zeros Shown

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	2	2	2					2		2
2	3	3	3	3	2					2		2
3	3	3	3	3	3							2
4	3	3	3	3	2	1		1			2	2

## 2MCA6(P)- DBMS LAB

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
0	0	4	2	--	40	10	50

### *Course Objectives:*

- To provide practical practice to the discipline of database management.
- To familiarise the participant with the nuances of database environments towards an information-oriented data-processing oriented framework.
- To give a good formal foundation on the relational model of data.
- To give an introduction to systematic database design approaches.
- To present the concepts and techniques relating to Query Processing, Form and Reports in Ms Access.

### *Course Outcome:*

1. Understand and apply the key concepts of database technology.
2. Analyze, design and implement the database system to solve the real problems.
3. Carry out the administration and Management activities of Database System using SQL
4. Write the SQL program for optimal query for fetching the information from database
5. Solve Database problems using Procedures, Functions, Packages, and Triggers features of Oracle 9i SQL

### **LIST OF EXPERIMENTS ON DBMS**

1. Draw an ER Diagram for University Database.
2. Draw an ER Diagram for Library Management System. Convert it to Tables.
3. Create a Library Management Schema/ Database and Search Anomalies in it.
4. Assume a Video Library Maintains a Database of Movies Rented Out. Without Any Normalization, All Information is Stored in One Table as Shown Below.

Full Names	Physical Address	Movies Rented	Salutation	Category
Janet Jones	First Street Plot No 4	Pirates of the Caribbean, Clash of the Titans	Ms.	Action, Action
Robert Phill	3 <sup>rd</sup> Street 34	Forgetting Sarah Marshal, Daddy's Little Girls	Mr.	Romance, Romance
Robert Phill	5 <sup>th</sup> Avenue	Clash of the Titans	Mr.	Action

5. Normalize the Following Schema with Given Constraints.

Books(Accessionno,Isbn,Title,Author,Publisher)

Users(Userid,Name,Deptid,Deptname)

Accessionno ->ISBN

ISBN ->Title

ISBN -> Publisher

ISBN ->Title

Userid -> Name,

Userid ->Deptid

Deptid -> Department

6. Compare 3NF and BCNF with Appropriate Example

### Database Query

7. Give Exercise on DDL and DML.
8. Create a Database Named “School.Mdb” and Perform the Following Tasks Using Ms Access or My SQL
9. Create a Table Named “Studentinfo” Having Following Table Structure.

Field Name	Data Type	Structure
Class	Number	
Section	Text	
Roll No.	Number	
Name	Text	40 Characters Long
Status	Lookup Wizard	Two Value:Senior and Junior
Photo	Ole Object	Photos of Student
Dob	Date/Time	Date of Birth of Students
Remarks	Memo	

- a. Fill At Least 5 Records.
- b. Prepare a Query to Display All Records and Name Should Be in Ascending Order.
- c. Prepare a Query Named “Senior” to Display Records Including Fields Name, Class, Sec, Rollno, Status, Photo and Value of “Status” Field Must Be Senior.
- d. Prepare a Form of Above Query “Senior”.
- e. Prepare a Report of All the Fields of Above Table

### Forms and Report

10. Create a Database Named “Library.Mdb” and Perform the Following Tasks:
11. Create a Table Named “Book” Having Following Structure:

Field Name	Data Type
Bookid	Text
Bname	Text
Wname	Text
Pyear	Date/Time
Pname	Text
Price	Currency

- a. Add at Least 5 Records.
- b. Prepare a Query to Display Only Records Including Book Name, Writer Name and Publication Name. Save the Query as “Q\_Book”.



- c. Prepare a Query to Display All Records on the Basis of Price Which is More Than Rs500.
- d. Prepare a Form on the Basis of Table.
- e. Prepare a Report on the Basis of Query Named "Q\_Book".

12. Create Tables According to the following Definition.

```
CREATE TABLE DEPOSIT (ACTNO VARCHAR2(5),CNAME VARCHAR2(18),
BNAMEVARCHAR2(18), AMOUNT NUMBER(8,2),ADATE DATE);CREATE TABLE
BRANCH(BNAME VARCHAR2(18),CITY VARCHAR2(18));CREATE TABLE
CUSTOMERS(CNAME VARCHAR2(19),CITY VARCHAR2(18));CREATE TABLE
BORROW(LOANNO VARCHAR2(5), CNAME VARCHAR2(18), BNAME
VARCHAR2(18), AMOUNT NUMBER (8,2));
```

- i. Insert the data as shown below.

### Deposit

ACTNO	CNAME	BNAME	AMOUNT	ADATE
100	ANIL	VRCE	1000.00	1-MAR-95
101	SUNIL	AJNI	5000.00	4-JAN-96
102	MEHUL	KAROLBAGH	3500.00	17-NOV-95
104	MADHURI	CHANDI	1200.00	17-DEC-95
105	PRMOD	M.G.ROAD	3000.00	27-MAR-96
106	SANDIP	ANDHERI	2000.00	31-MAR-96
107	SHIVANI	VIRAR	1000.00	5-SEP-95
108	KRANTI	NEHRU PLACE	5000.00	2-JUL-95
109	MINU	POWAI	7000.00	10-AUG-95

**Branch**

VRCE	NAGPUR
AJNI	NAGPUR
KAROLBAGH	DELHI
CHANDI	DELHI
DHARAMPETH	NAGPUR
M.G.ROAD	BANGLORE
ANDHERI	BOMBAY
VIRAR	BOMBAY
NEHRU PLACE	DELHI
POWAI	BOMBAY

**Customers**

ANIL	CALCUTTA
SUNIL	DELHI
MEHUL	BARODA
MANDAR	PATNA
MADHURI	NAGPUR
PRAMOD	NAGPUR
SANDIP	SURAT
SHIVANI	BOMBAY
KRANTI	BOMBAY
NAREN	BOMBAY

**Borrow**

LOANNO	CNAME	BNAME	AMOUNT
201	ANIL	VRCE	1000.00
206	MEHUL	AJNI	5000.00
311	SUNIL	DHARAMPETH	3000.00
321	MADHURI	ANDHERI	2000.00
375	PRAMOD	VIRAR	8000.00
481	KRANTI	NEHRU PLACE	3000.00

ii. From the above given tables perform the following queries:

- a. Describe deposit, branch.
- b. Describe borrow, customers.
- c. List all data from table DEPOSIT.
- d. List all data from table BORROW.
- e. List all data from table CUSTOMERS.
- f. List all data from table BRANCH.
- g. Give account no and amount of depositors.
- h. Give name of depositors having amount greater than 4000.

- i. Give name of customers who opened account after date '1-12-96'.  
 13. Create the below given table and insert the data accordingly.

a. Create Table Job (job\_id, job\_title, min\_sal, max\_sal)

COLUMN NAME	DATA TYPE
job_id	Varchar2(15)
job_title	Varchar2(30)
Min_sal	Number(7,2}
max_sal	Number(7,2)

b. Create table Employee (emp\_no, emp\_name, empsal, empcomm, dept\_no)

COLUMN NAME	DATA TYPE
Emp_no	Number{3}
Emp_name	Varchar2(30)
Emp_sal	Number(8,2)
Emp_c o m m	Number(6,1)
dept_no	Number(3)

c. Create table deposit (a\_no, cname, bname, amount, a\_date).

COLUMN NAME	DATA TYPE
a_no	Varchar2(5)
cname	Varchar2(15)
bname	Varchar2(10)
amount	Number(7,2)
a_date	Date

d. Create table borrow(loanno,cname,bname,amount)

COLUMN NAME	DATA TYPE
loanno	Varchar2(5)
cname	Varchar2(15)
bname	Varchar2(10)
amount	Varchar2(7,2)

e. Insert following values in the table Employee.

<b>Emp_no</b>	<b>emp_name</b>	<b>emp_sal</b>	<b>Emp_comm</b>	<b>Dept_no</b>
101	Smith	800		20
102	Snehal	1600	300	25
103	Adama	1100	0	20
104	Aman	3000		15
105	Anita	5000	50,000	10
106	Sneha	2450	24,500	10
107	Anamika	2975		30

f. Insert following values in the table job.

<b>job_id</b>	<b>job_name</b>	<b>min_sal</b>	<b>max_sal</b>
IT_PROG	Programmer	4000	10000
MK_MGR	Marketing manager	9000	15000
F1_MGR	Finance manager	8200	12000
F1_ACC	Account	4200	9000
LEC	Lecturer	6000	17000
COMP_OP	Computer Operator	1500	3000

g. Insert following values in the table **deposit**

<b>A_no</b>	<b>ename</b>	<b>Bname</b>	<b>Amount</b>	<b>date</b>
101	Anil	andheri	7000	01-jan-06
102	Sunil	Virar	5000	15-jul-06
103	jay	villeparle	6500	12-mar-06
104	vijay	andheri	8000	17-sep-06
105	keyur	dadar	7500	19-nov-06
106	mayur	Borivali	5500	21-dec-06

Perform following queries

- i. Retrieve all data from employee, jobs and deposit.
- ii. Give details of account no. and deposited rupees of customers having account opened between dates 01-01-06 and 25-07-06.
- iii. Display all jobs with minimum salary is greater than 4000.
- iv. Display name and salary of employee whose department no is 20. Give alias name to name of employee.
- v. Display employee no,name and department details of those employee whose department lies in( 10,20)

14. To study various options of LIKE predicate

- i. Display all employee whose name start with 'A' and third character is 'a'.
- ii. Display name, number and salary of those employees whose name is 5 characters long and first three characters are 'Ani'
- iii. Display the non-null values of employees and also employee name second character should be 'n' and string should be 5 character long.
- iv. Display the null values of employee and also employee name's third character should be "a"
- v. What will be output if you are giving LIKE predicate as '%\\_%' ESCAPE 'V'

15. To Perform various data manipulation commands, aggregate functions and sorting concept on all created tables.

- i. List total deposit from deposit.
- ii. List total loan from karolbagh branch
- iii. Give maximum loan from branch vrce.
- iv. Count total number of customers
- v. Count total number of customer's cities.
- vi. Create table supplier from employee with all the columns.
- vii. Create table sup1 from employee with first two columns.
- viii. Create table sup2 from employee with no data
- ix. Insert the data into sup2 from employee whose second character should be 'n' and string should be 5 characters long in employee name field.
- x. Delete all the rows from sup1.
- xi. Delete the detail of supplier whose sup no is 103.
- xii. Rename the table sup2.
- xiii. Destroy table sup 1 with all the data.
- xiv. Update the value dept no to 10 where second character of emp. name is 'm'.
- xv. Update the value of employee name whose employee number is 103.

16. To study Single-row functions.

- i. Write a query to display the current date. Label the column Date
- ii. For each employee, display the employee number, job, salary, and salary increased by 15% and expressed as a whole number. Label the column New Salary
- iii. Modify your query no 4.(2) to add a column that subtracts the old salary from the new salary. Label the column Increase
- iv. Write a query that displays the employee's names with the first letter capitalized and all other letters lowercase, and the length of the names, for all employees whose name starts

- with J, A, or M. Give each column an appropriate label. Sort the results by the employees' last names.
- v. Write a query that produces the following for each employee: <employee last name> earns <salary> monthly
  - vi. Display the name, hire date, number of months employed and day of the week on which the employee has started. Order the results by the day of the week starting with Monday.
  - vii. Display the hiredate of emp in a format that appears as Seventh of June 1994 12:00:00 AM.
  - viii. Write a query to calculate the annual compensation of all employees (sal+comm.).

#### 17. Displaying data from Multiple Tables (join)

- i. Give details of customers ANIL.
- ii. Give name of customer who are borrowers and depositors and having living city Nagpur
- iii. Give city as their city name of customers having same living branch.
- iv. Write a query to display the last name, department number, and department name for all employees.
- v. Create a unique listing of all jobs that are in department 30. Include the location of the department in the output
- vi. Write a query to display the employee name, department number, and department name for all employees who work in NEW YORK.
- vii. Display the employee last name and employee number along with their manager's last name and manager number. Label the columns Employee, Emp#, Manager, and Mgr#, respectively.
- viii. Create a query to display the name and hire date of any employee hired after employee SCOTT.

#### 18. To apply the concept of Aggregating Data using Group functions.

- i. List total deposit of customer having account date after 1-jan-96.
- ii. List total deposit of customers living in city Nagpur.
- iii. List maximum deposit of customers living in bombay.
- iv. Display the highest, lowest, sum, and average salary of all employees. Label the columns Maximum, Minimum, Sum, and Average, respectively. Round your results to the nearest whole number.
- v. Write a query that displays the difference between the highest and lowest salaries. Label the column DIFFERENCE.
- vi. Create a query that will display the total number of employees and, of that total, the number of employees hired in 1995, 1996, 1997, and 1998
- vii. Find the average salaries for each department without displaying the respective department numbers.
- viii. Write a query to display the total salary being paid to each job title, within each department.
- ix. Find the average salaries > 2000 for each department without displaying the respective department numbers.
- x. Display the job and total salary for each job with a total salary amount exceeding 3000, in which excludes president and sorts the list by the total salary.
- xi. List the branches having sum of deposit more than 5000 and located in city bombay.

19. To solve queries using the concept of sub query.

- i. Write a query to display the last name and hire date of any employee in the same department as SCOTT. Exclude SCOTT
- ii. Give name of customers who are depositors having same branch city of mr.sunil.
- iii. Give deposit details and loan details of customer in same city where pramod is living.
- iv. Create a query to display the employee numbers and last names of all employees who earn more than the average salary. Sort the results in ascending order of salary.
- v. Give names of depositors having same living city as mr.anil and having deposit amount greater than 2000
- vi. Display the last name and salary of every employee who reports to ford.
- vii. Display the department number, name, and job for every employee in the Accounting department.
- viii. List the name of branch having highest number of depositors.
- ix. Give the name of cities where in which the maximum numbers of branches are located.
- x. Give name of customers living in same city where maximum depositors are located.

20. Manipulating Data

- i. Give 10% interest to all depositors.
- ii. Give 10% interest to all depositors having branch vree
- iii. Give 10% interest to all depositors living in nagpur and having branch city Bombay.
- iv. Write a query which changes the department number of all employees with empno 7788's job to employee 7844's current department number.
- v. Transfer 10 Rs from account of anil to sunil if both are having same branch.
- vi. Give 100 Rs more to all depositors if they are maximum depositors in their respective branch.
- vii. Delete depositors of branches having number of customers between 1 to 3.
- viii. Delete deposit of vijay.
- ix. Delete borrower of branches having average loan less than 1000.

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	2	1								1
2	3	3	3	3	3					1	1	1
3	3	3	3	3	3				1		2	1
4	3	3	3	2	1					1		1
5	3	3	3	2	2						2	1

## 2MCA7(A)- COMMUNICATIVE ENGLISH

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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### *Course Objectives:*

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- Learn and Develop the Skills of Writing, Speaking, Reading and Listening.
- Learn how to write Effectively SRS and Project Reports in English.
- Gain the Knowledge and Develop Personality through Participation in Group Discussion, Mock Interview, Group and Individual Presentation

---

### *Course Outcome:*

---

1. Demonstrate the Competency in English Language Through Understandability and Practice in Four Skills of Language Such as Writing, Speaking, Reading and Listening.
2. Think Critically and Communicate Effectively in English and Prepare SRS and Project Reports.
3. Information Seeking Skills And Strategies Needed to be Conducted
4. Inculcate Soft Skills and Develop Personality through Participation in Group Discussion, Mock Interview, Group and Individual Presentation

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### *Unit-wise Syllabus :*

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#### **UNIT-I**

The Process of Communication: Communication, the Process of Communication, Barriers of Communication, Different Types of Communication, Characteristics and Conventions of Conversation, Conversational Problems of Second/Foreign Language Users, Difference Between Conversation and Other Speech Events

#### **UNIT- II**

Telephone Techniques: Speaking and Listening, Conference Calls, Vocabulary Building, Writing, Grammar and Usage, Pronunciation, Job Applications and Interviews: Reading, Curriculum Vitae, Preparing for an Interview, Listening and Speaking in the Interviews Group Discussions: Group-Discussion, Study Skills, Language Focus, Speaking.

#### **UNIT- III**

Soft Skills Practice, Personality Development, Participating in Group Discussion and Job Interviews, Time Management Presentation Skills, Leadership Skills, Assertiveness, Lateral Thinking, Team Work and Interpersonal Skills, Emotional Intelligence, Self-Confidence and Courage, Attitude Presentation Skills: Presentation Skills, Importance of Body Language in Presentations, Pronunciation, Visual Aids, Podium Panic, Speaking



#### UNIT- IV

Managing Organizational Structure: Role of a Manager, Leadership, Language Focus, Writing Reports, Pronunciation, Meetings: Successful Meeting, One to One Meeting, Editing, Criteria for Successful Meetings, Reporting Verbs, Memos, Taking Notes and Preparing Minutes: Taking Notes, Preparing Minutes, Grammar

#### UNIT- V

Functional Grammar- Tenses: Simple Present, Progressive Perfect, Present Perfect Progressive Along-with Past Tense and Indications of Futurity Reported Speech, Modals: Will, Shall Should, Would and Others Voice: Active and Passive

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#### Reference Books

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1. Darer. Shankar-Communication Skills in English Language
2. Dr. Uremia Rai and S.M.Rai - Business Communication
3. B. K. Das- an Introduction to Professional English and Soft Skills
4. Barun K. Mitra- Personality Development and Soft Skills
5. Shashikumar and Dhameja -Spoken English
6. Raymond Williams- English Grammar
7. Wren and Martin -English Grammar and Composition
8. Justin Seeley -Designing Presentation
9. Laura Bergelles- Public Speaking Foundations
10. M.a.K. Halliday- Spoken and Written Language
11. B Balasubriamianiam - Phonetics for Indian Students
12. R C Sharma- Business Correspondence
13. Dowel Jones- the Handbook of English Phonetics
14. Merriam Webster - Guide to Business Correspondence.
15. Ashish Singh - How to Communicate Effectively

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	2	1	2				2	3		2
2	1	2	2		2				2	3	1	2
3	1	2		2	1					3	1	2
4	1	2	1	1	2				2	3	2	2

## 2MCA7(B) – INFORMATION SYSTEM ANALYSIS AND DESIGN

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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### *Course Objectives:*

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- Understand System Characteristics, Components, Managing Projects, Prototyping.
- Introduce Established and Evolving Methodologies for the Analysis, Design, and Development of an Information System.
- Understand and Learn System Development Life Cycle (SDLC) Phases.
- Learn and Apply the Universal Modeling Language (UML) to Model the System.
- Learn and Inculcate the Technical and Soft Skills Required to System Analysts for Broad Understandings Policies, Culture, Operations and Business Processes of the Organization

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### *Course Outcomes:*

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1. Explain the Characteristics, Components, Activities of SDLC, Models of Information Systems, Types of Information Systems and Benefits of Various Information Systems
2. Identify, Analyze, Review and Validate the Requirement of Information System and Also Prepare System Requirement Specification (SRS) Document.
3. Design, Develop/Implement, Deploy and Evolve the Efficient, Reliable, Robust, and Cost Effective Information System.
4. Apply Universal Modeling Language (UML) to Analyze and Model the Solutions of Information System Problems
5. Work Effectively in Various Roles of System Analyst Such as Problem Investigator, Communicators, System Designer, Tester, Project Manager and Maintenance Engineer.

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### *Unit-wise Syllabus:*

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#### **UNIT-I**

System Concept: Definition, Features of a System, Characteristics of a System, Types of Systems, Elements of System, Physical and Abstract System, Open and Closed System, System Development Life Cycle: Various Phases of System Development, Structured Analysis and Design, Object Oriented Analysis and Design, the Role of System Analyst, What System Analyst Does?, Analyst, Types of Information, Qualities of Information, Information System, Expert System, office Automation Systems, Considerations for System Planning and Control for System Success, System Planning.

#### **UNIT-II**

Initial Investigation: Determining Users Requirements and Analysis, Interviews and its Types, Questionnaires and its Types, Problem Definition Project Initiation, Background Analysis, Review of Written Documents, Fact Finding Process and Techniques. Feasibility Study: Determination of Feasibility

Study, Technical, Operational & Economic Feasibilities, Data Analysis, Cost and Benefit Analysis: Tools and Techniques Study of PERT and GANTT Chart.

**UNIT-III**

Tools of Structured Analysis: Data Dictionary, Form, Gantt Charts, System Model, Pseudo Codes, Flow Chart, System Flow Chart, Structured Charts, Data Flow Diagrams Decision Tree, Decision Tables, Input/ Output and Form Design: Input and Output Form Design Methodologies, Menu, Screen Design, Design Representation, Common Diagramming Conventions and Guidelines Using DFD and ER Diagrams. Data Modeling and Systems Analysis, Designing the Internals: Program and Process Design.

**UNIT-IV**

User Manual, Programming Manual, Programming Specifications, Operator Manual. System Testing: System Testing and Quality Assurance, Software Maintenance. System Security: Data Security, EDP: Introduction, Job Responsibilities & Duties of EDP Personnel's, EDP Manager, System Analyst, Programmers, Operators etc. Essential Features in EDP.

**UNIT-V**

Module Specifications, Module Coupling and Cohesion, Top-Down and Bottom-Up Design System Implementation and Maintenance, Conversion Methods, System Audit and Security System Testing and Validation, Systems Quality Control and Assurance, Maintenance Activities and Issues, Disaster Recovery and Contingency Planning, Procedures and Norms for Utilization of Computer Equipment, Audit of Computer System Usage, Audit Trails.

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**Reference Books:**

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1. Elis M. Awad "Systems Analysis and Design" 2nd Edition Paper Back ISBN : 9788175156180
2. V.K. Jain "System Analysis & Design" Dreamtech Press sbn-8177220799
3. Len Fertuck "System Analysis & Design: with Modern Methods" : Business and Educational Technologies
4. A Hoffer, F George, S Valaciah "Modern System Analysis & Design" Low Priced Edition Pearson Education
5. Whitten, Bentley and Barlow, System Analysis and Design Methods, Galgotia Publication.

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	2	2						2		1
2	3	3	2	2						2		1
3	3	3	3	2	1				1		2	1
4	3	3		2	2					1		2
5	2	2	2	2					3	2	2	1

## SEMESTER III

### 3MCA1 - WEB TECHNOLOGIES

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
4	0	0	4	80	--	20	100

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#### *Course Objectives:*

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- Learn How to Design and Develop a Web Page Using HTML and CSS
- Learn How to Link Pages So That They Create a Web Site.
- Design and Develop a Web Site Using Text, Images, Links, Lists, and Tables for Navigation and Layout.
- Style Your Page Using CSS, Internal Style Sheets, and External Style Sheets.
- Learn to use JavaScript & XML in Web Design.
- Learn How to use Database in Web Design.

---

#### *Course Outcome:*

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1. Describe the Concepts of WWW Including Browser and HTTP Protocol.
2. List the Various HTML Tags and use them to Develop the User Friendly Web Pages.
3. Define the CSS with its Types and use them to Provide the Styles to the Web Pages at Various Levels.
4. Develop the Modern Web Pages Using the HTML and CSS Features with Different Layouts as per Need of Applications.
5. Use the Javascript to Develop the Dynamic Web Pages.
6. Use Server Side Scripting with PHP to Generate the Web Pages Dynamically Using the Database Connectivity.
7. Develop the Modern Web Applications Using the Client and Server Side Technologies and the Web Design Fundamentals.

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#### *Unit-wise Syllabus :*

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#### **UNIT-I**

Introduction to Web, Web Designing and Website Planning :Concept of WWW, Internet and WWW, HTTP Protocol : Request and Response, Web Browser and Web Servers, Website Hosting-Free vs. Paid, Linux Vs. Windows Hosting, Concepts & use of Database & Mail Servers Associated with Web Sites, Features of Web 2.0 Concepts of Effective Web Design, Web Design Issues Including Browser, Bandwidth and Cache, Display Resolution, Look and Feel of the Website, Page Layout and Linking, User Centric Design, Sitemap, Planning and Publishing Website, Designing Effective Navigation . Website Hosting Issues, Cpanel and FTP.

## **UNIT-II**

Web Development with HTML : Basics of HTML, Formatting and Fonts, Commenting Code, Color, Hyperlink, Lists, Tables, Images, Forms, Meta Tags, Character Entities, Frames and Frame Sets, Browser Architecture and Web Site Structure. Overview and Features of HTML5, use of HTML Code Editor & WYSIWYG Editor.

Cascading Style Sheets (CSS): Style Sheets : Need for CSS, Introduction to CSS, Basic Syntax and Structure, Using CSS, Background Images, Colors and Properties, Manipulating Texts, Using Fonts, Borders and Boxes, Margins, Padding Lists, Positioning Using CSS, CSS2, Overview and Features of CSS3

## **UNIT-III**

Technologies for Web Applications Javascript & XML: Javascript : Client Side Scripting with Javascript, Variables, Functions, Conditions, Loops and Repetition, Pop Up Boxes, Advance Javascript: Javascript and Objects, Javascript Own Objects, the Dom and Web Browser Environments, Manipulation Using Dom, Forms and Validations, DHTML : Combining Html, CSS and Javascript, Events and Buttons. XML : Introduction of XML, Validation of XML Documents, DTD, Ways to use XML, XML for Data Files, Html vs XML, Embedding XML into Html Documents, Converting XML to HTML for Display, Displaying XML Using CSS and XSL, Rewriting HTML as XML, Relationship Between Html, SGML and XML, Web Personalization, Semantic Web, Semantic Web Services. Transforming XML Using XSL and XSLT

## **UNIT-IV**

Web Design with PHP : Introduction and Basic Syntax of PHP, Decision and Looping with Examples, PHP and HTML, Arrays, Functions, Browser Control and Detection, String, Form Processing, Files, Advance Features: Cookies and Sessions, Object Oriented Programming with PHP

## **UNIT-V**

Introduction to Database Driven Websites with PHP : PHP and MYSQL : Basic Commands with PHP Examples, Connection to Server, Creating Database, Selecting a Database, Listing Database, Listing Table Names, Creating a Table, Inserting Data, Altering Tables, Queries, Deleting Database, Deleting Data and Tables, PHPMyadmin and Database Bugs

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### **Reference Books:**

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1. Roger S. Pressman, David Lowe, "Web Engineering", Tata McGraw Hill Publication, 2007
2. Achyut S Godbole and Atul Kahate, "Web Technologies", Tata McGraw Hill
3. Gopalan N P, Akilandeswari "Web Technology: a Developer S Perspective", PHI
4. Chris Bates Web Programming : Building Internet Applications Wiley
5. Refter, Fawset-Beginning XML 4th Edition Hnter, Wiley India
6. H.M. Deitel, P.J. Deitel, a.B. Goldberg-Internet & World Wide Web How to Program, Pearson Education, 3rd Edition,
7. C. Xavier, "Web Technology & Design ", Tata McGraw Hill.
8. Ivan Bay Ross, "HTML, DHTML, Java Script, Perl CGI", BPB.
9. Developing Web Applications, Ralph Moseley and M. T. Savaliya, Wiley-India
10. Web Technologies, Black Book, Dreamtech Press
11. HTML 5, Black Book, Dreamtech Press
12. Joel Sklar-Web Design, , Cengage Learning
13. Harwani-Developing Web Applications in PHP and Ajax, Mcgrawhill

**List of Open Source Software/Learning Website:**

1. Browsers Like IE, Mozilla, Firefox Etc
2. Server Software Xampp/Wamp/Lamp
3. [Www.Apachefriends.Org](http://www.Apachefriends.Org)
4. [Www.W3.Org](http://www.W3.Org)
5. [Www.w3schools.Com](http://www.w3schools.Com)
6. [Www.Php.Net](http://www.Php.Net)
7. [Www.MySql.Com](http://www.MySql.Com)
8. [Www.Phpmyadmin.Net](http://www.Phpmyadmin.Net)

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3				2							
2	3	2	2	2	3					1		
3	2	2	2	2	3					2		1
4	3	2	3	2	2							1
5	3	2	3	2	2							1

## 3MCA2- DATA STRUCTURE AND ALGORITHMS

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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### *Course Objectives:*

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- Learn Basic Data Structures such as, Linked Lists, Stacks and Queues, Tree and Graph.
- Learn Algorithm for Solving Problems Like Sorting, Searching, Insertion and Deletion of Data
- Understand the Complexity of Various Algorithms.
- Introduce Various Techniques for Representation of the Data in in Memory.

---

### *Course Outcomes:*

---

1. Understand and Explain Basic Data Structures Such as, Linked Lists, Stacks and Queues, Tree and Graph.
2. Select and Apply Appropriate Data Structures to define the particular Problem statement.
3. Implement Operations Like Searching/Sorting, Insertion, and Deletion, Traversing on Various Data Structures.
4. Determine and Analyze the Complexity of Given Algorithms

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### *Unit-wise Syllabus :*

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#### **UNIT-I**

Algorithm Analysis and Complexity, Data Structure- Definition, Types of Data Structures Recursion: Definition, Linear and Binary Recursion, Searching Techniques, Linear Search, Binary Search.

#### **UNIT- II**

Sorting Techniques: Basic Concepts, Sorting Algorithms: Insertion (Insertion Sort), Selection (Heap Sort), Exchange (Bubble Sort, Quick Sort), Distribution (Radix Sort) and Merging (Merge Sort) Algorithms.

#### **UNIT- III**

Stacks and Queues: Stacks: Basic Stack Operations, Representation of a Stack Using Arrays, Stack Applications: Reversing List, Factorial Calculation, Infix to Postfix Transformation, Evaluating Arithmetic Expressions.

Queues: Basic Queue Operations, Representation of a Queue Using Array, Implementation of Queue Operations Using Stack. Circular Queues, Priority Queues. Applications of Queues- Round Robin Algorithm,

#### **UNIT- IV**

Linked Lists: Introduction, Single Linked List, Representation of a Linked List in Memory, Operations on a Single Linked List, Circular Linked List, Double Linked List, Advantages and Disadvantages of Linked List.

**UNIT- V**

Trees: Terms Related to Tree, Binary Tree, Binary Tree Traversals, Creation of Binary Tree from In-order, Pre-order and Post-Order Traversals. Threaded Binary Trees. Binary Search Tree, BST Operations: Insertion, Deletion.

Graphs: Basic Concepts, Representations of Graphs: Using Linked List and Adjacency Matrix, Graph Algorithms. Graph Traversals (BFS & DFS), Applications: Dijkstra’s Shortest Path, Minimum Spanning Tree Using Prim’s Algorithm, Warshall’s Algorithm

**Reference Books**

1. R. S. Salaria- Data Structures and Algorithm-Khanna Publishing
2. G. a. V. Pai, Data Structures and Algorithms-2008, TMH
3. Debasis, Sarnanta- Classic Data Structures- 2/E, PHI, 2009
4. E. Horowitz, Sartaj Sahni and Susan Anderson, W. H. Freeman -Fundamentals of Data Structures in C
5. Schaum's Series- Introduction of Data Structure-Prentice Hall of India

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	2	2	2					1		1
2	3	3	3	2	2							1
3	1	3	3	2	1							
4	3	3	2	3							1	1



## 3MCA3-ADVANCE DBMS

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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### *Course Objectives:*

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- To Understand the Fundamentals of Data Models and Conceptualize and Depict a Database System Using ER Diagram.
- To Make a Study of Relational Database Design.
- To Acquire the Knowledge of Query Evaluation to Monitor the Performance of the DBMS.
- To Impart Knowledge in Transaction Processing, Concurrency Control Techniques and Recovery Procedures.
- To Understand MySQL and NoSQL Database Management System.

---

### *Course Outcome:*

---

1. Understand and describe the basic concepts and terminology of Database Management System.
2. Analyze and Design the database of applications using ER modeling and Normalization.
3. Demonstrate the database Schema, Data Modeling and Normalization Process With the help of Example.
4. Implement the Database Design using Appropriate Database Tools.
5. Understand and Describe the Basic Concepts MySQL and NoSQL Database Management System.

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### *Unit-wise Syllabus :*

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#### **UNIT-I**

Introduction to Relational Model : Relational Model Concepts, Database Schema, Keys, Relational Operations, Formal Relational Query Languages, Relational Algebra, Relational Calculus, Tuple Relational Calculus, Domain Relational Calculus, Overview of Commercial RDBMS Packages, Database Design, ER Diagram.

#### **UNIT-II**

Normal Forms 1NF, 2NF, 3NF, BCNF, 4NF, 5NF, ACID Property Fundamentals Concurrency Control, Structured Query Language, SQL Commands DDL, DML, DCL Table Fundamentals, Data Constraints, Computations on Table Data, Operators.

#### **UNIT-III**

Functions, Grouping Data, Sub Queries, Join, Dynamic SQL , Index, Views, Clusters, Sequence Security Management, OOPs in SQL, Procedural SQL PL/SQL Block Structure, PL/SQL Tables, Cursor Management PL/SQL Transaction PL/SQL Security PLSQL Data Base Objects

#### UNIT-IV

Introduction to MySQL, Applications of MySQL, Installing MySQL, MySQL Data Types Running and shutting Down MySQL Server, Making Account, Use Databasesname, Show Database,show tables, MySQL Connections, Create Database, Drop database, Select database, Creating Tables, Drop Tables,Inserting data, Select Query, Insert Query, Writing Query

#### UNIT-V

Introduction to NoSQL, Classification of NoSQL, Applications of NoSQL, Characteristics and Significance,Key and Value paires,NoSQL Table Structures, Data Types of NoSQL, Install and Using NoSQL, Reading Data, New Table, Modifiy Table, Concatenating Table, Big Tables, Data Access Control, Fast data Access Methods, Limitation of NoSQL.

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#### Reference Books

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1. Abraham Silberschatz, Henry Korth, S. Sudarshan, “Database Systems Concepts”, 7<sup>th</sup> Edition, McGraw Hill
2. Ramakrishnan and Gherke, “Database Management Systems”, TMH
3. Rajesh Narang “Database management System” PHI.
4. R. Elmarsi and SB Navathe, “Fundamentals of Database Systems”, Pearson
5. Bipin Desai, “An Introduction to database Systems”, Galgotia Publications.
6. GauravVaish-Getting Started with NoSQL Paperback
7. Dan McCreary, Ann Kelly-Making Sense of NoSQL: A guide for managers and the rest of us 1st Edition
8. Ted Hills -NoSQL and SQL Data Modeling: Bringing Together Data, Semantics, and Software First Edition
9. Paul DuBois-MySQL (4th Edition) 4th Edition
10. VaswaniVikram-MySQL(TM): The Complete Reference - The Complete Reference Paperback

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	2	2	2					2		2
2	3	3	3	3	2					2		2
3	3	3	3	2	2					2		2
4	3	3	2	2	1					2		2
5	3	3	3		2							2

## 3MCA4-OPERATING SYSTEM

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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### *Course Objectives:*

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- To Understand the Services Provided by Operating System
- To Understand the Working and Organization of Process and its Scheduling and Synchronization.
- To Understand the Concept of Deadlock.
- To Understand Different Approaches of Memory Management Techniques.
- To Understand the Structure and Organization of the File System.

---

### *Course Outcomes:*

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1. Identify and describe the Services Provided by Operating Systems.
2. Understand and Solve Problems Involving Process Control, Mutual Exclusion, Synchronization and Deadlock.
3. Implement Processor Scheduling, Synchronization and Disk Allocation Algorithms for a Given Scenario
4. Apply Various Approaches of Memory Management Techniques
5. Analyze Various Operating System Approaches in Linux and Windows

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### *Unit-wise Syllabus :*

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#### **UNIT- I**

Definitions, Components and Types of Operating System, Operating System Services, System Calls, System Programs, Process Concepts, Process State & Process Control Block, Process Scheduling, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, Real-Time Scheduling, Threads Introduction

#### **UNIT-II**

The Critical Sections Problem, Semaphores, Classical Problem of Synchronization, Deadlock Characterizations, Method for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock, Combined Approach to Deadlock

#### **UNIT-III**

Storage Management Logical Versus Physical Address Space, Swapping, Contiguous Allocating, Paging, Segmentation, Virtual Memory, Demand Paging, Performance of Demand Paging, Page Replacement, Page Replacement Algorithms, Thrashing, Demand Segmentation

**UNIT-IV**

Disk Structure, Disk Scheduling, Disk Management, Swap Space Management, Disk Reliability, Stable Storage Implementation, File Concepts, Directory Structure, Protecting, I/O Subsystem Overview, I/O Hardware, Application I/O Interface, Kernel I/O Subsystem

**UNIT-V**

Case Studies: Linux System: History, Components, Kernel Modules, Process Management – Model, Identity, Context, Scheduling – Kernel Synchronization, Process Scheduling, Memory Management of Physical Memory

Windows 2000 System: History, Design Principal, Components

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**Reference Books:**


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1. Silberschatz, Galvin, Gagne-Operating System Concepts -Wiley Student Edition
2. Milan Milenkovic-Operating System Concepts & Design-TMH Publication
3. Andrew S. Tanenbaum-Modern Operating System-PHI

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3				2					1		
2	3	2	1	1	1					1		1
3	3	2	3	3	2				1	1		1
4	2	2	3	2	2				1			1
5	1	3	3	3	2	1				1		1

## 3MCA5(P) -DATA STRUCTURE WITH C++ LAB

L	T	P	C	TheoryPaper	PracticalExams	InternalEvaluation	Total Marks
0	0	4	2	-	40	10	50

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### Course Objectives :

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- To Write and Execute Programs in C++ to Solve Problems using Data Structures Such as Arrays, Linked Lists, Stacks, Queues, Trees, Graphs, Tables and Search Trees.
- To Write and Execute Write Programs in C++ to Implement Various Sorting and Searching Methods.

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### Course Outcomes :

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1. Identify & Design the Appropriate Data Structure for Given Problem.
2. Implement the Single and Double Linked List, Stack, Queue Using Array and Pointers
3. Compare and Contrast the various Data Structures
4. Illustrate the Application of Stack to Evaluate the Expression and Conversion of infix Expression to Postfix Expression.
5. Analyze and Develop Searching and Sorting Program for Various Basic and User Defined Data Types.
6. Analyze various Graphical and Search Based Problems and Construct Programs for Graph Traversals and Pattern Matching.

### List of Practical's:

1. Program to Maintain a Linked List.
2. Program to Add a New Node to the Ascending Order Linked List.
3. Program to Maintain a Doubly Linked List.
4. Program to Implement Stack as an Array.
5. Program to Implement Stack as a Linked List.
6. Program to Convert an a.E. from Infix Form to Postfix Form.
7. Program to Evaluate an Expression Entered in Postfix Form.
8. Program to Implement Non-Recursive Function for Factorial of a Number.
9. Program to Implement Recursive Function for Factorial of a Number.
10. Program to Implement a Queue as an Array.
11. Program to Implement a Queue as a Linked List.
12. Program to Implement a Circular Queue as an Array.
13. Program to Implement a Circular Queue as a Linked List.
14. Program to Implement a **Deque** Using an Array.
15. Program to Implement Linear Search in an Unsorted Array.
16. Program to Implement Binary Search in a Sorted Array.
17. Program to Implement Selection Sort.
18. Program to Implement Insertion Sort (the Program Should Report the Number of Comparisons).
19. Program to Implement Bubble Sort.
20. Program to Implement Quick Sort.

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	2	2	1						1	1
2	3	3	2	2	1						1	1
3	2	2	1	2	1							1
4	3	2	2	2	2					1		1
5	3	3	3	2	2						1	1
6	3	3	3	3	2						1	1

## 3MCA6(P) - LINUX LAB

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
0	0	2	2	-	40	10	50

### **Course Objectives:**

- Understand Basic Commands of Linux
- Learn and create files and directories
- Learn about web servers

### **Course Outcomes:**

1. Understand, Explain the Syntax and Execute the Basic Commands of Linux Operating System
2. Write Shell Scripts for Various Tasks such as Creating, Deleting, Copying and Moving Files and Directories and Set their Properties.
3. Manage the Process and Set the Environmental Variables
4. Install Web Server and Configure use My Sql

### **List of Practical Using Linux:**

1. Basic Linux Commands, Locating Files and Directories, Using the Man Command
2. Creating, Viewing, and Editing Text Files:, Redirecting Output to File,
3. Editing Text Files from the Shell Prompt, Editing Files with Vim,
4. Editing Text Files with a Graphical Editor,
5. Access to Files with Linux File System Permissions:, Linux File System Permissions, Managing File System Permissions from the Command Line,
6. Controlling New File Permissions and Ownership
7. Archiving and Copying Files, Managing Compressed Tar Archives and Zip,
8. Backing Up and Restoring Files from a Tar Archive,
9. Copying Files between Systems Securely.
10. Writing Bash Scripts, Writing Bash Scripts (At Least 10 Bash Script for Common Task)
11. Web Server Installation and Configure
12. Using Mysqldb Commands, Managing Database Users and Access Rights,
13. Creating and Restoring Mysqldb Backups,
14. Configuring Mysqldb Databases

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	2	2	1					1		1
2	3	3	3	2	1					1	1	1
3	2	2	2	1	1						1	1
4	2	2	2	2								1

## 3MCA7(A) -DISCRETE MATHEMATICS

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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### *Course Objectives:*

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- Understand Different Types of Discrete Structures
- Express a Logic Sentence in Terms of Predicates, Quantifiers, and Logical Connectives
- Solve Problems Using the Principle of Inclusion-Exclusion.
- Understand Recursive Definitions;

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### *Course Outcome:*

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1. Analyze Properties of Algebraic Structures Such as Groups, Rings and Fields.
2. Apply the Operations of Sets and use Venn Diagrams to Solve Applied Problems;
3. Use and Analyze Recursive Definitions
4. Understand, Explain and Apply the Basic Principles of Sets and Operations in Sets to Solve the Problems
5. Analyze Modern Problems in Computer Science and solve them Using Graphs and Trees.

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### *Unit-wise Syllabus :*

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#### **UNIT-I**

Set Theory: Introduction to Set Theory, Set Operations, Algebra of Sets, Duality, Finite and Infinite Sets, Cartesian Product, Relations, Representation of Relations, Types of Relation, Equivalence Relations and Partitions, Partial Ordering Relations and Lattices, Function and its Types, Composition of Function and Relations

#### **UNIT- II**

Graphs and Trees: Introduction to Graphs, Directed and Undirected Graphs, Homomorphic and Isomorphic Graphs, Subgraphs, Cut Points and Bridges, Multigraph and Weighted Graph, Paths and Circuits, Shortest Path in Weighted Graphs, Eulerian Path and Circuits, Hamilton Paths and Circuits, Planar Graphs, Euler's Formula, Graph Coloring, Trees, Spanning Trees, Binary Trees and its Traversals.

#### **UNIT- III**

Propositional Logic: Basic Operations: and( $\wedge$ ), Or( $\vee$ ), Not( $\sim$ ), Truth Value of a Compound Statement, Propositions, Tautologies, Contradictions, Validity of Arguments, Boolean Algebra Group Theory: Definition and Examples of a Monoid, Semigroup, Groups and Rings, Homomorphism, Isomorphism and Automorphism, Subgroups and Normal Subgroups, Cyclic Groups, Cosets, Lagrange's Theorem.



#### UNIT- IV

Definitions and Properties; Equivalence Relations and Equivalence Classes. Representations of Relations by Binary Matrices and Digraphs; Operations on Relations. Closure of a Relations; Reflexive, Symmetric and Transitive Closures.

#### UNIT- V

Definitions and Properties of Recursion and Recurrence Relation: Linear Recurrence Relation with Constant Coefficients, Homogeneous Solutions, Particular Solutions, Total Solution of a Recurrence Relation Using Generating Functions.

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#### Reference Books :

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1. C.L Liu- Elements of Discrete Mathematics- McGraw Hill
2. K.H.Rosen, Discrete Mathematics and Applications, Fifth Edition 2003, Tata McGraw Hill
3. W.K.Grassmann and J.P.Tremblay, Logic and Discrete Mathematics, a Computer Science
4. Ronald Graham, Donald Knuth and Oren Patashik- Concrete Mathematics: a Foundation for Computer Science Ronald Graham,
5. Donald Knuth and Oren Patashik- Concrete Mathematics: a Foundation for Computer Science- Addison-Wesley
6. Judith L. Gersting -Mathematical Structures for Computer Science,-Computer Science Press.
7. K. a. Ross, Ch. R. B. Wright, Discrete Mathematics, Prentice Hall Inc., 1992 (Or PWN Warszawa 1996).

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3			1							1
2	3	3	3	2	1							1
3	3	3	1	1	1							1
4	3	3	3	2	1					1		1
5	3	3	3	3	2						1	1

## 3MCA7(B)-PROFESSIONAL COMMUNICATION SKILLS

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	---	20	100

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### *Course Objectives:*

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- Improve Verbal and Non-Verbal Communication Style
- Enhance Interpersonal Skills.
- Communicate Clearly and With Impact
- Develop Oral and Written Language Skills
- Develop Reading, Listening, Speaking Skills,

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### *Course Outcome:*

---

1. Explain and use Basic Concept of Communication.
2. Demonstrate the Phonetic Capability in Communication.
3. Indulge the Soft and Ethical Skills in Their Personality
4. Participate in Group Discussion, Mock Interview, Group Presentation etc.
5. Explain and use Leadership Skills, Time Management Skills, Public Speaking Skills, and Situation Handling Skills to Solve the Societal Problem.

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### *Unit-wise Syllabus :*

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#### **UNIT-I**

Elements of Communication : the Importance and Scope of Communication Through English at the Present Time, the Process and Factors of Communication : Sender, Receiver, Channel, Code, Topic, Message, Context, Feedback, 'Noise', Filters and Barriers. Purpose of Communication, Verbal and Non Verbal Communication.

#### **UNIT- II**

Sounds of English: Vowels, Diphthongs, Consonants, Consonant Clusters, the International Phonetic Alphabet (IPA) ; Phonemic Transcription, Problem Sounds, Stress and Intonation

#### **UNIT- III**

Developing Reading and Writing Skills: the Importance of Developing Reading and Skills, Benefits of Effective Reading, the Importance of Writing Skills, the Differences Between Speech and Writing, the Qualities of Effective Writing : Art of Condensation, Writing Effective Sentences, Developing Logical Paragraphs, Précis, Essay, Drafting, Editing.

## UNIT- IV

Soft Skills Practice and Ethical Skills :Personality Development, Participating in Group Discussion and Job Interviews, Time Management Presentation Skills, Leadership Skills, Public Speaking, Extempore, Expressing Oneself in Various Situations, the Illusion of Communications, Danger of Half Baked Ideas, The Art of Explanation .

## UNIT- V

Self Presentation :Dress Code, Business Card, Handshake, Telephone Etiquette, Email Etiquette, Dining Etiquette, office Etiquette, International Business Etiquette, Approaches to Professional Writing, Writing a C.V, Resume, Applications, Reports, Business and Social Letters, Notices, Circulars and Memos.

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### Reference Books :

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1. Practical English Usage, Michael Swan, Oxford
2. English for Effective Communication, Sanjay Kumar and Pushplata, Oxford
3. B.K.Das et al-An Introduction to Professional English and Soft Skills -Cambridge University Press.
4. Bovee et al Business Communication Today - ( Pearson)
5. Meenakshi Raman and Prakash Singh-Business Communication - -(Oxford)
6. Brian Clegg - Crash Course in Personal Development - Kogan Page
7. Adele B.Lynn Activities for Developing Emotional Intelligence -(HRD Press)
8. Edward De Bono -Lateral Thinking -Penguin

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	1			1	2		2	2	3		3
2	3	1			1	2		2	2	3		3
3	3	1			1	2		3	2	3		3
4	3	1	1	1	1	2		2	2	3		3
5	3	1	2	3	1	2		2	2	3		3

# 3MCA5(C)-MICROPROCESSOR AND ASSEMBLY LANGUAGE PROGRAMMING

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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## Course Objectives:

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- To Understand the Microprocessor as CPU of Digital Computer
- To Understand the Organization and Functioning of a Digital Computer
- To Examine the Basics of Assembly Language Programming for 8085
- To Learn the Advanced Microprocessor Features
- To Learn the Memory and I/O Hardware Interfacing Basic Controls for Microprocessor Organization.

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## Course Outcome:

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1. Understand and explain the Working of a Microprocessor and Microcontroller
2. Describe the General Architecture of a Microcomputer 8085 System
3. Write Assembly Programs Using Assembler and Execute them Using 8085 Simulator
4. Understand and Classify the Instruction Set
5. Understand, Explain and design the Interfacing of Memory & Various I/O Devices with 8085 Microprocessor Mapping with environment and sustainability development

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## Unit-wise Syllabus :

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### UNIT-I

Microprocessor Architecture and its Operation, Microprocessor Initiated Operation, Bus Organization of 8085, Registers, Memory UNIT of 8085, I/O Device, Interfacing Devices, Pin Out Diagram of 8085, Bus Timings, ALU of 8085 and its Flags, Instruction Set of 8085, Classification of Instructions

### UNIT- II

Addressing Modes, Data Transfer Operation Commands, Arithmetic Operation Commands, Logic Operation Commands, Branch Operation Commands, Writing and Debugging Simple Assembly Language Program, Tools for Developing Assembly Language Program, Writing Programs Using an Assembler and Executing Using Simulator, Branching Looping and Indexing.

### UNIT- III

Stack, Subroutine, Conditional Call and Return Instructions, Advanced Instructions - LHL, SHLD, XCHG, PUSH, POP, XTHL, PCHL, Assembly Programs of Addition, Subtraction, Multiplication of Multi Byte Signed and Unsigned Numbers, Basic Interfacing Concepts, Interfacing Output Display, Interfacing Input Key Board, Memory Mapped I/O, I/O Mapped I/O

#### UNIT- IV

Data Transfer (Synchronize and Asynchronies), 8085 Interrupts (Hardware and Software), Analog to Digital Converter, Digital to Analog Converter, I/O Ports, 8255 Programmable Peripherals Interfacing, 8253 Programmable Interfacing Timer, DMA (Direct Memory Access), 8087 Math Coprocessor, DMA Controller

#### UNIT- V

Introduction to 8086, Operating Modes, Register Organization of 8086, 8086 Bus Cycle Addressing Modes of 8086, Internal Organization of 8086 Bus Interface UNIT (Bui) Execution UNIT (EU) Memory Segmentation, Flag Register, General Idea of Advancements of Microprocessors, Pipelining, Cache Memory, Memory Management, Virtual Memory System

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#### Reference Books

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1. Microprocessor Architecture, Programming, and Application with 8085, Ramesh Gaonkar, Penram International Publication, 2011
2. Douglas V. Hall Microprocessors and Interfacing -TMH, 2nd Edition.
3. Peter Able -IBM PC Assembly Language Programming-PHI
4. B. Ram, Fundamentals of Microprocessors and Microcomputers DhanpatRai Publications. 5<sup>th</sup> Edition
5. K. R. Venugopal&Rajkumar-Microprocessor X86 Programming-BPB Publication, 2007.
6. Yn-Cheng Liu, Glenn a.Gibson, -Microcomputer Systems: the 8086 / 8088family Architecture, Programming and Design”, Second Edition-Prentice Hall of India, 2006.
7. Advanced Microprocessor and Peripherals –Architecture, Programming and Interfacing”, a.K.Ray& K.M Bhurchandi, Tata Mc-Graw Hill, 2006.
8. 8051 Microcontroller and Embedded Systems Using Assembly and C, Mohamed Ali Mazidi, Janice GillispieMazidi, Second Edition, Pearson Education / Prentice Hall of India, 2007

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	1	1	1					1		1
2	3	2	1	1	1					1		1
3	3	3	3	3	3							1
4	3	2	1									
5	3	3	3	2	2		2			1		1

## SEMESTER IV

### 4MCA1– JAVA PROGRAMMING

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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#### *Course Objectives:*

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- Introduce and Learn the Usage of the Java SDK Environment to Create, Debug and Run Java Programs.
- Understand Fundamentals of Java Programming Such as Character Set, Variables, Data Types, and Control Structures, Array, Class and Methods.
- Understand the Concepts of (OOPs) and Learn Implementation in Java Defining Classes, Invoking Methods, Using Class Libraries.
- Introduce Strings, Vectors, Interfaces, Packages and Threads Handling in Java.
- Gain the Knowledge of Java Applets, AWT, Swings, Servlet.
- Understand the GUI Application, Web Applications, N-Tier Architecture.
- Develop the Understanding of the Basic Knowledge of File Handling, Database Connectivity, Java Servlets and Web Application.

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#### *Course Outcomes (Cos):*

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1. Explain and Apply the Object Oriented Concepts for Solving Real Problem.
2. Use the Java SDK Environment to Create, Debug and Run Simple Java Programs.
3. Apply Java Technology to Develop the Small Applications, Utilities, and Web Applications.
4. Apply Events Management and Layout Managers Using AWT, Swing, JDBC and Servlet for Developing the Software for Various Problems.

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#### *Unit-wise Syllabus :*

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##### **UNIT-I**

Basics of Java : History and Basics of Java, Java Environment, JDK Tools, Java Virtual Machine, Java Program Structure, Java Language- Tokens, Keywords, Constants, Variables, and Data Types. Operators and Expressions, Statements - Decision Making, Branching and Looping, Labeled Loops Statement, Jump Statements: Break, Continue, and Return, Command Line Argument.

##### **UNIT-II**

Classes and Objects: Classes, Objects, Defining a Class, Adding Variables and Methods, Creating Objects, Accessing Class Members, Constructors, Static Members, Nesting of Methods, Inheritance and Polymorphism: Basics Types, Extending a Class, Using Super, Method Overloading, Method Overriding, Final Variables and Methods, Final Classes, Finalize Method, Abstract Methods and Classes, Visibility Control.

### UNIT-III

One and Two Dimension Arrays, String Array, String and String Buffer Classes, Vectors, Wrapper Classes. Interfaces: Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables, Packages: System Packages, Naming Conventions, Creating Packages, Accessing a Package, Using Package, Adding a Class to a Package, Hiding Classes. Exception Handling: Introduction to Exception Handling, Try-Catch, Finally, Throws, Java Thread Model: Life Cycle of a Thread, Thread Class, Runnable Interface

### UNIT-IV

Applet Programming : Creating and Executing Java Applets, Inserting Applets in a Web Page, Applet Tag, Local and Remote Applets, Applets Vs. Applications, Applets Life Cycle. AWT Classes, Swing Classes, Event Handling, AWT Programming: Working with Windows, Graphics and Text, Using AWT Controls, Layout Managers and Menus, Handling Image, Animation, Sound and Video. Java Swing: JApplet, Icons and Labels, Text Fields, Buttons, Radio Buttons, Check Boxes, Combo Boxes, List Boxes, Tabbed and Scroll Panes, Tables. Event Handling:

### UNIT-V

I/O Stream : Introduction of I/O Stream, Types of Streams, Stream Class Hierarchy, Using File Class, Byte Streams Vs Character Streams, TextfileVs Binary File, Standard I/O Streams, and Random Access File, Serialization.

Database Programming Using JDBC:-Introduction to JDBC, JDBC Drivers, Types of JDBC Drivers, Connecting with Database.

J2EE: Introduction of J2EE, Web Application Basics, Architecture and Challenges of Web Application, Servlet, Servlet Life Cycle, Developing and Deploying Servlets.

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#### Reference Books:

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1. E. Balagurusamy, "Programming with Java, a Primer",TMH, ISBN-13: 978-0-07-061713-1, ISBN-10: 0-07-061713-9.
2. Patrick Naughton and Herbert Schildt, "Java: the Complete Reference", TMH Publication, ISBN 0-07-463769-X.
3. Yashavantkanetkar, "Let us Java", BPB Publications.
4. Ivan Bayross, "Web Enabled Commercial Application Development Using HTML, DHTML, Javascript, Perl CGI",BPB Publications
5. Cay Horstmann, "Big Java", Wiley Publication
6. Peter Norton, "Java Programming", Techmedia Publications.
7. Joseph Weber, "Using Java 1.2", PHI, ISBN -81-203-1558-8.

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	2		2					1	2	1
2	3		3	2	3							1
3	3		3	2	3			1	2	1	2	1
4	3	2	2		1			1				

## 4MCAC2-COMPUTER NETWORKS

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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### *Course Objectives:*

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1. Build an Understanding of the Fundamental Concepts of Computer Networking.
2. Familiarize the Student with the Basic Taxonomy and Terminology of the Computer Networking Area.
3. Introduce the Student to Advanced Networking Concepts, Preparing the Student for Entry Advanced Courses in Computer Networking.

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### *Course Outcome:*

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1. Demonstrate the Basic Concepts of Networking, Networking Principles, Routing Algorithms, IP Addressing and Working of Networking Devices.
2. Demonstrate the Significance, Purpose and application of Networking Protocols and Standards.
3. Describe, compare and contrast LAN, WAN, MAN, Intranet, Internet, AM, FM, PM and Various Switching Techniques.
4. Explain the working of Layers and apply the various protocols of OSI & TCP/IP model.
5. Analyze the Requirements for a Given Organizational Structure and Select the Most Appropriate Networking Architecture and Technologies.
6. Design the Network Diagram and Solve the Networking Problems of the Organizations with Consideration of Human and Environment.
7. Install and Configure the Networking Devices.

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### *Unit-wise Syllabus :*

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#### **UNIT-I**

Introduction to Computer Networks, Types of Network - LAN, WAN, MAN, Internet, Network Topologies, Transmission Media, Communication Mode- Simplex, Half Duplex, Full Duplex Analog & Digital Signals, Base Band, Broad Band, Error Detection and Correction, OSI Model:- Functions of Each Layer, Services and Protocols, Inter-Networking Devices, Hub, Repeater, Bridge, Switch, Modem, Routers Gateways.

#### **UNIT- II**

Multiplexing Multiplexer FDM, TDM Statistical Multiplexing, Modulation AM, FM, PM, Switching Technique, Message Switching, Circuit Switching, Packet Switching, Virtual Circuit, IEEE Standards, 802.3, 802.4, 802.5. Fast Ethernet, FDDI Token Ring.



### UNIT- III

Routing Algorithm:- Shortest Path Routing, Distance Vector Routing, Unicast Routing, Multicast Routing, Link State Routing, Broadcast Routing, Congestion Control, Traffic Shaping. TCP/IP: Introduction, History of TCP/IP, Architecture, Layers of TCP/IP, Comparison Between OSI and TCP/IP Models, Transmission Control Protocol, User Datagram Protocol, Internet Protocol IP Addressing, IP Addressing Classes, Internet Protocols – IP Packet, ARP, RARP, ICMP,

### UNIT- IV

Various Protocol, HTTP, Telnet, FTP, SMTP, Mine, UDP, URL (Uniform Resource Locator), ISDN Channel, ISDN Services, Base Band ISDN, Broadband ISDN, Network Security : Network Security Issues, Firewalls – Need and Features of Firewalls, Types of Firewall Technology- Network Level and Application Level, IP Packets Filter Screening Routers, Limitations of Firewalls.

### UNIT- V

Introduction to Wireless Network, Fundamentals of Cellular Systems, Mobile Ad-Hoc and Sensor Networks, Wireless PAN/LAN/MAN, Multi-Path Propagation, Path Loss, Slow Fading, Fast Fading, Frequency Reuse, Cell Splitting, Cell Sectoring.

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### Reference Books

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1. Andrew S.Tanenbaum -Computer Networks Pearson- 4th Edition
2. Behrouza.Forouzan- Data Communications and Networking -Global Ed - 5th Edition
3. William a Shay - Understanding Data Communications and Networks -Course Technology Inc- 3rd Revised Edition
4. Prakash C. Gupta -Data Communications and Computer Networks-PHI-2nd Edition
5. William Stallings- Data and Computer Communications Pearson Education India 10th Edition
6. Larry L.Peterson and Bruce S. Davie,-Computer Networks – a Systems Approach- Morgan Kaufmann Publishers- Fifth Edition, 2011
7. Thomas D.Nadeau& Ken Gray-Software Defined Networks, o'reilly, 2013
8. [Http://Nptel.Ac.in/Video.Php?Subjectid=106105081](http://Nptel.Ac.in/Video.Php?Subjectid=106105081)

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	2	2	2					2	1	1
2	3	2	1					2		2	1	1
3	3	2	2	2	2			1		2	1	1
4	3	2	2	2	2			1		1		1
5	3	3	2		2							1
6	3	3	3	2	1		1	1	1			1
7	3	3	2	3	2							1

## 4MCAC3-CLOUD COMPUTING

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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### *Course Objectives:*

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- To Learn Fundamentals of Cloud Computing.
- To Know Various Cloud Computing Technologies
- To Understand Virtualization Fundamentals, Foundation
- To Introduce Data Storage in Cloud
- To Learn Elements and Services in Cloud Computing
- To Learn Application Platform for Cloud Applications.
- To Introduce Various Cloud Services.
- To Know Tools of Cloud Computing

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### *Course Outcome:*

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1. Describe the Key concepts, Advantages, Limitations and Applications of Cloud Computing
2. Explain the various Models and services of Cloud.
3. Understand and Describe the Core Issues and challenges of cloud computing Such as Security, Privacy, and Interoperability.
4. Select and Apply Suitable Technologies, Tools and Applications in the Cloud Computing Driven Systems
5. Design and develop the efficient solutions of the Cloud Computing problems and issues with consideration of environment and sustainable development.
6. Analyze the interface requirement for deploying the Applications in Cloud

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### *Unit-wise Syllabus :*

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#### **UNIT-I**

Introduction to Cloud Computing, Definition, History, Importance, Characteristics, Pros & Cons, Cloud Computing Technologies, Types of Cloud- Public & Private Clouds, Community Cloud, Hybrid, Cloud Infrastructure, Cloud Service Models, Cloud Deployment Models.

#### **UNIT- II**

Virtualization, Characteristics, Benefits, Virtualization in Cloud Computing, Hypervisors, Multitenancy, Types of Tenancy, Virtualization - Architecture Clustering, Grid Computing and Virtualization, Virtual Infrastructure, CPU Virtualization, Network and Storage Virtualization, Cloud Tools - VMware, Eucalyptus, Cloudsim, Opennebula,



### UNIT- III

Cloud Computing Application Platform, Tools for Building Cloud, Programming in the Cloud, Moving Applications to Cloud, Microsoft Cloud Services - Azure, Google Cloud Applications -Gmail, Calendar, Docs, Video etc., Google App Engine, Amazon Cloud Services EC2, Other Cloud Services - Cisco,Webex Mail, Yahoo Zimbra, Elasticemail, Salesforce.Com., IBM.

### UNIT- IV

Data Storage and Cloud Computing - Introduction to Enterprise Data Storage-DAS, SAN, NAS, Data Storage Management, FAT, NTFS, Cloud File Systems, Distributed Data Storage - Amazon Dynamo, Couchdb, Thrudb, Online File Storage, Amazon Storage System.

### UNIT- V

Cloud Computing Services -Cloud Computing Elements, Cloud Do's and Don'ts, Understanding Services and Applications By Types - Web Based Services, Infrastructure Services, on-Demand Computing, Other Cloud Services- STAAS, DAAS, INAAS, Future Trends in Cloud Computing, Mobile Cloud, Multimedia Cloud, Energy Aware Cloud Computing, Jungle Computing, Online Photo Editing Services.

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#### Reference Books:

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1. Raj Kumar Buyya, James Broberg, andrezeiM.Goscinski, -Cloud Computing: Principles and Paradigms,-Wiley 2011.
2. Srinivasan, J.Suresh,-Cloud Computing – a Practical Approach for Learning and Implementation, Pearson India, [ISBN 978131776513]
3. Toby Velte, Anthony Velte, Robert Elsenpeter,-Cloud Computing, a Practical Approach - McGraw Hill, 2010 [ISBN: 0071626948]
4. Greg Schulz -Cloud and Virtual Data Storage Networking, Auerbach Publications [ISBN: 978-1439851739].
5. Marty Poniatowski-Foundations of Green It- [ISBN: 978-0137043750].
6. Learning Spring Application Development, Ravi Kant Soni, Packt Publishing.
7. Michael Miller, Cloud Computing, 2008.
8. Judith Hurwitz, Robin Bllor, Marcia Kaufman, Fern Halper, Cloud Computing for Dummies, 2009.
9. BorkoFurht, Armando Escalante (Editors), Handbook of Cloud Computing, Springer, 2010.

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	1	1			1			1		1
2	3	2	2							1		1
3	3	2	2				1			1		1
4	3	2	2	2	2							1
5	3	3	3	2	2		2				2	1
6	3	2	2	2							1	1

## 4MCA4-DATA MINING AND BUSINESS INTELLIGENCE

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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### *Course Objectives:*

- Introduce the Basic Concepts of Data Base, Data Warehouse and Data Mining
- Understand the Concept of Knowledge Discovery
- Understand the process of deriving Information from data with Different Perspectives
- Understand and apply Preprocessing Methods on Raw Data
- Discover Interesting and Useful Patterns and associations, Analyze Supervised and Unsupervised Models
- Understand Business Intelligence Life Cycle and Techniques Used in It

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### *Course Outcome:*

1. Demonstrate an Understanding and knowledge of the Data Warehousing, Data Mining and Business Intelligence
2. Explain the Data Analysis and Knowledge Delivery Stages.
3. Organize and Prepare the Data Needed for Data Mining Using Pre Preprocessing Techniques
4. Implement the Appropriate Data Mining Methods Like Association, Classification, Clustering
5. Apply Data Mining Methods to Solve Practical Problems. (Analyze the Problem Domain, Data Collection, Preprocessing, Apply Suitable Data Mining Method, Interpret and Visualize the Results and Provide Decision Support.)

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### *Unit-wise Syllabus :*

#### **UNIT-I**

Data Ware Housing Definition, Usage and Trends, DBMS Vs. Data Warehouse, Data Marts, Metadata, Data Mining Definition & Application, DBMS Vs. Data Mining, KDD Versus Data Mining, Data Mining Techniques, Business Intelligence Introduction, Cycle of a Business Intelligence Analysis  
Data Preprocessing: Need, Data Cleaning, Integration & Transformation

#### **UNIT-II**

Data Warehouse Process & Architecture, OLAP and OLTP Definitions, Difference Between OLAP and OLTP, Dimensional Analysis, Multidimensional Data Mode, Data Cubes, Drill-Down and Roll-Up – Slice and Dice or Rotation, Operations, Types of OLAP, ROLAP Vs. MOLAP, Schemas for Multidimensional Database: Stars, Snowflakes and Fact Constellations  
Relation between BI and DW, the Business Intelligence User Types, Standard Reports, Interactive Analysis and Ad Hoc Querying, Parameterized Reports and Self-Service Reporting, Dimensional Analysis, Alerts/Notifications, Visualization: Charts, Graphs, Widgets, Scorecards and Dashboards

### UNIT-III

Association Rule Mining, Single-Dimensional Boolean Association Rules Apriori Algorithm, FP Growth, Multi-Level Association Rules from Transaction Databases

### UNIT-IV

Classification and Prediction, Concepts of Decision Tree Induction and Bayesian Classification, Cluster Analysis, Categorization of Methods, Partitioning Methods, K-Means Algorithm, Outlier Analysis, Hierarchical Methods

### UNIT-V

Emerging Technologies - Machine Learning, Big Data: Introduction, Importance, Four Vs  
Data Mining for Business Applications Like Fraud Detection, Market Segmentation, Retail Industry, Telecommunications Industry, Banking & Finance and CRMetc.,  
Spatial Databases, Multimedia Databases, Time Series and Sequence Data, Text Databases, Web Mining Concepts.

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#### Reference Books:

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1. Jiawei Han, Michelinekamber, “Data Mining Concepts and Techniques”, Morgan Kaufmann Publishers
2. Arun K Pujari, “Data Mining Concepts and Techniques”, University Press
3. G.K.Gupta, “Data Mining with Case Studies”, PHIPvt Ltd

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	1	1	1								1
2	3	3	2	2	1					1		1
3	3	3	3	3	2							1
4	3	3	3	3	2						1	1
5	3	3	3	3	2					1	2	1

## 4MCA5(P) – JAVA PROGRAMMING LAB

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
0	0	4	2	--	40	10	50

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### Course Objectives:

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- Implement Strings, Vectors, Interfaces, Packages and Threads Handling in Java.
- Implement Java Applets, AWT, Swings, Servlet.
- Learn and Understand the Implementation of GUI Application, Web Applications, N-Tier Architecture.
- Develop the Understandings of File Handling, Database Connectivity, Java Servlets and Web Application in Java.
- Learn and Understand the Implementation of GUI Application, Web Applications, N-Tier Architecture.

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### Course Outcomes

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1. Use the Java SDK & JRE Environment to Create, Debug and Run Simple Java Programs.
2. Analyze the Problem, Identify the Requirements & Features of Applications and Utilities
3. Implement Object Oriented Concepts for Solving Real Problem.
4. Develop Small Applications, Utilities, and Web Applications Using AWT, Event and Layout Managers

### List of Experiments on Java:

1. Write a Program in Java to Calculate the Simple Interest.
2. Write a Program in Java to Calculate Sum of Two Numbers Input from Command Line Argument.
3. Write a Program in Java to Calculate Area of Circle Using Scanner Class.
4. Write a Program in Java to Calculate Square Root of a Number.
5. Write a Program in Java to Display Name, Age, Calendar and Salary of a Person Input from the Keyboard.
6. Write a Program in Java to Display Grading of Student When His Percentage is Input from Keyboard.
7. Write a Program in Java to Display Odd Number from 1 to 100.
8. Write a Program in Java to Display the Following Pattern.

```
1
2 2
3 3 3
4 4 4 4
5 5 5 5 5
```

9. Write a Program in Java to Display the Following Pattern Using Function.

```
1
2 2
3 3 3
4 4 4 4
5 5 5 5 5
```

10. Write a Program in Java to Display the Following Pattern Using Function.

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

11. Write a Program in Java to Display the Following Pattern Using Function.

```
1
2 3
4 5 6
7 8 9 10
11 12 13 14
```

12. Write a Program in Java to Calculate the Factorial of a Number.

13. Write a Program in Java to Determine Whether a Number Input from Keyboard is Prime Number Or Not.

14. Write a Program in Java to Display the Prime Numbers from 1 to 500 Using Function.

15. Write a Program in Java to Show Accessing Class Members and use a Dot(.).

16. Write a Program in Java to Show Multilevel Inheritance.

17. Write a Program in Java to Show Single Inheritance.

18. Write a Program in Java to Concatenate Two Strings Without Using Library Function.

19. Write a Program in Java to Make First Alphabet Capital of Each Word in a String.

20. Write a Program in Java to Get the Last Index of Any Given Character in a String.

21. Write a Program in Java to Reverse Words of a String.

22. Write a Program in Java to Find Occurrences of Each Character in a String.

23. Java Program to Get String and Count Number of Words in Provided String.

24. Write a Program in Java to Check Given String is Palindrome String Or Not in Java.

25. Write a Program in Java to Reverse Each Word of Given String.

26. Write a Program in Java to Get Sub String from a Given String.

27. Java Program to Convert String to Lowercase and Uppercase.

28. Create a Java Applet and Show the use of Drawstring() Function.

29. Create a Java Applet to Show How to use Various Methods of Applet Class and Graphics Class in a Java Applet.

30. Write a Program in Java to Show the use of Interface.

31. Create a Java GUIApplication Using Labels and Textfields.



32. Create a Java GUI Application Using Radiobuttons.
33. Create a Java GUI Application Using Checkboxes.
34. Create a Java GUI Application Using Comboboxes.
35. Create a Java GUI Application Using Listboxes.
36. Create Two Html Pages with Links to Navigate from One Page to Other Page.
37. Write a Servlet to Display Current Date and Time of Server on Client : Date Servlet
38. Write a Servlet to Display Natural Numbers from 1 to 100 : Numberservlet
39. Create a JSP to Display Natural Numbers from 1 to 50 :Number.Jsp and Write Down the Process of Running It Step by Step.
40. Create a JSP to Display Current Date and Time of Server onClient :Date.JSP and Write Down the Process of Running it Step by Step.

### Group Assignment

41. Scientific Calculator Utility
42. Chat Application
43. Time Table System
44. Student Attendance System
45. Steganography & Data Encryption System Java
46. Student Information System
47. Survey Tool System
48. Text Editor Like Notepad/Wordpad
49. Game / Puzzle Like Luddo Game
50. Game / Puzzle Like Snake Game
51. Paint Application

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	2		2					1	2	1
2	3	3	2									1
3	3	3	3	2	3							1
4	3	3	3	2	3	2		1	2	1	2	1

## 4MCA6(P) - IoT LAB

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
0	0	2	2	-	40	10	50

### *Course Objectives:*

- To introduce the latest microcontrollers with application development, product design and prototyping.
- Learn and Understand Various Protocols used in Wireless Sensor Network.
- Learn to design Embedded System to Automate Real Life Problems.

### *Course Outcomes:*

1. Understand the Concepts of Internet of Things and the Application Areas of IoT
2. Analyze Basic Protocols in Wireless Sensor Network
3. Design IoT Applications in Different Domain and be able to Analyze their Performance.
4. Implement Basic IoT Applications on Embedded Platform
5. Able to Realize the Revolution of Internet in Mobile Devices, Cloud & Sensor Networks

### **List of Experiments on IoT**

1. To examine the Internet of Things possible applications.
2. To implement different IoT sensors in .Net.
3. To implement suitable IoT applications in smart lighting.
4. To implement suitable IoT applications in smart city.
5. To implement suitable IoT applications in weather monitoring.
6. To implement suitable IoT applications in smart power grid.
7. To implement suitable IoT applications smart logistics.
8. To implement suitable IoT applications in smart health monitoring
9. To implement an IoT platform with full design methodology.
10. An application IoT using Apache hadoop.
11. Study of a well-developed sample application of IoT.
12. To develop sample application of IoT using simulators.

### *Reference Books:*

1. Vijay Madiseti, Arshdeep Bahga, "Internet of Things: A Hands-on Approach"
2. Waltenege Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice"

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	1	1									1
2	3	2	2	1	1							1
3	3	3	3	2	1						1	1
4	3	3	3	2	1							1
5	2	1	1	1								1

## 4MCA7(A)-COMPUTER GRAPHICS

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

---

### *Course Objectives:*

- Introduce Computer Graphics – Software, Hardware, Applications
- Understand the various object Drawing Algorithms
- Learn the Basic Principles of 2 Dimensional, 3-Dimensional Transformations
- Understand the Concepts of Curves and Surfaces
- Understand the Concepts of Projection
- Learn and Understand the basic tools used in creation in Multimedia Project

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### *Course Outcomes:*

1. List out and Describe the Basic Concepts and terminologies Used in Computer Graphics
2. Discuss Issues Related to Emerging Electronic Technologies in concern of Graphic Design
3. Apply and Analyze different Approaches/ Algorithms for Drawing various graphics objects
4. Identify and Apply Various Geometrical Transformations Approaches
5. Implement Various Algorithms to Polygon Fill
6. Describe the Importance of Viewing and Projections
7. Identify Various Software systems Used in design, the Creation and Implementation of Multi-Media projects

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### *Unit-wise Syllabus :*

#### **UNIT I**

Graphics Introduction, Application of Graphics, Elements of Graphics Workstation, Pixel, Frame, Buffer, Resolution, Graphics Display Devices-Raster Scan System, Random Scan System, Refresh CRT, Color CRT, LCD Led Monitor and Plasma Panel, Hard Copy Devices: Printers & Plotters, Input Devices : Mouse, Trackball, Light Pen, Scanner, Digital Camera

#### **UNITII**

Drawing Geometry: Point-Plotting, Coordinate System, Point Plotting, Line Drawing-Line Segments, Line Drawing Algorithm: DDA Algorithm, Bresenham's Line Algorithm, Circle Drawing, Ellipse Drawing, Polygon Representation Rectangle, Filling- Filled Area Primitives, Scan Line Polygon Fill Algorithm, Flood Fill Algorithm, Boundary Fill Algorithm

#### **UNITIII**

2D Geometric Transformation: Translation, Rotation, Scaling, Geometric Transformation, Coordinate Transform and Composite Transformation, 2D Viewing Transformation & Clipping: World Coordinate System (WCS), Normalized Device Coordinate System, Point Clipping, Line Segment Clipping, Coahen-Sutherland Line Clipping

**UNIT IV**

3D Geometric Transformation 3D Geometric Transformation: Translation, Rotation, Scaling, Composite Transformation, 3D Display Methods – Parallel Projection, Perspective Projection  
Curve Representation, Bezier and B-Spline Methods

**UNIT V**

Multimedia Basics, Multimedia Applications, Multimedia: Text – Font, Faces, Animating Text, Hyper Text. Sound: Midi, Digital Audio Basics, File Formats Image - Bitmap, Vector Drawing, Color Palate, Image File Formats (BMP,JPG), Video – Broadcast Video Standards (NTSC, PAL), Integrating Computer and Television, Compression and Decompression (JPEG, MPEG) Animation: Principle of Animation, Cell Animation, Kinematics, Morphing

**Reference Books:**

1. D. Hearn & M. Baker, “Computer Graphics”, Prentice Hall
2. D. F. Rogers, J. a. Adams, “Mathematical Elements for Computer Graphics”, TMH
3. Multimedia Systems, J.F.K, Buford, Acm Press, 1994 (Isbn 0-201-53258-1).
4. Tay Vaughan, Multimedia: Making It Work (with Cd), 8th Edition, McGraw Hill Education 2011
5. Ranjan Parekh, Principles of Multimedia, 2nd Edition, McGraw Hill Education, 2013.

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	2							1		1
2	2	2	1	1						1		1
3	3	3	3	2	1						1	1
4	3	2	2	1	1							1
5	3	3	3	2	1							1
6	3	3	3	2	1							1
7	3	3	3	2	2				1		1	1

## 4MCA7(B)-THEORY OF COMPUTATION

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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### **Course Objectives:**

1. Learn and Understand FSA, DFA, N DFA, Turing Machine, Regular Expression, Push Down Automaton .
2. Learn and Understand Properties of Languages, Grammars and Automata.
3. Gain knowledge of Computing and Mathematics to Solve Problems.

---

### **Course Outcome:**

1. Demonstrates Models, Turing Machine, Regular Expression, Push Down Automaton .
2. Model, Compare and analyze different Computational Models.
3. Apply and Prove properties of Languages, Grammars and Automata.
4. Apply Knowledge of Computing and Mathematics to Solve Problem
5. Apply Mathematical Foundations, Algorithmic Principles and Computer Science Theory to the Modeling

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### **Unit-wise Syllabus :**

#### **UNIT-I**

Introduction to Theory of Computation: Basic Computational Constructs: Finite State Systems, Non Deterministic Finite Automata (N DFA), Deterministic Finite Automata (DFA), Equivalence of DFA and N DFA, Finite Automata with E-Moves, Limitations of FSM, Minimization of Finite Automata, Moore and Mealy Machines, Equivalence of Moore and Mealy Machines.

#### **UNIT- II**

Regular Sets, Closure Properties of Regular Sets, Pumping Lemma, Applications of Pumping Lemma. Regular Expression, Laws for Regular Expression, Equivalence of Finite Automata and Regular Expression, Introduction to Regular Grammar.

#### **UNIT- III**

Introduction to Context Free and Context Sensitive Grammar, Ambiguity, Parse Tree Representation of Derivations, Simplification of Context Free Grammar, Normal Forms (Chomsky Normal Form (CNF) and Griebach Normal Form (GNF)).

#### **UNIT- IV**

Definition, Deterministic Push Down Automaton (DPDA), Non-Equivalence of PDA & DPDA, Equivalence of CFG and PDA, Pumping Lemma for CFL's, Closure Properties of CFL, Non-CFL.

## UNIT- V

Turing Machine(TM): Introduction, Types of Turing Machine, Universal Turing Machine and Other Modifications, Construction of Tm for Simple Problems, Turing Machine as Enumerators, Relation Between Languages of Classes, Computational Complexity Theory. Computable Functions: Partial, Total, Constant Functions, Primitive Recursive Function, Regular Function, Recursive Functions.

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### Reference Books:

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1. John E Hopcroft, Rajeev Motwani, Jeffrey D. Ullman.Introduction to Automation Theory, Languages & Computation
2. Mishra &Chandrasekaran-Theory of Computer Science (Automata, Languages and Computation PHI ISBN-81-203-1271-6
3. Lewis & Papadimitriou Elements of the Theory of Computation, PHI ISBN 81-203-1016-0
4. John C. Martin -Introduction to Languages and Theory of Computation ISBN- 0-07-463722-3
5. Bernard M. Moret Pearson -Heory of Computation ISBN-81-7808-550
6. Raymond Greenlaw& H. James Hoover (Harcourt) - Fundamentals of Theory of Computation ISBN : 81-7867-036-4
7. C.L.Liu-Elements of Diseretemaths-TMH ISBN-0-07-043476-X

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	2	2	2					1		1
2	3	2	2	2	2							1
3	3	3	2	2	2							1
4	3	2	3	2	2							1
5	3	2	2	2	2					1		1

## 4MCA7(C) - MANAGEMENT THEORY AND PRACTICES

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	-	20	100

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### *Course Objectives:*

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- Describe the Nature and Scope of Management
- To Understand Various Levels of Management
- Describe Various Skills that are Necessary for Successful Managers.

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### *Course Outcomes:*

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1. Understand and Demonstrate the Process of Planning, Decision Making, Organizing, Staffing, Leading and Controlling.
2. Describe Different Leadership and Management Styles and Determine to Best Style for Organizational Problems
3. Discuss the Importance of Teamwork within an Organization, and Elements of Effective Team Dynamics
4. Demonstrate Competence in Planning, and Managing Resources, People and Performance
5. Discuss the Role of Planning and Controlling

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### *Unit-wise Syllabus :*

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#### **UNIT-I**

Management practices- Meaning and Functions, Development of Management Thought, F.W. Taylor and Henry Fayol's Theories of Management, Qualities of an Efficient Management, Management Principles of Modern Times (Empowerment, Kaizen, Quality Circles, Total Quality Management).

#### **UNIT-II**

Planning- Plan, Policies, Strategies And Programs, Steps In Planning & Decision Making, Forecasting, Qualities of An Effective Planner, Relevant Case Study

#### **UNIT-III**

Organizing-Organizational Design, Organizational Structure, Centralization & Decentralization, Delegation, Gantt chart and PERT/CPM, Relevant Case Study

#### UNIT-IV

Directing- Motivation and Team Building, Theories of Motivation, Factors Affecting Motivation. Leadership, Leadership Styles, Theories of Leadership, Qualities of a Effective Leader, Effective Communication and Presentation Skills, Relevant Case Studies.

#### UNIT-V

Controlling Meaning and Basic Principles, Types of Controls, Budget And Budgetary Control, Inventory Control and Quality Control, Relevant Case Studies.

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#### **Reference Books:**

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1. Joseph L. Massie, Essentials of Management, Prentice Hall of India
2. Biswajeet Patanayak, Human Resource Management, Prentice Hall of India
3. Gomes-Mejia, Balkin & Hardy, Managing Human Resources, Prentice Hall of India
4. Lesslie W. Rue & Lyod Byrns, Management, Tata McGraw Hill, 2009.
5. Joseph M. Putti, Harold Koontz, Essentials of Management, An Asian Perspective, 1998, Tata McGraw Hill
6. Management: An Introduction, David Boddy, Pearson
7. Management & Organisational Behaviour, Laurie J. Mullins with Gill Christy, Pearson

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	3	3	1			1	2	2	2	2
2	3	2	2	1	1						2	2
3	2	1		1	1				3	2	1	2
4	3	3	3	2	1			1	1	1	2	2
5	2	2	2	2							2	1



## SEMESTER V

### 5MCA1 – SOFTWARE ENGINEERING

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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#### *Course Objectives:*

- Understand, Learn and Apply the Theoretical and Practical Knowledge of Software Development Such as Software Development Paradigms, Process, Models, Tools and Techniques.
- Understand and Learn the Process of Software Requirements Identification, Analysis, Review, and Learn Recording Requirements in the IEEE Format of the SRS Document.
- Understand the Various Types and Levels of Software Testing and Basic Approaches of Test Case Designing.
- Gain the Knowledge of the Various Models of Software Quality, Estimation, Quality Assurance and Control.

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#### *Course Outcomes :*

1. Identify, Analyze, Review and Validate the Requirement of Software Components and System, and Also Prepare Software Requirement Specification (SRS) Document Using Relevant Standards, Tools and Methodologies.
2. Manage a Software Project by Applying Project Management Concepts Such as Planning, Scheduling and Risk Management for Developing Qualitative and Economic Software.
3. Work Effectively in Various Profiles of Software Developing Team Such as Software Analyst, Architecture, Programmer, Tester, Quality Assurance and Control officer, Project Manager and Leaders.
4. Communicate and Coordinate Competently by Listening, Speaking, Reading and Writing Software Documents
5. Apply Coding Standards & Guidelines, and Quality Norms in Coding of Software Systems to Satisfy the Requirements and Quality.
6. Design Test Cases and Optimize the Test Suite for UNIT, Integration and System-Level Testing using various Techniques and Tools for Adequately Testing the Software Components and Systems.

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**Unit-wise Syllabus :**

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**UNIT-I**

Software: Software Characteristics, Components, and Applications, Software Engineering Layered Technology, Software Development Life Cycle, Software Process Models- Linear Sequential Model, Prototype & RAD Model, Incremental and Evolutionary Process Models. Introduction of Agile Software Development, CBSD(Component Based Software Development ) Aspect Oriented Paradigm (AOP) and Green Software Development, Process and Product Metrics.

**UNIT-II**

Analysis Concept and Principles: Requirement Analysis, Analysis Principles, Requirement Elicitation, Information Gathering Techniques, Requirements Specification, Requirements Verification and Validation, Requirements Management. Requirements Modeling: Scenarios, Information and Analysis Classes, Flow and Behavioral Modeling, Documenting Software Requirement Specification (SRS) Characteristics of SRS, Format of SRS, Software Project Planning: Objectives, Decomposition Techniques, and Empirical Estimation Models. Project Metrics: Software Measurement–Size Oriented, Function Oriented Metrics.

**UNIT-III**

Design Concepts and Principles: Design Process, Design Concepts, Design Principles, Effective Modular Design, Human Computer Interface Design, Interface Design Guidelines. System Design: Design Models for Architecture, Component, Data and User Interfaces; Problem Partitioning, Abstraction, Cohesiveness, Coupling, Top Down and Bottom Up Design Approaches; Functional Versus Object Oriented Approach, Design Specification. Coding: Top-Down and Bottom-Up Structure Programming, Information Hiding, Programming Style, and Internal Documentation, Verification.

**UNIT-IV**

Software Testing: White and Black Box Testing, Levels of Testing, UNIT, Integration, System Testing, Functional Testing, Structural Testing, Test Plan, Software Testing Strategies, Verification & Validation, Incremental & Non-Incremental Testing, Top Down and Bottom Up Integration Testing, Alpha & Beta Testing, White Box and Black Box Testing Techniques, Debugging Techniques. Software Quality, Quality Models, Quality Control and Quality Assurance, ISO, SEI Capability Maturity Model (CMM) and Comparison between ISO& SEI CMM.

**UNIT-V**

Agile Methodology: Introduction and background, Values of Agile, Stakeholders, Challenges, Agile Manifesto and Principles,, Twelve Practices of XP, Overview of Scrum, Need of scrum, working of scrum, advanced Scrum Applications, Scrum and the Organization, scrum values, Framework of Scrum, Extreme Programming, Feature Driven development, Lean Software Development, Agile project management, Design and development practices in Agile projects, Refactoring, Pair Programming, User Stories, Characteristics and contents of User stories, Backlog Management, Agile Risk Management, Agile Planning and estimation, Scrum roles, Agile Tools, Agile Metrics and Measurements, Agile Design Practice, Refactoring Techniques, Agile Testing, Test-Driven Development (TDD), x Unit framework and tools for TDD, Risk based testing, Acceptance tests and Verifying stories, Agile Control, Agile Configuration Management, Atern Philosophy, Track Scrum Projects, Communication in Scrum Projects, Best Practices to Manage Scrum, Continuous Integration /Continuous Delivery (CI/CD), and DevOps

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**Reference Books:**

---

1. Roger S. Pressman, Software Engineering-a Practitioner’s Approach, McGraw Hill International Edition,

2. K. K. Aggarwal, Yogesh Singh, Software Engineering,
3. Ian Sommerville, Software Engineering, Addison-Wesley Publishing Company,
4. James F. Peter, Software Engineering - an Engineering Approach, John Wiley,
5. Fairley Richard Software Engineering Concepts, Tata McGraw Hill
6. Scrum KenSchawber, Mike Beedle-Agile Software Development with Publisher: Pearson  
Published: 21 Mar 2008.
7. Lisa Crispin, Janet Gregory Agile Testing: A Practical Guide for Testers and Agile Teams  
Publisher: Addison Wesley.
8. Essential Scrum: A Practical guide to the most popular agile process by Kenneth S. Rubin
9. Agile Software Development, Principles, Patterns and Practices by Robert C. Martin Publisher:  
Prentice Hall Published: 25 Oct 2002

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3			2	2				2		1
2	3	1	2		2						3	1
3	2	1	1			1			3	2	1	1
4										3		
5	3	2	2					2				1
6	2	3	4	5	6	7	8					1

## 5MCA2- DOT NET TECHNOLOGY

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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### *Course Objectives:*

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- Identify the Basics of .Net Framework, Architecture and User Programs
- Do GUI Programming Using Vb.Net and C#
- Examine the Challenges Involved in .Net Framework Programming
- Do Event Driven Programming Projects
- Learn the ADO.Net Database Usages in Website Creation
- Empower the Websites with use of Xml.

---

### *Course Outcome:*

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1. Understand and explore various Features of .Net Framework
2. Analyze, Design and Develop the GUI based Applications software using Vb.Net and C#
3. Design, Develop and Implement Complete software Projects using Vb.Net and C# with consideration of Environment in team spirit.
4. Analyze the requirement, design and develop Dynamic and Static Websites and Web applications using .Net technology.
5. Integrate and Apply Different Components Including Database, XML with Proper Choice of Languages Mapping

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### *Unit-wise Syllabus :*

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#### **UNIT-I**

Introduction to .Net, .Net Framework Features & Architecture, CL, Common Type System, MSIL, Assemblies: Types of Assemblies, Class Libraries. Event Drive Programming, Methods and Events Related with Mouse and Keyboard. Programming into Visual Studio, Types of Project in .Net, IDE of VB.Net- Menu Bar, Toolbar, Project Explorer, Toolbox, Properties Window, Form Designer, Form Layout, Immediate Window, ASP& HTML Forms

#### **UNIT- II**

the VB.Net Language- Variables, Declaring Variables, Data Types, Scope & Lifetime of a Variable, Arrays, Types of Array, Control Array, Subroutine, Functions, Passing Argument to Functions, Optional Argument, Returning Value from Function. Control Flow Statements: Conditional Statement, Loop Statement. Forms: Loading, Showing and Hiding Forms, Working with Multiple Forms, Controlling one Form within Another, Overview of C#, Structure of C# Program, C# in .Net.

### UNIT- III

GUI Programing with Windows Form with Properties, Methods and Events: Text Box Control, Label Control, Button Control, Listbox, Combo Box, Checked Box, Picture Box, Radio Button, Pannel, Scroll Bar, Timer Control, Adding Controls At Runtime, Common Dialog Control: File, Save, Print, Help. Designing Menus, MDI Forms, Overview of Dynamic Web Page, Asp.Net Controls, Applications, Web Servers, Web Form Controls, Server Controls, Client Controls Adding Controls to a Web Form, Form Validation Controls: Client Side Validation, Server Side Validation

### UNIT- IV

ADO, .Net Architecture, Create Connection, Accessing Data Using Data Adapters and Datasets, Using Command & Data Reader, Data Bind Controls, Displaying Data in Data Grid. Data Form Wizard, Processing SQL& Access Database Using Ado.Net Object Model, Connection Object, Command Object, Add, Delete, Move & Update Records to Dataset, Executing Queries

### UNIT- V

XML in .Net, XML Basics, Attributes, Fundamental Xml Classes: Document, Textwriter,Textreader, XML Validations, XML in ADO, .Net, the XMLdatadocument. Web Services: State Management- View State, Session State, Application State, Web Service Description Language, Building & Consuming a Web Service. Web Application Deployment, Caching

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#### **Reference Books**

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1. Steven HolznerVB.Net Programming-Black Book-Dreamtech Publications
2. EvangelosPetroutsosMastering VB.Net - BPB Publications
3. Mathew Macdonald-The Complete Reference Asp.Net-TMH
4. Professional ASP.Net- Wrox Publication
5. Stephen Walther Active Server Pages 2.0 (Unleashed) -Techmedia
6. Eric a. Smith Asp 3 Programming Bible: IDG Books
7. C# Programming-Wrox Publication
8. Matt Telles-C# Programming Black Book-Dreamtech Publication

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	2	2	2							2
2	3	3	3	3	2			1		1	1	1
3	3	3	3	3	2		1	1	2	1	2	2
4	3	3	3	3	2				1	1	2	2
5	3	3	3	2	2					1	1	1

## 5MCA3-INFORMATION AND NETWORK SECURITY

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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### *Course Objectives:*

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- Aware and Understand the Challenges and Scope of Information Security.
- Gain the Knowledge of Basic Security Concepts.
- Learn and Understand the Importance of Cryptographic Algorithms and Their Uses.
- Learn and Understand Access Control Mechanism Used for User Authentication and Authorization.
- Understand and Practice the Sockets Layer (SSL).
- Aware and Learn the Usages of Secure Internet Protocol (IP ) and HTTPS

---

### *Course Outcome:*

---

1. Explain the Principles of Cryptography and Cryptanalysis Including Symmetric and Asymmetric Encryption, Hashing, and Digital Signatures.
2. Explain the Fundamental Notions of Threat, Vulnerability, Attack and Countermeasure.
3. Be able to Identify the Security Goals of an Information System, Point Out Contradictory Goals and Suggest Compromises.
4. Identify and Classify Particular Examples of Attacks.
5. Implement the Various Security Algorithms.
6. Analyze the Root Causes of Attacks & Suggest Appropriate Solution for Different Types of Security Breach Scenario.

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### *Unit-wise Syllabus :*

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#### **UNIT-I**

Introduction: Security Concepts:-Confidentiality, Integrity, and Availability, Threats, Risks, Sources of Threats, Attacks Classification, Cryptography, Confusion Vs. Diffusion, Stream Ciphers Vs. Block Ciphers, Classical Cryptography, Objectives of Cryptography, Secret-Key and Public-Key Cryptography, Cryptanalysis, RC5, Blowfish.

#### **UNIT- II**

Block Ciphers Block Cipher Principles, Feistel Networks, S-Boxes and P Boxes, Block Cipher, Des, Elementary Number Theory, Prime Numbers, Factoring, Modular Arithmetic , GCD, Modular Square Roots,

#### **UNIT- III**

Key Exchange: Diffie-Hellman, Public-Key Encryption: RSA, Entity Authentication: Passwords, Challenge-Response Algorithms, Digital Signature, Digital Certificates, X509 Certificates, SSL, HTTPS, IPSEC.

#### UNIT- IV

Introduction to Hash Function : Message Digest: MD5 and SHA-1, Attacks on Hash Functions., MD Family, SHA Family, Trapdoor Functions, Digital Signatures, Overview of GPG, Seahorse, Frontends–Kleopatra, Enigmail.

#### UNIT- V

Network Issues, Public-Key Infrastructure (PKI), Kerberos, Encryption Using Non-Cryptographic Tools (VI,Zip), Authentication Principles and Methods, Passwords, Two-Factor Authentication, Steganography, Penetration Testing and Ethical Hacking.

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#### Reference Books

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1. William Stallings, Cryptography and Network Security, PHI.
2. Bruce Schneier- the Mathematics of Encryption- American Mathematical Society
3. Atulkahate, “Cryptography and Network Security”, TMH.
4. Calabrese, Info Security Intelligence-Cryptography Principles Appl- Cengage Learn.
5. Krawetz- Intro to Network Security, Cengage Learning.
6. Bruce Schneier, Applied Cryptography, John Wiley and Sons Mark Stamp,
7. Mark Stamp, Information Security: Principles and Practice, John Wiley and Sons.
8. Matt Bishop, Computer Security, Art and Science, Pearson Education.

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	2	2	2			1		1		1
2	3	2	2	2	2			2		1	1	1
3	3	3	1	1	1			1			1	1
4	3	3	1	2				1				1
5	3	3	3	3	2			2				1
6	3	3	3	3	1			2		1		1

# 5MCA4 -ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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## *Course Objectives:*

- To Understand the Concepts of Artificial Intelligence and Machine Learning.
- To Gain Knowledge of Supervised and Unsupervised Learning
- Understand the Design of Learning Systems.
- Understand the Design of Expert Systems.

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## *Course Outcomes.*

1. Demonstrate and Apply Artificial Intelligence Techniques, Various Types of Production Systems, and Characteristics of Production Systems.
2. Design Neural Networks Architecture and Implement Functions and Various Algorithms Involved.
3. Fuzzy Logic, Various Fuzzy Systems and their Functions.
4. Genetic Algorithms, its Applications and Advances
5. Able to Analyse and Design Expert Systems through Learning the Machine

---

## *Unit-wise Syllabus :*

### **UNIT-I**

AI Introduction, The AI problems, AI technique, Characteristics of AI Applications, Current Trends in AI. Machine Learning: Machine Learning Overview, Design of a Learning system, Types of machine learning, Applications of machine learning, Variables and probabilities - Probability Theory, Probability distributions

### **UNIT-II**

Problem Solving, General Problem Solving, Production Systems, Control Strategies Forward and Backward Chaining, Searching :Searching for Solutions, Uniformed Search Strategies – Breadth First Search, Depth First Search. Heuristic Search, Greedy Best First Search, Knowledge Representations Mapping & Issues

### **UNIT-III**

Soft Computing: Introduction to Soft Computing, Soft Computing vs. Hard Computing, Various Types of Soft Computing Techniques, Applications of Soft Computing. Basic Concepts of Neural Network, Human Brain- Biological Neural Network, Evolution of Artificial Neural Network, Structure and Function of a Single Neuron, Difference Between ANN and Human Brain, Characteristics and Applications of ANN, Learning Methods, Activation Function, Neural Network Architecture.



#### UNIT-IV

Supervised Learning: Perceptron learning,- Single layer, multilayer, Back propagation network, Unsupervised Learning Neural Networks – Competitive Learning Networks – Kohonen Self-Organizing Networks

#### UNIT-V

Introduction to expert system and application of expert systems, case studies, MYCIN  
Fuzzy Logic: Fuzzy Set Theory, Crisp Set, Fuzzy Set, Operations on Fuzzy Sets: Compliment, Intersections, Unions, Product, Difference, Properties of Fuzzy set,  
Genetic Algorithm: Fundamentals, Basic Concepts, Working Principle, Encoding, Fitness Function, Reproduction,

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#### Reference Books:

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1. Elaine Rich and Kevin Knight “Artificial Intelligence” - Tata McGraw Hill.
2. Dan W. Patterson “Introduction to Artificial Intelligence and Expert Systems”, Prentice India.
3. Nils J. Nilson “Principles of Artificial Intelligence”, Narosa Publishing House
4. Christopher Bishop, “Pattern Recognition and Machine Learning”, Springer
5. Kevin P. Murphy, “Machine Learning: A Probabilistic Perspective”, MIT Press
6. Ethem Alpaydin, “Introduction to Machine Learning”, MIT Press
7. Tom Mitchell, "Machine Learning", McGraw-Hill
8. Stephen Marsland, “Machine Learning - An Algorithmic Perspective”, Chapman and Hall/CRC Press
9. S. Rajasekaran & G.A. Vijayalakshmi Pai, Neural Networks, Fuzzy Logic & Genetic Algorithms, Synthesis & Applications, PHI publication.
10. S.N. Sivanandam & S.N. Deepa, Principles of Soft Computing, Wiley Publications.

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	2	2	2			1		1		1
2	3	2	2	2	2			2		1	1	1
3	3	3	1	1	1			1			1	1
4	3	3	1	2				1				1
5	3	3	3	3	2			2				1

## 5MCA5(P)-DOT NET LAB

L	T	P	C	Theory Paper	PracticalExams	InternalEvaluation	Total Marks
0	0	4	2	--	40	10	50

### *Course Objectives:*

- To Execute Projects in .Net Framework, Architecture
- To Implement GUI Programming Using VB.Net and C#
- To Develop Event Driven Programming Projects
- To Implement the ADO.Net Database Usages in Website Creation
- To Develop and Deploy Websites with use of XML.

### *Course Outcome:*

1. Develop and Execute Complete Projects in .Net Framework using VB.Net and C # Languages
2. Implement Database Connectivity in .Net
3. Develop, Implement and Deploy Static and Dynamic Websites Empowered by ADO, XML and other Tools Mapping:

### **LIST OF EXPERIMENTS**

1. Rocket Launching.
2. Calculator Simple
3. Calculator Scientific
4. Video Game with Sounds and Animation
5. Five Loops for Finding Average of N Numbers.
6. Word Editor.
7. Library Management System Using Access
8. Web Browser
9. Student Management System
10. Suitable Project of your Choice.

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	3	3	3				2	2	2	2
2	3	3	2	3	2						2	2
3	3	3	3	3	3				2	2	2	2

## 5MCA6(P) -MOBILE APPLICATION DEVELOPMENT LAB

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
0	0	2	2	-	40	10	50

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### Course Objectives:

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- This Course is designed for Providing Essential Skills and Experiences to the Students in developing android Applications.
- This Course Suits the Java Programmers a Student Will Learn to use Eclipse and/or android Studio and SDK as Development Environment.
- A Student will Learn to Develop own android App

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### Course Outcomes:

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1. Build a native application using GUI components and Mobile application
2. Design & Develop an android application using basic graphical primitives and databases
3. Construct an application using multi-threading and RSS feed
4. Make use of location identification using GPS in an application
5. Model new applications to hand held devices

### List of Practical:

1. Installing android Environment
2. Create "Hello World" Application. That Will Display "Hello World" in the Middle of the Screen in the Emulator. Also Display "Hello World" in the Middle of the Screen in the android Phone.
3. Create an Application with Login Module. (Check Username and Password).
4. Create Spinner with Strings Taken from Resource Folder (Res >> Value Folder) and on Changing the Spinner Value, Image Will Change.
5. Create a Menu with 5 Options and Selected Option Should Appear in Text Box.
6. Create a List of All Courses in Your College and on Selecting a Particular Course Teacher-in-Charge of That Course Should Appear At the Bottom of the Screen.
7. Create an Application with Three Option Buttons, on Selecting a Button Color of the Screen Will Change.
8. Create and Login Application as Above. on Successful Login, Pop Up the Message.
9. Create an Application to Create, Insert, Update, Delete and Retrieve Operation on the Database.
10. Create Simple Application Using android Resources.
11. Create a Simple Application Using Layouts.
12. Create a Simple Application Using Intents.
13. Create a Simple Application Using User Interfaces.
14. Create a Simple Application for Playing Audio and Video Files.
15. Create a Simple Application Using Database Connectivity with SQLite Database.

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**Reference Books:**

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1. James C. Sheusi, " Android Application Development for Java Programmers", Cengage Learning
2. Wallace Jackson, "Android Apps for Absolute Beginners", Apress, Isbn : 9788132211372
3. Michael Burton, Donnfelker, "android Application Development for Dummies", Dummies, Isbn : 9788126538775
4. Pradeep Kothari, " android Application Development (withKitkat Support)", Kogent Learning Solutions Inc., Black Book, Dreamtech Press, Isbn : 9789351194095
5. Charlie Collins, Michael Galpin, et. al., " android in Practice", Manning, Isbn : 9789350042397

**Online Reading / Supporting Material:**

1. [Http://www.Developer.android.Com](http://www.Developer.android.Com)
2. [Http://Developer.android.Com/About/Versions/Index.HTML](http://Developer.android.Com/About/Versions/Index.HTML)
3. [Http://Developer.android.Com/Training/Basics/Firstapp/Index.HTML](http://Developer.android.Com/Training/Basics/Firstapp/Index.HTML)
4. [Http://Docs.Oracle.Com/Javase/Tutorial/Index.HTML](http://Docs.Oracle.Com/Javase/Tutorial/Index.HTML) (Available in the Form of Free Downloadable Ebooks Also).
5. [Http://Developer.android.Com/Guide/Components/Activities.HTML](http://Developer.android.Com/Guide/Components/Activities.HTML)
6. [Http://Developer.android.Com/Guide/Components/Fundamentals.HTML](http://Developer.android.Com/Guide/Components/Fundamentals.HTML)
7. [Http://Developer.android.Com/Guide/Components/Intents-Filters.HTML](http://Developer.android.Com/Guide/Components/Intents-Filters.HTML)
8. [Http://Developer.android.Com/Training/Multiscreen/Screensizes.HTML](http://Developer.android.Com/Training/Multiscreen/Screensizes.HTML)
9. [Http://Developer.android.Com/Guide/Topics/Ui/Controls.Html](http://Developer.android.Com/Guide/Topics/Ui/Controls.Html)
10. [Http://Developer.android.Com/Guide/Topics/Ui/Declaring-Layout.HTML](http://Developer.android.Com/Guide/Topics/Ui/Declaring-Layout.HTML)
11. [Http://Developer.android.Com/Training/Basics/Data-Storage/Databases.HTML](http://Developer.android.Com/Training/Basics/Data-Storage/Databases.HTML)

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	3	3	3				1	1	2	2
2	3	3	3	3	3				1	1	2	2
3	3	2	3	2	2			1	1			1
4	3	3	2	2	2						1	1
5	3	3	1	1								1

## 5MCA7(A)-COMPILER DESIGN

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

### Course Objectives:

- Learn the Design Principles of a Compiler.
- Learn the Various Parsing Techniques and Different Levels of Translation.
- Learn How to Optimize and Effectively Generate Machine Codes.

---

### Course Outcomes:

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1. Specify and Analyze the Lexical, Syntactic and Semantic Structures of Advanced Language Features.
2. Describe Lexical, Syntactic and Semantic Analysis
3. Design a Scanner, Parser, and Semantic Analyzer
4. Describe and Apply Techniques for Intermediate Code and Machine Code Optimization.

---

### Unit-wise Syllabus :

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#### UNIT-I

Introduction to Compiler and Compilation Process, Typical Compiler Structure, Programming Language, One Pass & Multi Pass Compilers, Bootstrapping, Various Phases of Compiler.

#### UNIT- II

Lexical Analyzer: Introduction to Lexical Analyzer, Input, Buffering, Recognition of Tokens, Idea About LEX: a Lexical Analyzer Generator.

Syntax Analysis : CFG's, Need and Role of the Parser, Parsing Techniques- Top Down and Bottom UP Parsing, General Strategies- Recursive Descent Parser, Predictive Parser-Ll(1) Parser, Shift Reduce Parser, LR Parsers- (LR,SLR,LALR), Error Handling and Recovery in Syntax Analyzer.

#### UNIT- III

Syntax Directed Definitions, Construction of Syntax Trees, Top Down Translation, Specification of a Type Checker, Different Intermediate Forms, Syntax Directed Translation Mechanisms and Attributed Intermediate Code Forms Using Postfix Notation and Three Address Code, Representing TAC Using Triples and Quadruples, Translation of Assignment Statement, Boolean Expression and Control Structures. Symbol Table Organization: Symbol Tables Contents, Data Structures for Symbol Tables, Storage Memory Allocation – Static & Dynamic Memory Allocation, Compilation Control Transfer, Procedure Calls, Conditional Execution, Iteration Control Construct.

#### UNIT- IV

Code Generator: Issues in the Design of a Code Generator, Intermediate Code Generation, Declarations Statements, Assignment Statements, Boolean Expression, Case Statements, Back Patching, Procedure Calls, Code Generation, the Target Machine, Run-Time Storage Management, Basic Blocks and Flow Graphs, Register Allocation and Assignment, the Dag Representation of Basic Blocks, Generating Code from DAGS.

## UNIT- V

Code Optimization: Introduction to Optimization, Transformations, Local Optimization, Program Flow Analysis, Global Optimization. Principal Sources of Optimization, Dead Code Elimination, Loop Optimization, Peephole Optimization, Idea About Global Data Flow Analysis, Common Sub Expression Removal, Code Motion, Strength Reduction.

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### Reference Books:

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1. Introduction to Automata Theory, Language and Comutation, John E - Hopcoft, Rajeev Motwani, Jeffery D. Ullman 2nd Edition
2. Theory of Computer Sc.(Automata, Languages and Computation), K.L.P.Mishra&N.Chandrasekaran, PHI
3. Compiler Construction Principles & Practice, D.M. Dhamdhare 2nd Edition.
4. Principles of Compiler Design, Affred V. Aho, Jeffery D. Ullman.
5. Compilers Principles, Techniques and Tools, Affred V. Aho Ravi Sethi, Jeffery D. Ullman.
6. Introduction to Formal Languages & Automata-Peter Linz, Narosa Publication.
7. Ramond Green Lawand H. James Hoover,-Fundamentals of the Theory of Computation- Principles and Practice Harcourt India Pvt. Ltd.

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2		2								1
2	3	2		2	2					1		1
3	3	2	3	2	2					1		1
4	3	2		2	2					1		1

## 5MCA7(B)-BIG DATA ANALYTICS

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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### *Course Objectives:*

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- Familiarize the Students with Most Important Information Technologies used in Manipulating, Storing, and Analyzing Big Data.
- This Course Gives Students all Around Learning of the Big Data Framework using Hadoop and Spark, Including Yarn, HDFS and Mapreduce
- It Provide an Overview of Approaches Facilitating Data Analytics on Huge Datasets.

---

### *Course Outcome:*

---

1. Ability to identify the characteristics of datasets and compare the trivial data andbig data for various applications.
2. Demonstrate an ability to use Hadoop framework to efficiently store retrieve and process Big Data for Analytics.
3. Implement several Data Intensive tasks using the Map Reduce Paradigm

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### *Unit-wise Syllabus :*

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#### **UNIT-I**

Big Data- Introduction, Characteristics, Types, Elements, Traditional vs. Big Data Business Approach, Big Data Analytics, Advantages, Applications, Distributed & Parallel Computing for Big Data, Components in Big Data Architecture, Virtualization Approaches.

#### **UNIT- II**

Statistics and Probability: Sampling Techniques - Data Classification, Tabulation, Frequency and Graphic Representation, Measures of Central Value - Mean, Mode, Median, Random Variable and Probability Theory.

#### **UNIT- III**

Hadoop- Introduction, Features, Advantages, Versions, Key Considerations of Hadoop, RdbmsVsHadoop, Hadoop Ecosystem, HDFS - Architecture, Features, Commands, Processing Data withHadoop, Hadoop Yarn.

#### **UNIT- IV**

Mapreduce Framework, Features, Uses, Working onMapreduce, Mapreduce Input and Output Operations, Exploring Map and Reduce Functions, Mapreduce Optimization Technique, HBASE Introduction, Architecture, HBASE in Hadoop Applications.

## UNIT- V

Processing Data with Mapreduce, Task Execution & Environment – Installation of Eclipse, Hadoop, Java Development Kit and Linux Ubuntu OS, Mapreduce Program Steps to Obtain Word Count, Functionality of Input Format- Inputsplit, Recordreader, Fileinputformat, Output Process of Fileoutputformat – Outputformat, Recordwriter, Role of Combiner, Partitioner, Debugging Mapreduce.

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### **Reference Books:**

---

1. Rob Kitchin The Data Revolution: Big Data Open Data Data Infrastructures And Their Consequences SAGE Publications Ltd
2. Croll and B. Yoskovitz Lean Analytics: Use Data to Build a Better Startup Faster o'reilly
3. Mayer-Schönberger and K. Cukier Big Data: A Revolution That Will Transform How We Live Work and Think
4. E. Siegel-Predictive Analytics: The Power to Predict Who Will Click Buy Lie or Die
5. Bernard Marr-Big Data in Practice Wiley publication.

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3		1	1					1		1
2	3	3		2	2					1		1
3	3	3	3	1	1					1		1



## 4MCA7(C) -LINUX SERVER ADMINISTRATION

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
5	0	0	5	80	--	20	100

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### *Course Objectives*

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- Fully Understand the Most Important and Fundamental Concepts of Linux Server Administration,
- Understand How to Install and Customize Linux (Administration of Linux Servers from the GUI); Manage Users, Permissions, Folders, and Native Applications;
- Configure Internet and Intranet Services (Understanding and Managing the Linux TCP/IP Networking Stack and Services);
- Performance Tuning, Security (Building Robust Firewalls, and Routers), and
- Creating and Maintaining Print, E-Mail, FTP, and Web Servers.

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### *Course Outcome :*

---

1. Make Appropriate Decisions During the Configuration Process to Create a Properly Functioning Linux Environment.
2. Use Programs and Utilities to Administer a Linux Machine.
3. Explain How a Linux Server can be Integrated Within a Multi-Platform Environment.
4. Analyze the Need for Security Measures for a Linux Environment.
5. Develop Shell program

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### *Unit-wise Syllabus :*

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#### **UNIT-I**

Installing Requirement, Partitioning the Hard Drive for Linux, Installing the Linux System, System Startup and Shut-Down Process System Administration: Common Administrative Tasks, Configuration and Log Files, Role of System Administrator. Introduction to Shell Programming-Develop Some Shell Programs.

#### **UNIT-II**

Managing User Accounts-Adding & Deleting Users, Changing Permissions and Ownerships, Creating and Managing Groups, Modifying Group Attributes, Temporary Disable User's Accounts, Creating and Mounting File System, File Security & Permissions, Becoming Super User Using Su. Host Name, Disk Partitions & Sizes, Users, Kernel. Backup and Restore Files, Installing and Removing Packages. Starting & Using KDE&GNOME Graphical Interfaces.

Basic Networking Administration: Setting up a LAN Using Linux, Choosing Peer to Peer Vs Client/Server Model, Setting up an Ethernet LAN, Configuring Host Computers, Checking Ethernet Connecting, Connecting to Internet, Common Networking Administrative Tasks, Configuring Ethernet, Initializing Ethernet Interface, IPconfig, Netstat and Netconfig Commands, TCP/IP Network, DNS Services.

### UNIT-III

Installation, Configuration & Administration of Following Servers in Linux

- Mail Server
- Remote Access
- DHCP
- Ftp Server

### UNIT-IV

Installation, Configuration & Administration of Following Servers in Linux

- DNS,
- Apache Web Server,
- NFS,
- Samba,
- VNC Serve

### UNIT-V

- Using Mysql Databases - Mysqldb Commands, Managing Database Users and Access Rights,
- Creating and Restoring Mysqldb Backups, Configuring Mysqldb Databases

---

#### **Reference Books:**

---

1. Christopher Negus Fedora and Red Hat Enterprise Linux Bible, Wiley India Ltd.
2. Christopher Negus, Linux Bible, Wiley India Ltd
3. Linux Administration, Kogent Learning Solutions Inc., ISBN 13- 9789350044209, ISBN 10- 935004420x, Wiley India
4. Forouzan-Unix & Shell Programming, Cengage Publications

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	1	2	1							1
2	3	2	2	2	1					1	1	1
3	3	2	1	2	1					1		1
4	3	3	2	1	1							1
5	3	3	3	2	1							1

## COP (A) - ADVANCED EXCEL

L	T	P	TheoryPaper	PracticalExams	InternalEvaluation	Total Marks
2	0	1	25	15	10	50

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### *Course Objectives:*

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- To use of various Excel functions.
- To create pivot tables and charts.
- To validate and consolidate data.
- To protecting worksheets and workbooks.
- To Create, use, Edit, and Manage macros.
- To Import and export data.

---

### *Course Outcomes:*

---

1. Explain and Apply Functions, Formulas, Chart, Macro, Filtering and Sorting of Data in Excel.
2. Protect data and carryout data analysis in Excel
3. Create Summaries and Linkage in Excel
4. Explain and Apply Data Consolidation Feature to Combine Data from Several Workbooks into one
5. Apply Goal Seek Analysis for Efficient Decision Making

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### *Unit-wise Syllabus :*

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#### **UNIT-I**

Using Excel Shortcuts with Full List of Excel Shortcuts, Copy, Cut, Paste, Hide, Unhide, Delete and Link the Data in Rows, Columns and Sheets, Using Paste Special Options, Formatting Cells, Rows, Columns and Sheets, Protecting & Un protecting Cells, Rows, Columns and Sheets with or without, Password, Page Layout, Themes, Background and Printer Properties, Inserting Pictures, Hyperlinks, Header/Footers, Shapes and Other Objects in Worksheets

#### **UNIT-II**

Lookup and Reference Functions: VLOOKUP, HLOOKUP, INDEX, ADDRESS, MATCH, OFFSET, TRANSPOSE etc., Logical Function: IF/ELSE, AND, OR, NOT, TRUE, NESTED IF/ELSE etc., Date and Time Functions: DATE, DATEVALUE, DAY, DAY360, SECOND, MINUTES, HOURS, NOW, TODAY, MONTH, YEAR, YEARFRAC, TIME, WEEKDAY, WORKDAY etc., Information Functions: CELL, ERROR.TYPE, INFO, ISBLANK, ISERR, ISERROR, ISEVEN, ISLOGICAL, ISNA, ISNONTEXT, ISNUMBER, ISREF, ISTEXT, TYPE etc.

### UNIT-III

Math and Trigonometry Functions: RAND, ROUND, CEILING, FLOOR, INT, LCM, MOD, EVEN, SUMIF, SUMIFS etc. Statistical Functions: AVEDEV, AVERAGE, AVERAGEA, AVERAGEIF, COUNT, COUNTA, COUNTBLANK, COUNTIF, FORECAST, MAX, MAXA, MIN, MINA, STDEVA etc Text Functions: LEFT, RIGHT, TEXT, TRIM, MID, LOWER, UPPER, PROPER, REPLACE, REPT, FIND, SEARCH, SUBSTITUTE, TRIM, TRUNC, CONVERT, CONCATENATE, DOLLAR etc.

### UNIT-IV

Using Conditional Formatting, Using Conditional Formatting with Multiple Cell Rules, Using Color Scales and Icon Sets in Conditional Formatting, Creating New Rules and Managing Existing Rules, Data Sorting and Filtering, Sorting Data by Values, Colors, etc. Using Filters to Sort Data, Advance Filtering Options, Database Functions: DGET, DMAX, DMIN, DPRODUCT, DSTDEV, DSTDEVP, DSUM, DVAR, DVARP etc, Financial function PV, FV etc.

### UNIT-V

Pivot Tables, Creating Pivot Tables, Using Pivot Table Options, Changing and Updating Data Range, Formatting Pivot Table and Making Dynamic Pivot Tables, Creating Pivot Charts, Types of Pivot Charts and Their Usage Formatting Pivot Charts and Making Dynamic Pivot Charts, VBA Macro, Introduction to VBA Macro, Recording Macro & Understanding Code Behind, Editing

---

#### **Reference Books:**

---

1. Microsoft Excel 2013 Bible by John Walkenbach, Wiley publication
2. Excel 2013 Pivot Table Data Crunching by Bill Jelen, Pearson publication
3. Excel Functions and Formulas by Bernd Held, BPB publication

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3		2	2					1		1
2	3	3		2	2							1
3	3	3		1	1					1		1
4	3	3		2	2					1		1
5	3	3		2	2					1		1

## **COP (B) – ORACLE & SQL PROGRAMMING**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Theory Pape r</b>	<b>PracticalExams</b>	<b>InternalEvaluation</b>	<b>Total Marks</b>
2	0	1	3	25	15	10	50

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### ***Course Objectives:***

- It provides a strong database concepts implementation, Using Oracle.
- To know about Oracle Products and Editions.
- To understand Architecture of Oracle database.
- To implement simple SQL Queries.
- To implement User Management.
- To implement PL/SQL Constructs.

---

### ***Course Outcomes :***

1. Understand and apply the key Concepts of database technology.
2. Analyze, design and implement the database system to solve the real problems.
3. Carry out the Administration and Management Activities of Database System using SQL and PL/SQL.
4. Write the PL/SQL Program for Optimal Query for Fetching the Information from Database
5. Solve Database Problems using Procedures, Functions, Packages, and Triggers Features of Oracle 9i SQL and PL/SQL.

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### ***Unit-wise Syllabus :***

#### **UNIT-I**

Introduction to Oracle Database, Oracle Database's architecture, Oracle Database editions, Key database features, Oracle's other database products, Features of Oracle Database 11g, Categorize the different types of SQL statements

#### **UNIT-II**

Working with Tables, Data Constraints, Capabilities of SQL SELECT statements, Operators, Understand Operator Precedence, Oracle Built In Function Grouping data from Tables in SQL, Manipulation Data in SQL, Joining Multiple Tables

#### **UNIT-III**

Sub queries, Oracle Security– Privileges, Creating view, Granting Permissions, Updating, Selection, Destroying view Creating Indexes, Creating and Managing, Working with Sequences

## UNIT-IV

PL/SQL Introduction, Data type support in PL/SQL, Conditional Statements, Using DML within PL/SQL, Procedures & Functions, Cursors, Parameterized Cursor

## UNIT-V

Exception handling in PL/SQL, Triggers- Concept, use, how to apply database triggers, type of triggers, Syntax, deleting

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### Reference Books:

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1. IVAN bayrosss "SQL. PL/SQL", BPB Publications
2. Oracle data base 11 G SatishAsnani PHI learning
3. Liebschuty. "The Oracle Cookbook", BPB publication
4. Michael Abbey, Michael Jcorey, "Oracle A BeginnersGuide". TMH publication
5. Oracle official site [www.oracle.com](http://www.oracle.com)

### List of Practical:

1. To study DDL-create and DML-insert commands.
  - i. Create tables according to the following definition.

```
CREATE TABLE DEPOSIT (ACTNO VARCHAR2(5),CNAME VARCHAR2(18),  
BNAME VARCHAR2(18), AMOUNT NUMBER(8,2),ADATE DATE); CREATE TABLE  
BRANCH (BNAME VARCHAR2 (18),CITY VARCHAR2(18)); CREATE TABLE  
CUSTOMERS (CNAME VARCHAR2 (19),CITY VARCHAR2(18)); REATE TABLE  
BORROW (LOANNO VARCHAR2 (5), CNAME VARCHAR2 (18), BNAME  
VARCHAR2(18), AMOUNT NUMBER (8,2));
```

- ii. Insert the data as shown below:

#### DEPOSIT

ACTNO	CNAME	BNAME	AMOUNT	ADATE
100	ANIL	VRCE	1000.--	1-MAR-95
101	SUNIL	AJNI	5000.--	4-JAN-96
102	MEHUL	KAROLBAGH	3500.--	17-NOV-95
104	MADHURI	CHANDI	1200.--	17-DEC-95
105	PRMOD	M.G.ROAD	3000.--	27-MAR-96
106	SANDIP	ANDHERI	2000.--	31-MAR-96
107	SHIVANI	VIRAR	1000.--	5-SEP-95

108	KRANTI	NEHRU PLACE	5000.--	2-JUL-95
109	MINU	POWAI	7000.--	10-AUG-95

**CUSTOMERS**

ANIL	CALCUTTA
SUNIL	DELHI
MEHUL	BARODA
MANDAR	PATNA
MADHURI	NAGPUR
PRAMOD	NAGPUR
SANDIP	SURAT
SHIVANI	BOMBAY
KRANTI	BOMBAY
NAREN	BOMBAY

**BORROW**

LOANNO	CNAME	BNAME	AMOUNT
201	ANIL	VRCE	1000.--
206	MEHUL	AJNI	5000.--
311	SUNIL	DHARAMPETH	3000.--
321	MADHURI	ANDHERI	2000.--
375	PRMOD	VIRAR	8000.--

481	KRANTI	NEHRU PLACE	3000.--
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From the above given tables perform the following queries:

- Describe deposit, branch.
- Describe borrow, customers.
- List all data from table DEPOSIT.
- List all data from table BORROW.
- List all data from table CUSTOMERS.
- List all data from table BRANCH.
- Give account no and amount of depositors.
- Give name of depositors having amount greater than 4000.
- Give name of customers who opened account after date '1-12-96'.

**Create the below given table and insert the data accordingly:**

Create Table Job (job\_id, job\_title, min\_sal, max\_sal)

COLUMN NAME	DATA TYPE
job_id	Varchar2(15)
job_title	Varchar2(30)
min_sal	Number(7,2)
max_sal	Number(7,2)

Create table Employee (emp\_no, emp\_name, emp\_sal, emp\_comm, dept\_no)

COLUMN NAME	DATA TYPE
emp_no	Number(3)
emp_name	Varchar2(30)
emp_sal	Number(8,2)
emp_comm	Number(6,1)
dept_no	Number(3)

Create table deposit(a\_no,cname,bname,amount,a\_date).

<b>COLUMN NAME</b>	<b>DATA TYPE</b>
a_no	Varchar2(5)
Cname	Varchar2(15)
Bname	Varchar2(10)
amount	Number(7,2)
a_date	Date

Create table borrow(loanno,cname,bname,amount).

<b>COLUMN NAME</b>	<b>DATA TYPE</b>
Loanno	Varchar2(5)
Cname	Varchar2(15)
Bname	Varchar2(10)
amount	Varchar2(7,2)

Insert following values in the table Employee:

<b>emp_no</b>	<b>emp_name</b>	<b>emp_sal</b>	<b>emp_comm</b>	<b>dept_no</b>
101	Smith	800		20
102	Snehal	1600	300	25
103	Adama	1100	0	20
104	Aman	3000		15
105	Anita	5000	50,000	10
106	Sneha	2450	24,500	10
107	Anamika	2975		30

Insert following values in the table job:

job_id	job_name	min_sal	max_sal
IT_PROG	Programmer	4000	10000
MK_MGR	Marketing manager	9000	15000
FI_MGR	Finance manager	8200	12000
FI_ACC	Account	4200	9000
LEC	Lecturer	6000	17000
COMP_OP	Computer Operator	1500	3000

Insert following values in the table deposit:

A_no	cname	Bname	Amount	date
101	Anil	andheri	7000	01-jan-06
102	sunil	virar	5000	15-jul-06
103	jay	villeparle	6500	12-mar-06
104	vijay	andheri	8000	17-sep-06
105	keyur	dadar	7500	19-nov-06
106	mayur	borivali	5500	21-dec-06

Perform following queries:

- Retrieve all data from employee, jobs and deposit.
- Give details of account no. and deposited rupees of customers having account opened between dates 01-01-06 and 25-07-06.
- Display all jobs with minimum salary is greater than 4000.
- Display name and salary of employee whose department no is 20. Give alias name to name of employee.
- Display employee\_no, name and department details of those employee whose department lies in(10,20)

To study various options of LIKE predicate:

- Display all employee whose name start with 'A' and third character is 'a'.
- Display name, number and salary of those employees whose name is 5 characters long and first three characters are 'Ani'.
- Display the non-null values of employees and also employee name second character should be 'n' and string should be 5 character long.
- Display the null values of employee and also employee name's third character should be 'a'.

- What will be output if you are giving LIKE predicate as '%\\_%' ESCAPE '\'
2. To perform various data manipulation commands, aggregate functions and sorting concept on all created tables.
    - List total deposit from deposit.
    - List total loan from karolbagh branch
    - Give maximum loan from branch vice.
    - Count total number of customers
    - Count total number of customer's cities.
    - Create table supplier from employee with all the columns.
    - Create table sup1 from employee with first two columns.
    - Create table sup2 from employee with no data
    - Insert the data into sup2 from employee whose second character should be 'n' and string should be 5 characters long in employee name field.
    - Delete all the rows from sup1.
    - Delete the detail of supplier whose sup\_no is 103.
    - Rename the table sup2.
    - Destroy table sup1 with all the data.
    - Update the value dept\_no to 10 where second character of emp. name is 'm'.
    - Update the value of employee name whose employee number is 103.
  
  3. Displaying data from Multiple Tables (join)
    - Give details of customers ANIL.
    - Give name of customer who are borrowers and depositors and having living city Nagpur
    - Give city as their city name of customers having same living branch.
    - Write a query to display the last name, department number and department name for all employees.
    - Create a unique listing of all jobs that are in department 30. Include the location of the department in the output
    - Write a query to display the employee name, department number, and department name for all employees who work in NEW YORK.
    - Display the employee last name and employee number along with their manager's last name and manager number. Label the columns Employee, Emp#, Manager, and Mgr#, respectively.

- Create a query to display the name and hire date of any employee hired after employee SCOTT.

To apply the concept of Aggregating Data using Group functions.

- List total deposit of customer having account date after 1-jan-96.
- List total deposit of customers living in city Nagpur.
- List maximum deposit of customers living in Bombay.
- Display the highest, lowest, sum, and average salary of all employees. Label the columns Maximum, Minimum, Sum, and Average, respectively. Round your results to the nearest whole number.
- Write a query that displays the difference between the highest and lowest salaries. Label the column DIFFERENCE.
- Create a query that will display the total number of employees and, of that total, the number of employees hired in 1995, 1996, 1997, and 1998
- Find the average salaries for each department without displaying the respective department numbers.
- Write a query to display the total salary being paid to each job title, within each department.
- Find the average salaries > 2000 for each department without displaying the respective department numbers.
- Display the job and total salary for each job with a total salary amount exceeding 3000, in which excludes president and sorts the list by the total salary.
- List the branches having sum of deposit more than 5000 and located in city Bombay.

**4. To solve queries using the concept of sub query:**

- Write a query to display the last name and hire date of any employee in the same department as SCOTT. Exclude SCOTT
- Give name of customers who are depositors having same branch city of Mr. Sunil.
- Give deposit details and loan details of customer in same city where Pramod is living.
- Create a query to display the employee numbers and last names of all employees who earn more than the average salary. Sort the results in ascending order of salary.
- Give names of depositors having same living city as Mr. Anil and having deposit amount greater than 2000
- Display the last name and salary of every employee who reports to ford.
- Display the department number, name, and job for every employee in the Accounting department.

- List the name of branch having highest number of depositors.
- Give the name of cities where in which the maximum numbers of branches are located.
- Give name of customers living in same city where maximum depositors are located.

**5. Manipulating Data**

- Give 10% interest to all depositors.
- Give 10% interest to all depositors having branch vice
- Give 10% interest to all depositors living in Nagpur and having branch city Bombay.
- Write a query which changes the department number of all employees with empno 7788's job to employee 7844's current department number.
- Transfer 10 Rs from account of Anil to Sunil if both are having same branch.
- Give 100 Rs more to all depositors if they are maximum depositors in their respective branch.
- Delete depositors of branches having number of customers between 1 to 3.
- Delete deposit of Vijay.
- Delete borrower of branches having average loan less than 1000.

**6. Create Table**

Employee(E\_id,L\_Name,F\_Name,Post\_ID,Supervisor,Hire\_Date,Salary,Commission,Dept\_ID) Create a view on it to hide Salary and commission from above, perform insertion in view and monitor appropriate response.

**7. For the following relation schema:**

employee(employee-name, street, city) works(employee-name, company-name, salary) company(company-name, city) manages(employee-name, manager-name)

Give an expression in SQL for each of the following queries:

- Find the names, street address, and cities of residence for all employees who work for 'First Bank Corporation' and earn more than \$10,000.
- Find the names of all employees in the database who live in the same cities as the companies for which they work.
- Find the names of all employees in the database who live in the same cities and on the same streets as do their managers.
- Find the names of all employees in the database who do not work for 'First Bank Corporation'. Assume that all people work for exactly one company.
- Find the names of all employees in the database who earn more than every employee of 'Small Bank Corporation'. Assume that all people work for at most one company.

- Assume that the companies may be located in several cities. Find all companies located in every city in which 'Small Bank Corporation' is located.
  - Find the names of all employees who earn more than the average salary of all employees of their company. Assume that all people work for at most one company.
  - Find the name of the company that has the smallest payroll.
8. To apply the concept of security and privileges.
  9. To study Transaction control commands.
  10. Write a PL/SQL block of code for inverting a four-digit number (eg.5639 Inverted to 9365).
  11. Write a PL/SQL block to find factorial of any number.
  12. Write a PL/SQL block code to display a given no. in words. (e.g. if user enters a no 436 then output "Four Three Six" must be displayed).
  13. Write a PL/SQL block of code that first insert a record in 'EMP' table with New employee AKHIL with salary 2000 and update salaries of 'RAM' and 'SHYAM' by Rs. 2000 and 1500 respectively. Then check if total salary exceeds 20,000-undo salary update.

**TABLE EMP**

EMPNO	EMPNAME	SAL
E1	Ram	5000
E2	Shyam	2000
E3	Lata	3000
E4	Rita	6000

14. Create function that returns TRUE if student eligible to face the interview else FALSE. Eligibility based on current-age of candidates should be 18- 21 yr up to end of the current month. TABLE - [Stu-id, name, date-of-birth, marks].
15. Create a function named SimpleInterest for calculating Simple interest. The function will receive Principal, Rate, and Interest rate and return SI using formula  $P*I*R/100$ .
16. Write a procedure that accepts Adm-no, and returns name, branch, marks of student marks calculated as  $(\text{Internal marks} + \text{External marks}) / 2$ .  
STUDENT (Adm-no, name, Internal marks, External marks, branch).
17. Create a data base trigger that allows DELETE or UPDATE on LEDGER only on week days (Not on SAT, SUN), It generates appropriate message if delete is attempted on weekends.
18. Develop a program which will accept ACC\_ID and provide last transaction detail of the account. In case ACC\_ID is incorrect a user friendly message will generate.

19. Write a PL/SQL block which calculate commission on the basis of salary with the rule 10% if salary <1000,20% up to 5000 and 30% above it. As a result print E\_ID and commission if commission is above 5000 else print minimum commission message.
20. Create a block to access primary key through a sequence.
21. Develop a program which will inactive all those accounts in which no transaction have been occurred in the last 1 year. Moreover insert a record in tbl\_bank\_audit specifying the account ID and date if inactivation whenever such case occurred.
22. Write a procedure which will implemented as FD\_Maturity. The process involved is set sttus of FD Mature,Update balance of account with this FD and make an entry on transaction table with Transaction type Credit on the account.
23. Create a data base trigger that allows DELETE or UPDATE on LEDGER only on week days (Not on SAT, SUN), It generates appropriate message if delete is attempted on weekends.
24. Develop a program which will accept ACC\_ID and provide last transaction detail of the account. In case ACC\_ID is incorrect a user friendly message will generate.

Open Ended Problem (Minimum 1 for each student):

1. Develop a Library management system, where indexing of book according to the author or alphabetical order can be done. Issuing of books to the student can be managed and searching of books.
2. Make a SQL data base of student details and collaborate it with student semester performance and display each student performance individually.
3. Develop Inventory control and procurements for school management systems. School does have regular purchase of chalk box, chairs, benches etc.

Cos	Program Outcomes (Pos)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	2	1								1
2	3	3	3	3	3					1	1	1
3	3	3	3	3	3				1		2	1
4	3	3	3	2	1					1		1
5	3	3	3	2	2						2	1



## COP(C) -PYTHON PROGRAMMING

L	T	P	C	TheoryPaper	PracticalExams	InternalEvaluation	Total Marks
2	0	1	3	25	15	10	50

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### *Course Objectives:*

- To Introduce Python Programming Language as Multipurpose Programming Language with Features and Applications.
- To Learn Installing Python and Introducing Cross Multiplatform Usage of Python.
- To Practice Basic Language Features of Python.
- To Implement Oops Concepts Using Python.
- To Work with Files in Python

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### *Course Expected Outcome:*

1. Install and use Python on Various Platform.
2. Understand and Explain the features of Python language
3. Design and Develop Python applications for data analysis using object-oriented concept .
4. Build package and modules in Python with reusability and exception Aspect
5. Write programs for Reading and Writing files in Python.

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### *Unit-wise Syllabus :*

#### **UNIT-I**

Environment Setup of Python Application Area, Interactive Mode and Script Mode Data Types, Mutable and Immutable Variables, Expressions and Statements, Variables and Keywords, Operators and Operands in Python, Expressions and Statements; Taking Input (Using Raw\_Input( ) and Input( ) and Displaying Output.

Functions: Importing Modules, Invoking Built in Functions, Functions from Math Module, Functions from Random Module. Function from Date Time Module, Functions from Re-module Composition Defining Functions, Invoking Functions, Scope, Passing Parameters, Scope of Variables, Void Functions and Functions Returning Values, Recursion

Conditional and Looping Construct, use of Compound Expression in Conditional and Looping Construct

#### **UNIT- II**

Strings: String Operators, Comparing Strings Using Relational Operators; String Functions & Methods, Regular Expressions and Pattern Matching

Lists: Concept of Mutable Lists, Creating, Initializing and Accessing the Elements, Traversing, Appending, Updating and Deleting Elements, Composition, Lists as Arguments, List Operations, List Functions and Methods

Dictionaries: Concept of Key-Value Pair, Creating, Initializing and Accessing the Elements in a Dictionary, Traversing, Appending, Updating and Deleting Elements. Dictionary Functions and Methods  
Tuples: Immutable Concept, Creating, Initializing and Accessing Elements in a Tuple, Tuple Assignment, Tuple Slices, Tuple Indexing, Tuple Functions.

### UNIT- III

Concept of Object Oriented Programming: Data Hiding, Data Encapsulation, Class and Object, Polymorphism, Inheritance, Advantages of Object Oriented Programming Over Earlier Programming Methodologies

Classes: Defining Classes (Attributes, Methods), Creating Instance Objects, Accessing Attributes and Methods, Using Built in Class Attributes (Diet, Doc, Name, Module, Bases), Constructor (Init(), Del() and Str()) Methods in a Class, Private Attributes (Limited Support), Importance of "Self" (Acts as a Pointer to Current Calling Object) Operator Overloading with Methods

### UNIT- IV

Inheritance: Concept of Base Class and Derived Class: Single, Multilevel and multiple Inheritance-Overriding Methods, Using Super() in Derived Class to Invoke Init() Or Overridden Methods of Parent Class

Data File: Need for Non-Bold for Data File, Types of Data File-Text and Binary, Opening and Closing Files- Open(), Close(), Access Modes (Output, Input, Default), File Object, Access\_Modes, Reading and Writing a File Read(), Readline(), Readlines(), Write(), Writelines File Positions (Seek(), Tell()), Renaming and Deleting a File, Flush()

### UNIT- V

Implementation of Basic File Operations on Text and Binary File in Python: Creating/Writing Data into File, Reading and Displaying Data from File, Searching for Particular Data from a File, Insertion and Deletion of Data from an Already Existing File, Modification of Data in File

Error and Exceptions: Nameerror, Indexerror, Typeerror, I/O Error, Importerror, Valueerror, Eoferror, Generator Function Using Yield

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### Reference Books :

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1. Mark Lutz Learning Python, 5th Edition o'reilly Publication
2. Fabrizio Romano Learning Python - Download Link – <https://www.packtpub.com/Packt/Free-Ebook/Learning-Python>
3. Mark Lutz Learning Python (Fourth Edition) –Download Link [Http://Freebook.Qiniudn.Com/Learning%20python,%204th%20edition.Pdf](http://Freebook.Qiniudn.Com/Learning%20python,%204th%20edition.Pdf)
4. <https://docs.python.org/3/tutorial/index.html>

### List of Experiments on Python

1. Program to demonstrate basic data type in python
2. Program to demonstrate operators in python  
A cashier has currency notes of denominations 10, 50, and 100.If the amount to be withdrawn is input through the keyboard using input() function in hundreds,find the total number of currency notes of each denomination the cashier will have to give to the withdrawer
3. Program to demonstrate list and tuple in python  
Write a program in Python, A library charges a fine for every book returned late. For first 5 days the fine is 50 paisa, for 6-10 days fine is one rupee and above 10 days fine is 5 rupees. If you return the book after 30 days your membership will be cancelled.

4. Write a program to accept the number of days the member is late to return the book and display the fine or the appropriate message
5. Write a program to calculate overtime pay of 10 employees. Overtime is paid at the rate of Rs.12.00 per hour for every hour worked above 40 hours. Assume that employee do not work for fractional part of an hour  
Two numbers are entered through the keyboard, write a program to find the value of one number raised to the power of another
6. Write a function that receives marks received by a student in 3 subjects and returns the average and percentage of these marks. Call this function from main() and print the result in main
7. Write a program to read a file and display its contents
8. Write a program to demonstrate database connectivity in python

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	1		2	2							1
2	3	1		1	2					1	1	1
3	3	3	3	3	2			1		1	1	1
4	3	3	3	2	2			1				1
5	3	3	1	2	1							

## COP(D) - ANGULAR JAVASCRIPT

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
2	0	1	3	25	15	10	50

### *Course Objectives:*

- Implement single-page applications, Build Angular Forms
- Understand the use of Modules, Controllers and Directives
- Understand the concept and implementation of Dependency Injection
- Master AngularJS expressions, filters, and scopes

### *Course Outcomes:*

1. Build real client apps with Angular on your own
2. Troubleshoot common compile-time and run-time errors
3. Write clean and maintainable code like a professional
4. Apply best practices when building Angular apps

### *Unit-wise Syllabus :*

#### **UNIT-I**

Introduction to Angular JS, Java Script Client-Side Frameworks, Features of Angular JS, Architectural concepts, setting up the framework, organizing the code, Introducing Data Binding, Simple Data Binding

#### **UNIT-II**

Creating modules, Controllers, Scope, Two-way data binding Modules, Understanding Angular JS Forms, Form validation.

#### **UNIT-III**

Creating Reusable Components with Directives – directive introduction, using Angular JS built-in directives, creating our own directives

#### **UNIT-IV**

Data Handling, Expressions, Filters, Basic usage with expressions, currency, date, filter, creating filters.

#### **UNIT-V**

Dependency Injection and Services, Creating services, Using AngularJS built-in services, Factory & Provider

### *Reference Books:*

1. AngularJS Essentials- Rodrigo Branas, Packt Publishing Ltd Open Source
2. AngularJS:Novice To Ninja - Sandeep Panda, Sitepoint Pty. Ltd, Download link <http://www.longevity.co.uk/media/1008/angularjs-novice-to-ninja.pdf>

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	3	3	2						2	1
2	3	2	1	3	2							1
3	3	3	3	2	2	1		1			1	1
4	3	3	3	1	1			2			2	1

## **COP (E) – PROGRAMMING WITH R**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Theory Paper</b>	<b>Practical Exams</b>	<b>Internal Evaluation</b>	<b>Total Marks</b>
2	0	1	3	25	15	10	50

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### ***Course Objectives:***

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- Provide the knowledge of Basic R Programming Language to Students.
- Prepare Students for Role of Professional Data Analyst.
- Learn about Concepts of R Programming like Control Structures, Functions, Arrays .
- This course will teach students, How to develop workflows going from raw data to graphics and statistical analysis, Using the Programming Language and Statistical Environment R.
- Over the Course of the Semester, Students will Learn the Skills to Write Scripts to automate data formatting and analysis, making their studies replicable.
- Student will be able Apply Programming Knowledge to Develop R Programs Based onSimulation .

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### ***Course Outcomes:***

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1. Learn and apply the features of R Programming Tool to Carry out Statistical Analysis of data
2. Write, Compile and Execute the Programs Written in R Programming Language
3. Implement Intelligent Algorithms in R to Solve Statistical and Decision Making Problems

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### ***Unit-wise Syllabus :***

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#### **UNIT-I**

Introduction: Overview and History of R, Software Installation, R Studio, Basic Features of R, Limitations of R, R Interface, Getting Help, Data Types, R Objects, Comments.

#### **UNIT-II**

Arrays, Matrices and Data Frames, Subsetting, Reading and Writing Data

#### **UNIT-III**

Control Structures: If, While, For Loops, Next, Break, R Functions, Basic Data Manipulation.

#### **UNIT-IV**

Accessing R Packages, Dates and Times, lapply, tapply, split, mapply, apply, Coding Standards.

#### **UNIT-V**

Introduction to Scoping Rules, Debugging Tools, Simulation, R Profiler

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**Reference Books:**

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- W.N. Venables, D. M. Smith, an introduction to R, r-core team,2015
- Alain F. Zuur, Elena n. Ieno, and Erik Meesters. A beginner’s guide to R. Use R. Springer, 2009. ISBN: 978-0-387-93836-3.
- Roger D. PengR Programming for Data Science, , <https://leanpub.com/rprogramming>
- John Verzani, chapman -Using R for introductory statistics, , ISBN- 1584884509
- HadleywickhamAdvanced R, , ISBN-9781466586963.
- Peter Dalgaard. Introductory Statistics with R. Springer, 2nd edition, 2008. ISBN 978-0-387-79053-4.
- Brian Everitt and TorstenHothorn. A handbook of statistical analyses using R. Chapman & hall/crc, bocaraton, fl, ISBN 1-584-88539-4.
- Phil Spector. Data manipulation with R. Springer, New York, ISBN-978-0-387-74730-9.
- John Maindonald and John Braun. Data analysis and graphics using R. Cambridge University press, Cambridge, 2nd edition, ISBN 978-0-521-86116-8.
- <https://www.r-project.org/doc/bib/r-books.html>

**R Programming Lab****List of Practicals:**

1. Write a program that prints ‘Hello World’ to the screen.
2. Write a program that asks the user for a number n and prints the sum of the numbers 1 to n.
3. Write a program that prints a multiplication table for numbers up to 12.
4. Write a function that returns the largest element in a list.
5. Write a function that computes the running total of a list.
6. Write a function that tests whether a string is a palindrome.
7. Implement the following sorting algorithms: Selection sort, Insertion sort, Bubble Sort.
8. Implement linear search.
9. Implement binary search.
10. Implement matrices addition, subtraction and Multiplication.

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	2	3	3							2
2	3	3	2	3	2							2
3	3	3	3	3	2		1	1			1	2

## COP(F) – SOFTWARE TESTING AND QUALITY ASSURANCE

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
3	0	0	3	40	--	10	50

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### *Course Objectives:*

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- Understand, Learn and Apply the Theoretical and Practical Knowledge of Software Testing.
- Introduce Quality Models, Factors Affecting Quality, Various Characteristics and Relationship, Quality Metrics, Estimation Techniques, Quality Assurance and Control, and Certification.
- Understand, Learn and Analyze the Code by Applying Code Inspection, Review and Structured Walkthrough Approaches for Static Testing Software Product.
- Understand the Key Concepts of Software Testing Such as Types, Levels, Process, Strategies and Metrics of Software Testing and Defect Management.
- Learn the Various Testing Techniques and Hands on Testing Tool for Designing, Exercising the Test Case on Sut and Auditing the Results.
- Introduce, Understand and Learn Features and Working of Various Tools of Software Testing and Apply on Different Software Artifacts.

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### *Course Outcomes :*

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1. Explain and Apply Knowledge of Key Concepts of Software Testing, Quality and Testing Tools.
2. Draw the DD Graph and Identify the Various Test Cases from Paths of Flow Graph of Software Testing Problem and Determine the Complexity of Software.
3. Design Test Cases and Develop Test Suite, Write Test Scripts, Set Environmental Variables for Carrying Out the Various Levels of Testing Manually and Automatically.
4. Manage Software Defects, and Risks Within a Software Project.
5. Work Effectively in Profile of Software Tester, Quality Assurance and Control officer, Project Manager and Leaders.

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### *Unit-wise Syllabus :*

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#### **UNIT-I**

Software Testing Process, Objectives, Testing Techniques, Software Testing Life Cycle, Concept of Testing, Types of Errors, Stubs and Drivers Verification and Validation, Different Types of Verification & Validations Mechanisms, Concepts of Software Reviews, Code Inspection and Code Walkthrough, Testing of Component Based Software System, Energy Efficient Testing, Mobile Application Testing.

#### **UNIT-II**

Software Testing Methods, Testing Fundamentals, Test Case Design, White Box Testing and its Types, Black Box Testing and its Types, Software Testing Strategies, Strategic Approach to Software Testing, UNIT Testing, Integration Testing, Validation Testing, System Testing, Test Planning, Budgeting and Scheduling.

#### **UNIT-III**

Software Testing Metrics, Concept and Developing Testing Metrics, Different Types of Metrics, Complexity Metrics, Defect Management, Definition of Defects, Defect Management Process, Defect Reporting, Metrics Related to Defects, Using Defects for Process Improvement.

#### UNIT-IV

Software Quality, Factors Affecting Software Quality, Quality Models, Software Quality Estimation, Quality Metrics, Quality Assurance, SQA Activities, Software Reviews, Formal Technical Reviews, Quality Control Quality Management, and, SQA Plan. Quality Improvement, Pareto Diagrams, Cause-Effect Diagrams, Scatter Diagrams, Run Charts, Total Quality Management, Statistical Quality Assurance, Software Reliability, the ISO 9001 Quality Standard, Six Sigma, Informal Reviews.

#### UNIT-V

Quality Costs, Quality Cost Measurement, Utilizing Quality Costs for Decision-Making. Manual Vs Automatic Testing, Basics of Automated Testing, Drawback of Manual Testing, Advantages of Automation of Testing, Factors for Automation Testing, Types Automation of Testing Tools, Introduction to QTP, QTPIDE, Basic Components in QTP, QTP Framework, Write Scripts, Introduction to Winrunner, and Rational Robot.

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#### Reference Books:

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1. Roger S. Pressman, Software Engineering – a Practitioners Approach, McGraw Hill Education; 7 Edition, 1 April 2009.
2. K.K. Aggarwal&Yogesh Singh, “Software Engineering”, 2nd Ed., New Age International Publishers, New Delhi, 2005.
3. KshirsagarNaik, PriyadarshiTripathy, Software Testing and Quality Assurance Theory and Practice, Wiley-Spektrum; 1 Edition, August 18, 2008.
4. Donna C. S. Summers, Quality Management, Pearson; 2 Edition, April 26, 2008
5. Yogesh Singh, Software Testing, Cambridge University Press, 2012
6. William Perry, “Effective Methods for Software Testing”, John Wiley & Sons, New York, 1995
7. Louise Tamres, “Software Testing”, Pearson Education Asia, 2002
8. CemKaner, Jack Falk, Nguyen Quoc, “Testing Computer Software”, Second Edition, Van Nostrand Reinhold, New York, 1993.
9. Boris Beizer, “Black-Box Testing – Techniques for Functional Testing of Software and Systems”, John Wiley & Sons Inc., New York, 1995.

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	2	2	3	2				2		1
2	3	3	3	2	1					1		1
3	3	3	3	3	2				2	2		1
4	3	2	2		1				2		3	1
5	2	1	1						3	2	3	1



## **COP(G)-CYBER CRIME & LAWS**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Theory Paper</b>	<b>Practical Exams</b>	<b>Internal Evaluation</b>	<b>Total Marks</b>
3	0	0	3	40	--	10	50

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### ***Course Objectives:***

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- Define and Describe the Nature and Scope of Cybercrime
- Develop Knowledge of Major Incidents of Cybercrime and Their Resulting Impact
- Introduce the Cyber World and Cyber Law in General
- Explain About the Various Facets of Cyber Crimes
- Enhance the Understanding of Problems Arising Out of Online Transactions and Provoke Them to Find Solutions
- Clarify the Intellectual Property Issues in the Cyber Space and the Growth and Development of the Law in This Regard
- Educate About the Regulation of Cyber Space At National and International Level

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### ***Course Outcome:***

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1. Demonstrate a Critical Understanding of the Cyber Law with Respect to Indian IT/Act 2008
2. Practice Specific Laws and Governing Policies for Cyber Crime Detection and Protection
3. Identify, Apply and Evaluate the Specific Technology that Facilitates Cybercrime and Digital Law Enforcement
4. Critically Evaluate the Impact of Cybercrime on Society
5. Work in profile of Cybercrime Detector and Investigator

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### ***Unit-wise Syllabus :***

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#### **UNIT-I**

Cyberspace – Definition, Overview of Communication and Web Technology- Internet, History of Internet, Switching Techniques, TCP/IP, Wwww, Domain Name, Management of Domain Name, Bandwidth, Search Engines, Portal, Email

#### **UNIT- II**

Cybercrime and Cyber Law, IT Act 2000, Contract Act, Trademark Act, Copyright, Patents

#### **UNIT- III**

Cybercrime Targeting Computer Systems – Data Diddling, Denial of Service, Attacks, Virsus, Worms, Trojan Horses, Spy Ware, Logic Bombs

#### **UNIT- IV**

Cybercrime Against Persons- Pornography, Cyber Stalking and its Type, Phishing and its Type, Impersonation

**UNIT- V**

Cybercrime Targeting Countries – Cyber Terrorism, It Act 2008, International Response to Cybercrime, Digital Evidence and Computer Forensics

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**Reference Books**

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1. Kumar K -Cyber Laws: Intellectual Property & E Commerce, Security, Dominant Publisher
2. Information Security Policy & Implementation Issues, NIIT, PHI
3. Marine R.C.- Cyber Crime Impact in the New Millennium, Auther Press

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	2	1	1		1		1		1		2
2	3	3	3	2	2	2		2				2
3	3	3	3	3	2	2		2			1	2
4	3	2	1	3	2	3		1			1	2
5	3	3	3	3	2	2		2		2	1	2

## COP(H) - SOFT COMPUTING

L	T	P	C	TheoryPaper	PracticalExams	InternalEvaluation	Total Marks
3	0	0	3	40	-	10	50

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### *Course Objectives:*

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The purpose of this course is to understand the concept and applications of Soft computing paradigm through fuzzy logic, neural networks, genetic algorithms and hybrid systems.

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### *Course Outcomes:*

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1. Explain the advantages and limitations and working of soft computing techniques
2. Identify and Describe Soft Computing Techniques and their Roles in Building Intelligent Solutions
3. Carry out the Feasibility study for Applicability of Soft Computing Methodology for solving the Particular Problem
4. Apply Fuzzy Logic and Reasoning to Handle Uncertainty and Solve Engineering Problems
5. Apply Neural Networks approach to Pattern Classification and Regression Problems
6. Effectively Use the Software Tools to Solve Real Problems Using a Soft Computing Approach

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### *Unit-wise Syllabus :*

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#### **UNIT-I**

Soft Computing: Introduction of soft computing, soft computing vs. hard computing, various types of soft computing techniques, applications of soft computing. Basic concepts of neural network, Human Brain-Biological neural network, evolution of artificial neural network, Structure and Function of a single neuron, Difference between ANN and human brain, characteristics and applications of ANN, Learning Methods, Activation function, neural network architecture.

#### **UNIT-II**

Supervised Learning: Perceptron learning,- Single layer, multilayer, linear Separability, Widrow&Hebb's Learning Rule/Delta Rule, Back propagation network, Error back propagation algorithm, characteristics and application of EBPA.

#### **UNIT-III**

Counter Propagation Network, Architecture, Functioning & Characteristics of Counter, Propagation Network, Hopfield/Recurrent Network, Configuration, Stability Constraints, Adaptive Resonance Theory: Architecture, Classifications, Application in Pattern and Face Recognition.

#### **UNIT-IV**

Fuzzy Logic: Fuzzy Set Theory, Crisp Set, Fuzzy Set, Operations on Fuzzy Sets: Compliment, Intersections, Unions, Product, Difference, Properties of Fuzzy Set, Crisp Relation & Fuzzy relations,

introduction & features of membership functions, Fuzzy rule base system: Fuzzy propositions, Formation, decomposition & aggregation of Fuzzy rules, Fuzzy reasoning, Applications of fuzzy logic.

**UNIT-V**

Genetic Algorithm: Fundamentals, basic concepts, working principle, encoding, fitness function, reproduction, Genetic modeling: Inheritance operator, cross over, inversion & deletion, mutation operator

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**Reference Books:**

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- S, Rajasekaran& G.A. VijayalakshmiPai, Neural Networks, Fuzzy Logic & Genetic Algorithms, Synthesis & Applications, PHI publication.
- S.N. Sivanandam&S.N.Deepa, Principles of Soft Computing, Wiley Publications.

COs	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	1	1	1								2
2	3	3	3	2	3						2	2
3	3	3	2	2	3		1		1		2	2
4	3	3	3	3	3		1				1	2
5	3	3	3	3	3						1	2
6	3	3	3	3	3							2

## COP(I)-MATLAB PROGRAMMING

L	T	P	C	Theory Paper	Practical Exams	Internal Evaluation	Total Marks
2	0	1	3	25	15	10	50

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### *Course Objectives:*

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- To Learn Arrays, Multidimensional Arrays, Operations in Matlab.
- Understanding the Matlab Environment and Features
- To Introduce the Uses of Inbuilt Functions of Matlab.
- To Learn and Write Functions and Script Files in Matlab
- To Carry Out Data Analysis By Plotting, Special Plotting: 3D and 2D Plotting .
- Learn and use Matlab for Simulation of Real World Problems.

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### *Course Outcome:*

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1. Use Matlab features and Tools for Solving the Problems
2. Explain and apply Matlab functions and Control Structures for Mathematical Problems
3. Design and Develop GUI Based Solution
4. Read and Write the Data from the Files.
5. Make Interface Between Different Programming Language
6. Write M-Files for User-Defined Functions.

### **UNIT-I**

Introduction to Matlab, What is Matlab, Applications, Various Windows in Matlab, Help, Variables and Constants, Basic Arithmetic : Matrix and Vectors, Indexing, Dot Operators, Elementary Math's Functions, Saving and Loading Data, Arithmetic and Logical Operator.

### **UNIT- II**

Arrays, Multidimensional Arrays, Matrix Operations and Functions, the Colon Operator, Accessing Parts of a Matrix, Combining and Transforming Matrices Etc, Functions and Formulas, Reading and Writing Data File, File Handling, Excel Files, Text Files.

### **UNIT- III**

Matlab Graphics Basics 2 D and 3 D Plotting, Plot3, Mesh, Grid, Surf , 3D Viewing Options, Exploring Data, Data Types, Programming in Matlab, Conditional Statements and Looping Statements, Script and Functions.

### **UNIT- IV**

Matlab GUI : Push Button, Toggle Button, Radio Button, Check Box, Edit Text Field, Slider, List Box, Pop-Up Menu Panel, Button Group, Menu Item, Writing Code for GUI Call Back.

## UNIT- V

Matlab Toolboxes - Toolbox Structure, User Defined Functions, Editing and Debugging Matlab Programs, Data Acquisition Toolbox, Image Acquisition Toolbox,

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### Reference Books :

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1. Brian R. Hunt, Ronald L. Lipsman, Jonathan M. Rosenberg, Kevin R. Coombes, John E. Osborn, Garrett J. Stuck. —a Guide to Matlab: for Begginers and Experienced Users Cambridge University Press, 2006
2. Matlab Tutorial Files, Www.Mathworks.Com
3. Amos Gilat -Matlab: an Introduction with Applications-Wiley India Edition
4. Peter I. Kattan-Matlab for Beginners: a Gentle Approach - Revised Edition -Petra Books.
5. Stormy Attaway-Matlab:-a Practical Introduction to Programming and Problem Solving-
6. Brian R. Hunt, Jonathan Rosenberg, and Ronald L Lipsman-a Guide to Matlab: for Beginners and Experienced Users  
Textbook 2 Editions - Cambridge

COS	Program Outcomes (POS)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	3	3	3	2	3							1
2	3	3	2	1	2					1		1
3	3	3	3	2	2						1	1
4	3	3	3	2	2						1	1
5	3	3	3	2	2						1	1
6	3	3	3	2	2						1	1

## SEMESTER VI

### Major Project

SubjectCode	Subject Name	L	T	P	C	TheoryMarks	InternalMarks	PracticalMarks	Total Marks
6MCA1	<ul style="list-style-type: none"><li>• Project Analysis &amp; Planning</li><li>• Project Design &amp; Development</li><li>• Project Testing &amp; Validation</li><li>• Project Documentation</li><li>• Project Presentation &amp; Viva</li></ul>	0	0	5	25	0	200	300	500
	<b>Semester Total Marks and Credits</b>				<b>25</b>	<b>0</b>	<b>200</b>	<b>300</b>	<b>500</b>

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#### ***GUIDELINES FOR MCA PROJECT***

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The Master of Computer Applications (MCA) Programme is designed with the Objective to Prepare the Students to Take up Positions in IT Industries as Programmer, Systems Designers, Software Engineers, and Project Managers etc. The Curricula are designed to Provide Students Comprehensive Knowledge Covering the Skills and Core Areas of Computer Science in Theory and Practical's. With the Same Objective Six Months Major Project is Part of Curricula in Last Semester of MCA. In the Major Project Students are supposed to Develop Quality Software Solutions by Applying Theoretical and Practical Knowledge of Various Courses Learnt.

The Project Work Constitutes a Major Component in the Course it Needs to Be Carried out with due Care, and Should Be Executed with Seriousness by the Students with Essential Foundation, Principles, and Practices to Develop Effective ways to Solve Computing Problems.

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#### ***OBJECTIVES***

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The Objective of the Project is to help the Student Develop the Ability to Apply Theoretical and Practical Tools / Techniques to Solve Real Life Problems Related to Industry, Academic Institutions and Research Laboratories. After Completion of this Project Work, The Students Should be able to Describe the Systems Development Life Cycle (SDLC) in their Project:

- Evaluate Systems Requirements.
- Evaluate a Problem Definition.
- Collect Information to Determine Requirements.
- Perform and Evaluate Feasibility Studies Like Cost-Benefit Analysis, Technical Feasibility, Time Feasibility and Operational Feasibility for the Project.
- Work on Data Collection Methods for Fact Finding.
- Construct and Evaluate Data Flow Diagrams.
- Construct and Evaluate Data Dictionaries/ Decision Trees/ Decision Table.
- Create and Evaluate Graphical Tools as Systems Flow Charts, Entity-Relationship (ER) Diagrams and State Transition Diagrams.
- Decide the S/W Requirement Specifications and H/W Requirement Specifications.
- Plan the Systems Design Phase of the SDLC.
- Distinguish Between Logical and Physical Design Requirements.
- Design and Evaluate System Outputs.
- Design and Evaluate Systems Inputs.
- Design and Evaluate Validity Checks for Input Data.
- Design and Evaluate User Interfaces for Input.
- Estimate Storage Requirements.
- Decide and Describe Various Data Structures.
- Perform Coding for the Project.
- Documentation Requirements and Prepare Documentation.
- Perform Various Testing Techniques/Strategies.
- Be able to Generate Various Reports in Project.
- Able To Deploy The Project On Machine/Lab/Real Time Environment
- Brief the Maintenance Procedures.
- To Decide the Future Scope and Further Enhancement of the System.
- Plan For Appendices (If Any) to be Placed in Support with the Project Report Documentation.

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### ***TYPE OF PROJECT***

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The Majority of the Students are expected to Work on Real-Life Project Preferably in Some Industry/ Research and Development Laboratories / Educational Institution / Software Company. Students are Encouraged to Work in the Various Areas of Computer Applications Listed Below. However, it is not mandatory for a Student to Work on a Real-Life Project. The Student can formulate a Project Problem with the Help of Her/his Supervisor and if Approved, the Student Commence Working on it.

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### ***PROJECT PROPOSAL FORMULATION***

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The Project Proposal should be Prepared in Consultation with Supervisor. Approval of the Project Proposal is Mandatory to Continue and Submit the Project Work. The Project Proposal Should Clearly State the Project Objectives and the Environment of the Proposed Project to be undertaken.

The Project Proposal Should Contain Complete Details In The Following Form:

1. Title of the Project
2. Introduction and Objectives of the Project



3. Project Category (RDBMS/OOPS/Networking/Multimedia/Artificial Intelligence/Expert Systems/ Cloud/ Security/ Data Analytics etc.)
4. Analysis (DFDs, ER Diagrams, Class Diagrams, Time Line etc. as per the Project Requirements).
5. A complete Structure which Includes:
  - Number of Modules and their Description to Provide an Estimation of the Student's Effort on the Project.
  - Data Structures as per the Project Requirements for all the Modules
  - Process Logic of Each Module
  - Reports Generation.
6. Tools / Platform, Hardware and Software Requirement Specifications
7. Security Mechanisms
8. Project Team Members (If any)
9. Organization/ Company Details with Profile of Supervisor (If project is carried out outside the Department)

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### ***Project Work Guidelines***

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- The Project Work Should Normally Include Software Development.
- Preferably, not more than one Student is permitted to Work on a Project. However, in Case a Project is Comprehensive enough that requires one human-year or More Time for its Completion, then as per Requirements at most two Students may Work on the Same Project. If 2 Students have been allowed to Work on a Project, The Project Synopsis and Project Reports by them Must Include only respective Modules undertaken / worked upon individually. Each Student Must Submit a Separate Project Proposal and a Separate Project Reports Related to her/his Modules. Completely identical Project Synopses and/or Project Reports are Not Allowed. Only Introductory and Possibly Concluding Remarks may be similar or common. Each Student has to undergo all the Phases
- The Project may be done in the University Campus or in an Approved Sponsoring Organization in View of the Proposed Topic.
- A Candidate is required to present the Progress of the Project Work during the Semester as per the Schedule provided by the MCA Project coordinator, under the Guidance of the Supervisor.

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### ***PROJECT REPORT FORMULATION***

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Good quality white executive bond paper A4 size should be used for typing and duplication. Care should be taken to avoid smudging while duplicating the copies.

Page Specification: Left margin-3.0cms, Right Margin- 2.0 cm, Top Margin 2.54 cm, Bottom Margin 2.54 cm, Line Spacing – Single, Font Size – 12 for Normal Text, 14 for Headings, 16 for Chapter Heading, Page numbers - All Text Pages as well as Program Source code listing should be numbered at the bottom of the pages. Employ MS-Word or Open Source Software.

The project report should contain the following:

1. Front Page – Colored
2. The Approved Performance and Synopsis.
3. Certificate from the Supervisor with her/his signature and date.

4. Certificate from company/industry in their letter head (if project is carried out outside the department)
5. Certificate of Originality/ Self Certificate
6. The Project Report documentation should include the following topics (as per the project requirements).
  - Acknowledgement
  - Table of Contents / Index with page numbering
  - Introduction / Objectives of the project
  - System Analysis
  - Feasibility Study
  - Software and Hardware Requirement Specifications
  - System Design
  - Coding
  - Validation checks
  - Implementation and Maintenance
  - Testing (Testing techniques and Testing strategies used along with the test data and the errors listed for each test case).
  - System Security measures (Implementation of security for the s/w developed)
  - Reports, Tables Figures should be properly numbered/labeled
  - Screen Shots of Projects
  - Conclusion
  - Future scope and further enhancement of the Project
  - Bibliography/ References
  - Appendices (if required)

Two Copies of the Original Project Report in Bound Form are to be submitted. Each Student is required to Prepare Individual Copy of Project Report in CD and Submit along with His/hers Project Report in MS-Word as well as PDF. The Same Must Contain the Report, Results, Screenshots, Errors, Databases, Source Codes (Wherever it is not feasible Explicit Approval from the Supervisor Must be obtained). Soft Copy of Labeled and Signed Project CD Should be in a thick Envelope Pasted Inside of the Back Cover of the Project Report.

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### ***PROJECT EVALUATION***

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The Project Report is evaluated for Total of 500 Marks. The Evaluation is done in Following Five Heads of 100 Marks Each. Normally The Evaluation Shall be Done by the Same Examiners for Each of these Five Heads. For Passing the Examination a Total of 50% in all these Heads Together but in Two Separate Heads as Internal (200 Marks) and External (300 Marks) Evaluation Shall be Essential.

- Project Analysis & Planning
- Project Design & Development
- Project Testing & Validation
- Project Documentation
- Project Presentation & Viva



## Format for Project Certificate

This is to certify that the project report entitled \_\_\_\_\_ submitted to MakhnallalChaturvedi National University of Journalism & Communication, in partial fulfillment of the requirement for the award of the degree of MASTER OF COMPUTER APPLICATIONS (MCA), is original work carried out by myself Mr / Ms ----- with enrolment no. \_\_\_\_\_ Under the Supervision of Prof/Dr/Mr/Ms----- .

The matter embodied in this project is genuine work done by myself and has not been submitted whether to this University or to any other University / Institute for the fulfillment of the requirement of any course of study.

Date:

Name & Signature of the Student

Contact Details (Email, Phone & Address)

.....

Verified by the Supervisor

Name & Signature of the Supervisor/s

Date: .....