



# **Punjab Technical University**

## **Jalandhar**

# **Syllabus Scheme**

**(1<sup>st</sup> to 6<sup>th</sup> Semester)**

**For**

# **Master of Computer Applications (MCA)**

**Implemented**

**From Aug. 2005 and onward**

# PUNJAB TECHNICAL UNIVERSITY

## STUDY SCHEME FOR MCA

### SEMESTER – 1

CODE	SUBJECT	LEC	PRA	TOTAL	INTERNAL	EXTERNAL	TOTAL
MCA-101	Introduction to Information Technology	20	30	50	25	75	100
MCA-102	Programming in C	24	24	48	25	75	100
MCA-103	Accounting & Financial Mgmt	50	0	50	25	75	100
MCA-104	Computer Mathematical Foundation	52	0	52	25	75	100
MCA-105	System Analysis And Design	40	-	40	25	75	100
MCA-106	Communication & Soft Skills	30	-	30	50	0	50
MCA-107	Software Lab-I (IT)	-	-	-	25	75	100
MCA-108	Software Lab-II (C )	-	-	-	25	75	100
<b>TOTAL</b>		<b>216</b>	<b>54</b>	<b>270</b>	<b>225</b>	<b>525</b>	<b>750</b>

### SEMESTER – 2

CODE	SUBJECT	LEC	PRA	TOTAL	INTERNAL	EXTERNAL	TOTAL
MCA-201	Management Information System	40	0	40	25	75	100
MCA-202	Object Oriented Programming Using C++	26	26	52	25	75	100
MCA-203	Data Communication & Networks	40	0	40	25	75	100
MCA-204	Principles of Management	40	0	40	25	75	100
MCA-205	Introduction to Micro Processor	40	28	68	25	75	100
MCA-206	Software Lab-III (C++)	-	-	-	25	75	100
MCA-206	Hardware Lab-I (Micro Processor)	-	-	-	25	75	100
<b>TOTAL</b>		<b>186</b>	<b>54</b>	<b>240</b>	<b>175</b>	<b>525</b>	<b>700</b>

### SEMESTER 3

CODE	SUBJECT	LEC	PRA	TOTAL	INTERNAL	EXTERNAL	TOTAL
MCA-301	Computer System Architecture	48	0	48	25	75	100
MCA-302	Data Structures	26	26	52	25	75	100
MCA-303	Visual Basic Programming	30	30	60	25	75	100
MCA-304	RDBMS-I	30	10	40	25	75	100
MCA-305	Computer Based Optimization Methods	40		40	25	75	100
MCA-306	Software Lab-IV (DS)	-	-	-	25	75	100
MCA-307	Software Lab-V (RDBMS-I)	-	-	-	25	75	100
<b>TOTAL</b>		<b>174</b>	<b>66</b>	<b>240</b>	<b>175</b>	<b>525</b>	<b>700</b>

**SEMESTER  
4**

CODE	SUBJECT	LEC	PRA	TOTAL	INTERNAL	EXTERNAL	TOTAL
MCA-401	RDBMS-II	40	20	60	25	75	100
MCA-402	Software Engineering	40	0	40	25	75	100
MCA-403	System Software	40	0	40	25	75	100
MCA-404	Operating System	40	20	60	25	75	100
MCA-405	Elective - I	40		40	25	75	100
MCA-406	Software Lab-VI (RDBMS)	-	-	-	25	75	100
MCA-407	Software Lab-VII (OS)(LINUX/NT)	-	-	-	25	75	100
<b>TOTAL</b>		<b>200</b>	<b>40</b>	<b>240</b>	<b>175</b>	<b>525</b>	<b>700</b>

**SEMESTER  
5**

CODE	SUBJECT	LEC	PRA	TOTAL	INTERNAL	EXTERNAL	TOTAL
MCA-501	Computer Graphics	40	20	60	25	75	100
MCA-502	Java Programming	34	34	68	25	75	100
MCA-503	Elective - II	30	30	60	25	75	100
MCA-504	Elective - III	26	26	52	25	75	100
MCA-505	Software Lab-VIII (Graphics)	-	-	-	25	75	100
MCA-506	Software Lab-IX (Java)	-	-	-	25	75	100
MCA-507	Comprehensive Viva Voce	-	-	-	25	75	100
<b>TOTAL</b>		<b>130</b>	<b>110</b>	<b>240</b>	<b>175</b>	<b>525</b>	<b>700</b>

**SEMESTER  
6**

CODE	SUBJECT	LEC	PRA	TOTAL	INTERNAL	EXTERNAL	TOTAL
MCA -601	Project	-	-	-	100	300	400

**Elective-I**

MCA-405-A : Artificial Intelligence  
MCA-405-B : Robotics Engineering  
MCA-405-C : Object Oriented Analysis and Design

**Elective-II**

MCA-503-A : Internet Prog. & E-Commerce  
MCA-503-B : Compiler Design  
MCA-503-C : Visual Basic.NET

**Elective-III**

MCA-504-A : System Simulation And Modeling  
MCA-504-B : Advanced Microprocessor Systems  
MCA-504-C : Linux Operating System

**Guidelines for Internal Assessment :**

The internal marks will be based on a continuous assessment and the following is to be adhered to :

- Test/Quiz's (15 Marks). Best 2 out of 3.
- Presentation/Reports/Home assignments (5 Marks)
- Class attendance/General behaviour (5 marks)

**Guidelines for External Practical / Viva-Voce :**

The external practical /viva-voce will be conducted as per the details mentioned above in study scheme by an external examiner appointed by the University.



The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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#### **Section-I**

Problem Solving with Computers: Algorithms, and Flowcharts. Data types, constants, variables, operators, data input and output, assignment statements, conditional statements.

Iteration, arrays, strings processing, defining function, types of functions, function prototype, passing parameters, recursion.

Storage class specifiers, pre-processor, header files and standard functions.

#### **Section-II**

Pointers: Definition and uses of pointers, pointer arithmetic, pointers and array, pointers and functions, pointer to pointer.

Structures, union, pointers to structures, user-defined data types, enumeration.

#### **Section-III**

Data files: Opening, closing, creating, processing and unformatted data files.

Introduction to Dynamic Memory Allocation

C-programming applications: Sorting (Bubble sort, Selection sort), Searching (Binary search, Linear Search)

## **MCA-103 ACCOUNTING AND FINANCIAL MANAGEMENT**

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### **INSTRUCTIONS FOR PAPER-SETTER**

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The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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#### **Section-I**

Accounting: Principles, concepts and conventions, double entry system of accounting, introduction to basis books of accounts of sole proprietary concern, closing of books of accounts and preparation of trial balance.

Final Accounts: Trading, Profit and Loss accounts and Balance sheet of sole proprietary concern (without adjustment)

**Section-II**

Financial Management: Meaning, scope and role, a brief study of functional areas of financial management. Introduction to various FM tools: Ration Analysis, Fund Flow statement and cash flow statement (without adjustments)

Costing: nature, importance and basic principles. Marginal costing: Nature scope and importance, Break even analysis, its uses and limitations, construction of break even chart, Standard costing: Nature, scope and variances (only introduction)

**Section-III**

Computerized accounting: Meaning and advantages, Computer Programs for accounting, Balancing accounts, Trial balance and final accounts in computerized, Accounting, control, and Audit, Sub-Modules of computerized accounting systems.

**MCA-104 COMPUTER MATHEMATICAL FOUNDATION**

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**INSTRUCTIONS FOR PAPER-SETTER**

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The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

**INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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**Section-I**

Sets and Relations: Definition of sets, subsets, complement of a set, universal set, intersection and union of sets, De-Morgan's laws, Cartesian products, Equivalent sets, Countable and uncountable sets, minset, Partitions of sets, Relations: Basic definitions, graphs of relations, properties of relations

**Section-II**

Introduction of a Matrix, its different kinds, matrix addition and scalar multiplication, multiplication of matrices, transpose etc. Square matrices, inverse and rank of a square matrix, solving simultaneous equations using Gauss elimination, Gauss Jordan Methods, Matrix Inversion method.

**Section-III**

Algebra of logic, Propositions, Connectives, Tautologies and contradiction, Equivalence and implication, Principle of Mathematical induction, quantifiers.

A general introduction, simple and multipgraphs, directed and undirected graphs, Eulerian and Hamiltonian Graphs, Shortest path algorithms, Chromatic number, Bipartite graph, graph coloring.

**MCA-105 SYSTEMS ANALYSIS AND DESIGN**

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### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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#### **Section-I**

System: Definition, Characteristics, elements and types of system. System Development Life Cycle, Role of system analyst, Initial investigation, Feasibility study-Technical, economic and behavioral feasibility, Cost and Benefit analysis.

#### **Section-II**

System Analysis: Problem Definition, Information requirements, Information gathering tools, Tools of structured Analysis – Data Flow Diagrams, Data Dictionary, Decision Tree, Decision tables and structured English.

System Design: Structured Design, Input design, and Output design, Form Design. File Organization: Sequential Indexed Sequential, Chaining and Inverted list organization.

#### **Section-III**

System Testing: Test Plan AND test data, type s of system test.

System Implementation: Implementation Plan, activity network for conversion, combating resistance to change. Hardware/Software Selection: Procedure for selection, Major phases in selection, Make v/s buy decision, Criteria for software selection.

### **MCA-106 COMMUNICATION & SOFT SKILLS**

**Essentials of Grammar:** Parts of Speech, Punctuation, Vocabulary Building, Phonetics

**Office Management :** Types of Correspondence, Receipt and Dispatch of Mail, Filing Systems, Classification of Mail. ,Role & Function of Correspondence, MIS, Managing Computer

**Letter & Resume Writing:** Types of Letters-Formal / Informal, Importance and Function, Drafting the Applications, Elements of Structure, Preparing the Resume, Do's & Don'ts of Resume, Helpful Hints

**Presentation Skills:** Importance of Presentation Skills, Capturing Data, Voice & Picture Integration, Guidelines to make Presentation Interesting, Body Language, Voice Modulation, Audience Awareness, Presentation Plan, Visual Aids, Forms of Layout, Styles of Presentation.

**Interview Preparation:** Types of Interview, Preparing for the Interviews, Attending the Interview, Interview Process, Employers Expectations, General Etiquette, Dressing Sense, Postures & Gestures

**Group Discussion & Presentation:** Definition, Process, Guidelines, Helpful Expressions, Evaluation

(Note: Every student shall be given 15 minutes. of presentation time & 45 minutes of discussion on his/ her presentation.)

**The student will be evaluated on the basis of :**

- his / her presentation style
- Feedback of Faculty & Students
- General Etiquette
- Proficiency in Letter Drafting / Interview Preparation
- The paper is internal and at least 3 tests will be taken. Best 2 of 3 shall account for final grades (70% Test & 30% Presentation)

## **MCA-201      MANAGEMENT INFORMATION SYSTEM**

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### **INSTRUCTIONS FOR PAPER-SETTER**

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The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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#### **Section I**

Introduction to systems and Basic systems concepts, Types of systems, The systems Approach, Information systems: Definition and characteristics, types of Information, role of Information in Decision – Making, Sub – systems of information systems: EDP and MIS, management levels, EDP/MIS/DSS

#### **Section-II**

An overview of Management Information System: Definition and Characteristics, Components of MIS, Frame Work understanding MIS: Robert Anthony's Hierarchy of Management Activity. Information requirements and Levels of Management, Simon's Model of decision – Making, structured Vs un-structured decisions, Formal Vs. Information systems

#### **Section-III**

Developing Information systems: Analysis and design of information systems: Implementation and evaluation, Pitfalls in MIS development.  
Functional MIS: A study of Marketing, Personnel, financial and Production MIS

## **MCA-202                      PROGRAMMING IN C++**

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### **INSTRUCTIONS FOR PAPER-SETTER**

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The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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#### **Section-I**

Evolution of OOP, OOP Paradigm, advantages of OOP, Comparison between functional programming and OOP Approach, characteristics of object oriented language – objects, classes, inheritance, reusability, user defined data types, polymorphism, overloading. Introduction to C++, Identifier and keywords, constants, C++ operators, type conversion, Variable declaration, statements, expressions, features of iostream.h and iomanip.h input and output, conditional expression loop statements, breaking control statements.

#### **Section-II**

Defining function, types of functions, storage class specifiers, recursion, pre-processor, header files and standard functions, Arrays, pointer arithmetic's, structures, pointers and structures, unions, bit fields typed, enumerations.

Classes, member functions, objects, arrays of class objects, pointers and classes, nested classes, constructors, destructors, inline member functions, static class member, friend functions, dynamic memory allocation.

#### **Section-III**

Inheritance, single inheritance, types of base classes, types of derivations, multiple inheritance, container classes, member access control

Function overloading, operator overloading, polymorphism, early binding, polymorphism with pointers, virtual functions, late binding, pure virtual functions, opening and closing of files, stream state member functions, binary file operations, structures and file operations, classes and file operations, random access file processing.

### **MCA-203 DATA COMMUNICATION & COMPUTER NETWORKS**

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#### **INSTRUCTIONS FOR PAPER-SETTER**

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The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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#### **Section-I**

Introduction to data communication, analog Vs Digital Communication, Fourier Analysis, Band Width limitation, data rate of a channel, Error detection and correction; nature of errors, parity check, CRC, hamming code, Modulation; Multiplexing: SDM, FDM, TDM, STDM.  
Introduction to computer networks and application; network hardware, network software

## **Section-II**

OSI reference model, TCP/IP model, network standardization, physical layer: circuit switching, packet switching, message switching, terminal handling, telephone system, modems, connections, transmission media.

Data link layer: design issues, elementary data link protocols-sliding window protocol, HDLC/SDLC, ALOHA, CSMA/CD, token passing, IEEE standard 802 for LAN and WAN.

## **Section-III**

Network layer: design issues, Routing algorithms: shortest path routing, flooding, distance vector routing, flow based routing, Congestion control algorithms: leaky bucket, token bucket, Internet working, the network layer in the Internet IP protocol, IP address.

Transport layer: design issues, elements of transport protocol, addressing establishing & releasing a connection, flow control & buffering, TCP/IP service model, TCP connection management.

## **MC-204**

## **PRINCIPLES OF MANAGEMENT**

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### **INSTRUCTIONS FOR PAPER-SETTER**

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The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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## **Section I**

Management: Nature and scope

Planning: - Nature, Types, Steps in planning, the process of planning, setting of objectives, strategies policies and planning premises, the process of decision making.

Organizing: nature, Process of organizing, departmentation, line and staff arrangement, organization structure and design, project and matrix organization, authority, decentralization, delegation, creating an effective span of management.

## **Section II**

Need, recruitment and selection techniques, types of interview co-ordination: Need and importance, types and techniques.

Controlling: Control process, control techniques

Directing: - Conception, motivation, communication and leadership.

### **Section III**

Introduction of the following function Areas:

Production – Production systems Production planning and control, work study

Marketing – Concept, segmentation of market, marketing mix, marketing research.

Finance – Finance functions, sources of finance for fixed assets and working capital structure

HRD – concept, different functions of HRD

## **MCA-205      INTRODUCTION TO MICROPROCESSOR**

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### **INSTRUCTIONS FOR PAPER-SETTER**

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The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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### **Section I**

Introduction to Microprocessor, its historical background and Microprocessor applications.

INTEL 8085: Microprocessor Architecture and its operations, 8085 MPU and its architecture, 8085 instruction cycle and timing diagram, Memory read and Memory Write operations, Instructions for 8085: Data movement, Arithmetic and logic; and branch control instructions., RISC v/s CISC processors.

### **Section II**

INTEL 8086: Introduction, 8086Architecture, real and Protected mode, Memory Addressing, Memory Paging, Addressing Modes. Pin diagram of 8086, clock generator (8284A)

### **Section III**

Various types of instructions: Data movement, Arithmetic and logic; and program control.

Interrupts: Introduction, 8257 Interrupt controller, basic DMA operation and 8237 DMA Controller, Arithmetic coprocessor, 80X87 Architecture

## **MCA-301      COMPUTER SYSTEM ARCHITECTURE**

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### **INSTRUCTIONS FOR PAPER-SETTER**

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The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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#### **Section I**

Logic gates, flip flops, Registers, Counters, Adder, Subtractor, MUX and DEMUX, Encoder-Decoder  
Computer organization and design: Instruction codes, op-code, computer registers, computer instructions, Timing and control, instruction cycle, memory reference instructions. CPU: Stack organization, Instruction formats and addressing modes Program control, Types of Interrupts

#### **Section II**

Control Memory, Micro programming vs Hardwired control unit, Overview of RISC/CISC, I/O and their brief description, I/O, processing, Bus interface, data transfer techniques, I/O interrupts, channels.

#### **Section III**

Memory system, storage technologies, Memory hierarchy, Memory management, Main and Auxiliary memory, Associative, Virtual and cache memory

**MCA-302**

## **DATA STRUCTURES**

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### **INSTRUCTIONS FOR PAPER-SETTER**

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The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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#### **Section I**

Basic concepts and notations, data structures and data structure operations, mathematical notation and functions, algorithmic complexity and time space trade off.

Basic data structures such as arrays, stack and queues and their applications, linked and sequential representation. Linked list, representation of linked list, multi linked structures.

#### **Section II**

Trees-definitions and basic concepts, linked tree representation, representations in contiguous storage, binary trees, binary tree traversal, searching insertion and deletion in binary trees, heap tree and heap sort algorithm, AVL trees.

### **Section III**

Graphs and their application, sequential and linked representation of graph – adjacency matrix, operations on graph, traversing a graph, Dijkstra's algorithm for shortest distance, DFS and BFS, Hashing.

Searching and sorting use of various data structures for searching and sorting, Linear and Binary search, Insertion sort, Selection sort, Merge sort, Radix sort, Bubble sort, Quick sort, Heap Sort.

**MCA-303**

## **VISUAL BASIC PROGRAMMING**

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### **INSTRUCTIONS FOR PAPER-SETTER**

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The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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### **Section - I**

Introduction to Visual Basic :The Visual Basic Program Development Process; The Visual Basic Environment; Opening a Visual Basic Project; Saving a Visual Basic Project; Running a Visual Basic Project;

Visual Basic Fundamentals : Numeric Constants; String Constants; Variables; Data Types and Data Declarations; Operators and Expressions; Hierarchy of Operations; String Expressions; Library functions , Branching and Looping Statements, Relational Operators and Logical Expressions; Logical Operators; Branching with the if-Then Block; Branching with if-Then -Else Blocks; Selection: Select-case; Looping with for-Next; Looping With Do-Loop; Looping with While-Wend

Visual Basic Control Fundamentals : Visual Basic Control Tools; Control tool Categories; Working with controls; Naming Forms and Controls; Assigning Property Values to Forms and Controls; Executing Commands(Event Procedures and Command Buttons); Display Output Data (Labels and Text Boxes);Entering Input data(Text Boxes); selecting Multiple Features(Check Boxes); selecting Exclusive Alternatives(Option Button and Frames);Assigning Properties Collectively(The With Block); Generating Error Messages(The MsgBox Function);Creating Times Events; Scrollbars;

Menus and Dialog Boxes :Building Drop-down Menus; accessing a Menu from the Keyboard; Menu Enhancements; Submenus; Pop-up Menus; Dialog Boxes; Input Box;

### **Section - II**

Executing and Debugging a New Project : Syntax Errors; Logical Errors; Setting break Points; Defining Watch Values; Stepping Through a Program; User- Induced Errors; Error Handlers;

Procedures : Modules and Procedures; Sub Procedure; Event Procedures; Function Procedures; Scope; Optional Arguments

Arrays : Array Characteristics; Array declarations; Processing Array Elements; Passing Arrays to Procedures; Dynamic Arrays; Array-Related Functions; Control Arrays;

Using Class Modules : Object Oriented Principles; Creating Class Modules; Using Class Modules Adding Properties and Events and Methods.

Using COM Components : Introduction to ActiveX Components and Component Object Model; Benefits of COM; Clients and Servers; Types of ActiveX Components Available in Visual Basic; Creating user defines ActiveX Components; Managing Components; The Visual Component Manager; Registering and UnRegistering Components.

### **Section - III**

ActiveX Controls : Creating an ActiveX Control; Benefits of ActiveX Control; Adding Properties; Methods and Events to the Control; Managing and Distribution of the Control; Built-in Active X Controls.

ActiveX EXE and ActiveX DLL : Introduction to ActiveX DLL and EXE; Creating ActiveX EXE Component; Creating ActiveX DLL Component

Data Access using ADO : Data Access Technology with VB ; The ActiveX Data Object Model; Advantages of ADO and OLEDB; Connecting to a Data Source; Retrieving from a Data Source; Sorting and Searching Data; Updating Data; Creating Dynamic Record Sets; Using Cursors; Cursor Types; Locking; Accessing ADO Data Control.

Data Environment and Data Report : Introduction; Data Environment Designers; Working with Data Reports; Cut different types of Data Reports.

## **MCA-304 RELATION DATA BASE MANAGEMENT SYSTEM-I**

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### **INSTRUCTIONS FOR PAPER-SETTER**

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The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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### **SECTION-I**

Overview of DBMS, Basic DBMS terminology, data independence. Architecture of a DBMS, Distributed databases, structure of distributed databases, design of distributed databases.

Introduction to data models: entity relationship model, hierarchical model: from network to hierarchical, relational model, object oriented database, object relational database, comparison of OOD & ORD, comparison of network, hierarchical and relational models.

### **SECTION-II**

Relational model: storage organizations for relations, relational algebra, relational calculus, functional dependencies, multivalued dependencies, and normalization.

### **SECTION-III**

Relational query language: SQL, database integrity, security, concurrency, recovery, client/server architecture, and technical introduction to oracle.

## **MCA-305      COMPUTER BASED OPTIMISATION METHODS**

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### **INSTRUCTIONS FOR PAPER-SETTER**

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### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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**Use of non-programmable scientific calculator is allowed**

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### **SECTION-I**

Origin & development of O.R., Nature & Characteristic features of O.R., Models & Modeling in operation research. methodology of O.R., general methods for solving O.R. & decision making, application, use & limitations of O.R.

Linear Programming formulation, graphical & simplex method, duality in L.P.

### **SECTION-II**

Transportation Problems: Loops, Test For Optimality, Degeneracy In Transportation Problems. Unbalanced Transportation Problems. Transshipment Problems, Assignment & Routing Problems, Traveling Salesman Problem.

### **SECTION-III**

Probability & Uncertainty, Sample Space & Probability, Algebra Of Events, Conditional Probability. Decision Making: Decision Making, Environment, Decision Under Uncertainty, Decision Under Risk, Decision Tree Analysis. Revised Simplex Method, Integer Programming, Branch & Bound Method, Dynamic Programming.

## **MCA-401      RELATIONAL DATABASE MANAGEMENT SYSTEM-II**

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### **INSTRUCTIONS FOR PAPER-SETTER**

The question paper will consist of Two parts, A and B. Part A will have 15 short answer questions (40-60 words) of 2 marks each. Part B will have 12 long answer questions of 5 marks each.

The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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#### **SECTION-I**

Degree Of Data Abstraction, The Database Life Cycle (DBLC): Initial Study Of The Database, Database Design, Implementation And Loading, Testing And Evaluation, Operation, Maintain Ace And Evaluation.

Centralized Verses Decentralized Design, What Is A Transaction? Concurrency Control (Locking Methods, Time Stamping Method, Optimistic Method) DDBMS Distributed Database Management Systems) Advantage And Disadvantages. Homogeneous And Heterogeneous DBMS,

#### **SECTION-II**

Distributed Database Transparency Features. Level Of Data And Process Distribution: SPSD (Single–Site Processing, Single–Site Data), MPSD (Multiple–Site Processing, Single Site Data), MPMD (Multiple –Site Processing, Multiple–Site Data)

Systems, Client / Server: Architecture And Implementation Issues.

Client / Server Systems, What Is Client / Server? The Forces That Drive Client /Server

#### **SECTION-III**

(DSS) Decision Support Systems: Operational Data Vs. Decision Support Data, The DSS Database Requirements. The Data Warehouse: The Evaluation Of The Data Warehouse, Rules For Data Warehouse. Online Analytical Processing (OLAP): OLAP Architecture Relational, OLAP And Comparison, Data Mining.

**MCA-402**

### **SOFTWARE ENGINEERING**

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#### **INSTRUCTIONS FOR PAPER-SETTER**

The question paper will consist of Two parts, A and B. Part A will have 15 short answer questions (40-60 words) of 2 marks each. Part B will have 12 long answer questions of 5 marks each.

The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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#### **SECTION-I**

Software: Characteristics, Components Applications, Software Process Models: Waterfall, Spiral, Prototyping, Fourth Generation Techniques, Concepts Of Project Management, Role Of Metrics And Measurement. . S/W Project Planning: Objectives, Decomposition Techniques: S/W Sizing, Problem Based Estimation, Process Based Estimation, Cost Estimation Models: COCOMO Model, The S/W Equation,

## **SECTION-II**

System Analysis: Principles Of Structured Analysis, Requirement Analysis, DFD, Entity Relationship Diagram, Data Dictionary.

S/W Design: Objectives, Principles, Concepts, Design Mythologies: Data Design, Architecture Design, Procedural Design, Object – Oriented Concepts.

## **SECTION-III**

Testing Fundamentals: Objectives, Principles, Testability, Test Cases: White Box & black box Testing, Testing Strategies: Verification & Validation, Unit Test, Integration Testing, Validation Testing, System Testing.

**MCA –403**

**SYSTEM SOFTWARE**

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### **INSTRUCTIONS FOR PAPER-SETTER**

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The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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#### **Section I**

Introduction to software processors; elements of assembly language programming; assembly scheme; single pass and two pass assembler; general design procedure of a two pass assembler

Software Tools: Text editor and its design.

Macros and microprocessor: macro definition, macro expansion, Nested macro calls, features of macro facility, design of a macro preprocessor.

#### **Section II**

Interpreters: use of interpreter, pure and impure interpreter

Loaders: Compile and go loader, Absolute loader, Relocating loader, and direct linking loader.

Compilers: Aspects of compilation, lexical analysis, syntax analysis, memory allocation, compilation of expressions; intermediate code for expressions, compilation of control structures, Code optimization – local and global optimization. Linkers – translated linked and load time addresses, relocation and linking concepts. Design of a linker, self relocating programs.

#### **Section III**

Basic concept so f an operating system and its functions.

Memory management: contiguous, non-contiguous memory allocation, Paged allocation, Demand paged allocation, segmented paged allocation.

Processor management: Scheduler, traffic controller, race condition.

Information management: Structure and features of file systems, objectives of segmented environment

**MC-404**

**OPERATING SYSTEMS**

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**INSTRUCTIONS FOR PAPER-SETTER**

The question paper will consist of Two parts, A and B. Part A will have 15 short answer questions (40-60 words) of 2 marks each. Part B will have 12 long answer questions of 5 marks each.

The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

**INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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**Section I**

Introduction to operating system, its need and operating system services; operating system classification – single user, multi user, simple batch processing, Multiprogramming, Multitasking, parallel Systems, Distributed system, Real time system

Process Management: Process concept, Process scheduling, threads, overview of Inter process communication, CPU scheduling: Basic concepts, Scheduling Criteria, Scheduling algorithms.

**Section II**

Memory management: Logical versus Physical address space, Swapping, Partition, Paging and segmentation.

Virtual memory: Demand paging, Page replacement algorithms, Allocation algorithms, Thrashing.

File Management: File concept, access methods, and Directory structure – single level, two lever, tree structures, acrylic graph and general graph directory, file protection. Allocation methods: Contiguous, linked and index allocation, free space management.

**Section III**

Device management: Disk structure, disk scheduling, FCFS scheduling, SSTF scheduling, SCAN scheduling, C-SCAN scheduling, Selecting Disk Scheduling Algorithms

Deadlock: Deadlock characteristics, Prevention, Avoidance, Detection and Recovery, critical section, synchronization hardware, semaphores, combined approach to deadlock handling

Resource Management: Mechanism and Policy, domain of protection, access matrix.

Security: Authentication, Program Threats, System Threats, and Encryption.

**MCA-405-A****ARTIFICIAL INTELLIGENCE (ELECTIVE-I)**

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**INSTRUCTIONS FOR PAPER-SETTER**

The question paper will consist of Two parts, A and B. Part A will have 15 short answer questions (40-60 words) of 2 marks each. Part B will have 12 long answer questions of 5 marks each.

The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

**INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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## **SECTION I**

Introduction to AI: Definitions, Basic Elements of AI, AI application Areas, Introductory Concepts of AI - clausal form, Resolution, Unification, Inference Mechanisms.

AI Language PROLOG: Operators, Data Structures, Input & Output, Controlling Program Flow, Strings, and Recursion.

## **Section II**

Knowledge Based Systems: Knowledge representation, acquisition, organization & Manipulation, Basic Components & architecture of Expert systems, ES-Shells, Dealing with uncertainty.

## **Section III**

Natural language processing: syntactic processing, semantic analysis, Morphological, discourse and pragmatic processing.

## **MCA-405-B ROBOTICS ENGINEERING (ELECTIVE I)**

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### **INSTRUCTIONS FOR PAPER-SETTER**

The question paper will consist of Two parts, A and B. Part A will have 15 short answer questions (40-60 words) of 2 marks each. Part B will have 12 long answer questions of 5 marks each.

The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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Use of non-programmable scientific calculator is allowed

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### **Section I**

Introduction to robotics, Manipulators & Mobile Robots, Classification of Robots, Robot Applications. Industrial application environment and work cells. Feeders and Oriented Device. Robot Anatomy, Robot and effectors, Transmission and actuators, with special reference to servomotors.

### **Section II**

Robot arm kinematics, World, Tool, and Joint coordinates, DH transformation and Inverse Kinematics. Fundamentals of Closed loop control, PWM amplifiers, PID control, and Robotics sensors: Range, Proximity, Touch, Force and Torque Sensing, uses of sensors in Robotics.

Machine Vision: Introduction to machine Vision, The sensing and digitizing function in Machine Vision, Image processing and analysis, Training and vision system, Robotic Application, Low and High level vision.

### **Section III**

Robot programming and languages and environment: Different methods, features of various programming methods, case study, Robot Task planning: concept, different methods, robot learning, Mobile Robot: Introduction, obstacle Representatives, Motion Planning in fixed, Changing structured.

## **MCA-405-C OBJECT ORIENTED ANALYSIS AND DESIGN (ELECTIVE-I)**

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## **INSTRUCTIONS FOR PAPER-SETTER**

The question paper will consist of Two parts, A and B. Part A will have 15 short answer questions (40-60 words) of 2 marks each. Part B will have 12 long answer questions of 5 marks each.

The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

## **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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### **Section – I**

Abstract Data Types: Model of Real World, Autonomy, Generation of correct Applications, Reusability Classes, Instance Values, Methods and Messages, Creating and destroying Objects, Constraints on object and Instance Variables, Pre and Post conditions of Methods.

Inheritance: Subsets as Subtypes, Sub typing of Structured Types Contrasting in inheritance with subtyping, Implicit Subtyping verses Explicit inheritance, Subtyping and dynamic binding class inheritance. Redefining Instance variables, Hiding Instance Variables inheriting methods, Method Overriding, Invoking Superclass method, Constrained Overriding, Inheriting the Interface, Excluding Super class Methods metaclasses, Explicit Support, Implicit of hidden Metaclasses, Object Oriented Languages without Metaclasses, Prototype Systems and Delegation, Multiple inheritance.

Polymorphism, Object Identity, Object Modeling concepts, Object Oriented Design, Object Oriented Programming Languages, Object Oriented Database, Object Oriented User Interface.

### **Section – II**

Overview C + +: Linkages, How to make a Library, Functions, Macros.

Class & Objects: Data Members, Member Functions, Private and Public Members, Default Labels, Data hiding and Encapsulation, Arrays within a class, Class Function Definition and pass values.

Operator Overloading: Operator Function, User Defined Type Conversion Literal, Large Objects, Assignments and Initialization, Subscripting, Function Call, Deferencing, Increment and Decrement A string Class, Friends and Members.

Inheritance through Extending C: Concept of Inheritance, Visibility Modes, Private, Public, Protected, Single Inheritance: Privately derived, Publicly derived.

Streams, Templates and Design of Libraries: Output, Input, Formatting, Files and Streams, Design of libraries.

### **Section III**

Object Oriented Analysis & Design: Object Oriented Development, System Design, Object Design, Entity Relationship Model, Overview of Existing methodologies.

Semantic and Entity Relationship Modeling: Contrasting Design for Databases and OOA/OOD.

Overview of Existing Methodologies: Object Oriented Analysis, Object Oriented Design, Object Diagram, Dynamic Model, Functional Model.

## **MCA-501      COMPUTER GRAPHICS**

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## **INSTRUCTIONS FOR PAPER-SETTER**

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The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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#### **Section I**

Graphics Hardware: The Functional Characteristics Of The Systems Are Emphasized. Input Device: Keyboard Touch Panel, Light Pens, Graphic Tablets, Joysticks, Trackball, Data Glove, Digitizer, Image Scanner, Mouse, Voice Systems.

Hard Copy Devices: Impact And Non Impact Printers, Such As Line Printers, Dot Matrix Printers, Laser, Ink-Jet, Electrostatic, Flatbed And Drum Plotters.

Video Display Devices: Refresh Cathode-Ray Tube, Raster Scan Display, Random Scan Displays, Color CRT-Monitors, Direct View Storage Tube, Flat Panel Displays, 3-D Viewing Devices, Raster Scan Systems, Random Scan Systems, Graphic Monitors And Workstation.

#### **Section II**

Scan Conversion Algorithm Line, Circle And Ellipse, Bresenham's Algorithm, Area Filling Techniques, Character Generation.

2-Dimensional Graphics: Cartesian And Homogenous Co-Ordinate Systems, Geometrical Transformation (Translation, Scaling, Rotation, Reflection, Shearing), Two Dimensional Viewing Transformation And Clipping (Line, Polygon And Text)

#### **Section III**

3-Dimensional Graphics: Geometrical Transformation (Translation, Scaling, Rotation, Reflection, Shearing), Mathematics And Projections (Parallel And Perspective). 3-D Viewing Transformation And Clipping.

Hidden Line Surface Removal Algorithms, Z-Buffer, Scan Line, Sub Division

Shading: Modeling Light Intensities: Diffuse Reflection, Refracted Light, Half toning.

Surface Shading Methods: Constant Intensity Method, Gouraud Shading, Phong Shading.

### **MCA-502      JAVA PROGRAMMING**

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#### **INSTRUCTIONS FOR PAPER-SETTER**

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The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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#### **SECTION -I**

FUNDAMENTALS OF OBJECT-ORIENTED PROGRAMMING :- Introduction; Object-Oriented Paradigm; Basic Concepts of Object-Oriented Programming, Objects and Classes, Data abstraction and encapsulation, Inheritance, Polymorphism etc.;

**JAVA EVOLUTION :-** Java History; Java Features (Compiled and interpreted, Platform-independent and portable, Object-oriented, Robust and secure, Distributed, Simple, small and familiar, Multithreaded and interactive, High performance, Dynamic and extensible); How Java Differs from C and C++ (Java and C, Java and C++); Java and Internet, Java and World Wide Web, Web Browsers (Hot Java, Netscape Navigator, Internet Explorer); Hardware and Software Requirements; Java Support Systems, Java Environment (Java development kit, Java standard library).

**JAVA CLASSES :** Types of Classes, Scope rules, Access modifiers, Instantiating Objects of a class, Calling methods, Packages & Interfaces, The String class, Java control statements, Operators, Arrays & Vectors.

## **SECTION -II**

**PROGRAMMING IN JAVA :** Java Applications, Applets & Servlets

**JAVA APPLETS :** Life Cycle of Applet, Creating Applets, Adding Applet to HTML File; Running the Applet, Passing Parameters to an Applet, Drawing Images on the applet.

**JAVA SWING :** Introduction to Swing, Swing features, Swing Components, Working with Swing, Swing basic Containers, Buttons, User Interface Components (Buttons, TextFields, TextAreas, CheckBoxes, RadioButtons, JApplet etc.), Layouts & Layout Managers, Using Dialogs, JOptionPane class, Input Dialog Boxes, Timers & sliders, Progress Bars, Tables.

**EVENT HANDLING :** Event delegation Approach, ActionListener, AdjustmentListener, MouseListener and MouseMotionListener, WindowListener, KeyListener, Change Listener, CaretListener.

**MANAGING ERRORS AND EXCEPTIONS :-** Introduction; Types of Errors (Compile-time error, Runtime error); Exceptions; Syntax of Exception Handling Code; Multiple Catch Statements; Using finally Statement; Creating User defined Exceptions

**JAVA I/O HANDLING :** I/O File Handling(InputStream & OutputStreams, FileInputStream & FileOutputStream, Data I/P and O/P Streams, Buffered I/P and O/P Streams, File Class, Reader and Writer Streams, RandomAccessFile).

## **SECTION -III**

**MULTITHREADING :** Overview of Multithreading, The Thread control methods, Thread life cycle, Newly created threads, Main thread, Creating a Thread (Implementing Runnable Interface, Extending the Thread Class), Thread Synchronization, Writing Applets with Threads.

**SOCKET PROGRAMMING :** Introduction, TCP/IP Protocol, UDP Protocol, Ports, Using TCP/IP Sockets, Using UDP Sockets.

**JAVA DATABASE CONNECTIVITY (JDBC) :** JDBC/ODBC bridge, DriverManager Class, Java.SQL Package (Connection Interface, Statement Interface, Prepared Statement Interface, ResultSet Interface, ResultSetMetaData Interface), SQL Exception class.

**JAVA SERVLETS :** Introduction to Server Side Technologies, Servlet Life cycle, HttpServlets, GenericServlets, init(),service(), doGet(), doPost(), destroy() , Servlets & JDBC.

## **MCA 503-A INTERNET PROGRAMMING & E-COMMERCE (ELECTIVE II)**

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### **INSTRUCTIONS FOR PAPER-SETTER**

The question paper will consist of Two parts, A and B. Part A will have 15 short answer questions (40-60 words) of 2 marks each. Part B will have 12 long answer questions of 5 marks each.

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### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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### **SECTION -I**

#### **HTML (hypertext marking language)**

**INTRODUCTION TO THE INTERNET** :- Computers in Business; Networking; Internet; Electronic Mail (E-Mail); Resource Sharing; Gopher; World Wide Web; Usenet; Telnet; Bulletin Board Service; Wide Area Information Service.

**INTERNET TECHNOLOGIES** :- Modem; Internet Addressing; Physical Connections; Telephone Lines.

**INTERNET BROWSERS** :- Internet Explorer; Netscape Navigator.

**INTRODUCTION TO HTML** :- Designing a Home Page; History of HTML; HTML Generations; HTML Documents; Anchor Tag; Hyper Links.

**HEAD AND BODY SECTIONS** :- Header Section; Title; Prologue; Links; Colorful Web Page; Comment Lines.

**DESIGNING THE BODY SECTION** :- Heading Printing; Aligning the Headings; Horizontal Rule; Paragraph; Tab Setting; Images and Pictures; Embedding PNG Format Images.

**ORDERED AND UNORDERED LISTS** :- Lists; Unordered Lists; Headings in a List; Ordered Lists; Nested Lists.

**TABLE HANDLING** :- Tables; Table Creation in HTML; Width of the Table and Cells; Cells Spanning Multiple Rows/Columns; Coloring Cells; Column Specification.

**DHTML AND STYLE SHEETS** :- Defining Styles; Elements of Style; Linking a Style Sheet to an HTML Document; In-line Styles; External Style Sheets; Internal Style Sheets; Multiple Styles.

**FRAMES** :- Frameset Definition; Frame Definition; Nested Framesets.

**Forms** :- Action Attribute; Method Attribute; Enctype Attribute; Drop Down List.

#### **VBScript**

Working with Variables :- What is a Variable?; Data Types; Integer; Floating-Point Numbers (String, Date, Boolean, Currency, Object, What Are Variant Variables?. What Does It Mean to Declare a Variable?, Why Use Explicit Declarations in VBScript?, How Do You Name a Variable?, Constants, Arrays, How Do You Determine Your Variable's Type?); VB Script Operators (Assignment Operators, Mathematical Operators, Subtraction, Multiplication, Division, Integer Division, Modulus, Exponentiation, Negation Concatenation, Comparison Operators, Logical Operators).

VBScript Control Structures :- What Is a Control Structures; Types of Controls (Conditional Logic, Looping Logic, Branching Logic); Control Structure Examples (Conditional Logic Controls, Looping Logic Controls, Branching Logic Controls).

VBScript's Built-In Functions :- Typecasting Variables (What is Typecasting and Why Should I Typecast?, How to Typecast Your Variables); Formatting Functions; Math Functions; Date Functions (Working with Date Values, Breaking Down Date Values); String Functions; Other Functions.

## **SECTION -II**

### **ASP (Active Server Pages)**

Introduction to Active Server Pages :- What are Active Server Pages ? (Understanding the Client Server Model, How ASP differs from Client-Side Scripting Technologies); Running ASP Pages (Setting Up Personal Web Server, Setting Up Internet Information Server, Using ASP without IIS or PWS); Creating Your First ASP Pages.

Starting ASP :- Understanding ASP Scripts (What Does Response.Write Do ?, The <%=Shortcut, What's with the <%@ LANGUAGE=VBSCRIPT%>?, Writing ASP Code Without Using <%...%>, Comments, Line Continuation Character); What Your ASP Script Returned to the Browser; The ASP Process.

Working with Objects :- What are objects?; The Building Blocks of Objects (Properties, Methods, Instances of Objects); Built-in ASP Objects (Response Objects, Request Object, Application Object, Session Object, Server Object,ObjectContext Object, ASPError Object); Collections; Working with Objects; Events.

Response Object :- What is the Response Object; Dissecting the Response Object (Sending HTML to the Browser, Buffering ASP Pages, Sending the User to Another Page, Cookies, Caching Your ASP Pages).

Communicating with the User :- Receiving Information from the User (What are Forms?, Creating Forms, Designing Forms, Submitting Forms, Reading Form Values from an ASP Page); Using Advanced Form Techniques (Revisiting the ACTION Property, Client-Side Form Validation); Using the Different Form Fields (Text Boxes, List Boxes, Check Boxes, Radio Buttons, Choosing your Checkboxes and Radio Buttons).

Collecting the Form Information :- Retrieving the Results of a Form (Using the Request Object); Using the Querystring to Send Information,

Request Object :- Accessing the HTTP Headers (Useful HTTP Headers, Reading the HTTP Headers with Request. ServerVariables); Accessing the Environment Variables (Useful Environment Variables, Reading the Environment Variables Using Request. ServerVariables); Using Cookies (What are Cookies?, How to Read Cookies Using the Request Object, How to Write Cookies Using the Response Object, Advantages and Disadvantages of Using Cookies.

Maintaining Persistent Information :- It's a Fact: The Web Is Stateless (Ways to Maintain State); The Session Object (Using Session Variables, Pitfalls of Session Variables, Session Variables Without Cookies); The Application Object (Using Application Variables, Pitfalls of Application Variables); Initializing Application and Session Variables (Creating a Global. asa File).

Debugging ASP scripts and Handling Errors :- Debugging Your ASP Scripts (Debugging Fatal Bugs, Debugging Nonfatal Bugs); Handling ASP Errors Gracefully (Using the Err Object, Using the ASPError Object); Handling Non-ASP Errors Gracefully.

### **SECTION III**

Using Databases :- What Are Relational Databases ?(Common Relational Databases); Why Use Databases ?; Working with Databases Using ASP.

Reading from a Database :- Databases and ASP (Communicating with a Database Using ActiveX Data Objects (ADO)); Connecting to a Database (The Connection Object, Using a System DSN, Using a DSN-less Connection, Opening the Connection, Closing the Connection, Properties of the Connection); Reading Data from a Database (The Recordset Object, Using adovbs.inc, Reading and Displaying the Contents of a Database Table).

Inserting, Updating, and Deleting Database Records :- Inserting Records (Lock Types, AddNew and Update); Updating Records; Deleting Records.

Recordset Object :- Enhancing Information Retrieval (Using the Fields Collection); Understanding the CursorType and CursorLocation Properties; Sorting Recordsets; Filtering Recordsets (Filtering Recordsets Bases on User Input).

Using SQL Statements to Query Data :- What is SQL ? (Executing SQL Statements Using ASP and ADO); The SELECT SQL Statement (Using the WHERE Clause, Iterating Through Recordsets Generated by SQL Statements); Allowing Users to Query Data.

E-Commerce : Introduction, Definition of E-Commerce, History of E-Commerce, Conceptual & Architectural framework, Types of E-Commerce, Consumer-to-Business e-commerce, Business-to-business e-commerce, Virtual Private networks, Extranets, Electronic Data Interchange (EDI), Electronic Payment Systems, Security Issues.

### **MCA-503-B COMPILER DESIGN (Elective II)**

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#### **INSTRUCTIONS FOR PAPER-SETTER**

The question paper will consist of Two parts, A and B. Part A will have 15 short answer questions (40-60 words) of 2 marks each. Part B will have 12 long answer questions of 5 marks each.

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#### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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Use of non-programmable scientific calculator is allowed

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### **SECTION-I**

The Structure Of A Compiler, Phase Of A Compiler, Compiler Tools, Finite Automata, Regular Expressions, Conversion From Regular Expression To Finite Automata.

### **SECTION-II**

Syntax Analysis, Context Free Grammars, Top Down & Bottom Up Parsing Techniques. Construction of LR, SLR&LALR Parsers.Syntax Directed Translation & Their Implementation. Intermediate Code, Postfix Translation, Phase Trees, Syntax Trees.

### **SECTION-III**

Run Time Environment: Storage Organization, Storage Allocation Strategies, Parameter Passing, Symbol Tables, Code Generation, Problem In Code Generation, A Simple Code Generation & Code Optimization: Principle Sources, Loop Optimization, DAG Representation

## **MCA-503-C VISUAL BASIC.NET (Elective- II)**

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### **INSTRUCTIONS FOR PAPER-SETTER**

The question paper will consist of Two parts, A and B. Part A will have 15 short answer questions (40-60 words) of 2 marks each. Part B will have 12 long answer questions of 5 marks each.

The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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### **SECTION -I**

INTRODUCTION TO .NET : Introduction to .NET, The origin of .NET; The .Net Framework: Key design goals; Common Language runtime; Simpler Faster development; Tool Support; Scalability; metadata; Namespaces; Deployment and Execution;

.NET FRAMEWORK BASE CLASSES : Inside the .NET Class Framework; System Namespaces; the System Types; System.object class; System.Exception Class; System.Collections;

USER AND PROGRAM INTERFACES : User interfaces; Windows forms; Web forms; Console Applications; Program interfaces Web services.XML as the .NET "meta language".

INTRODUCTION TO CLR : Common Runtime and Type System; The Anatomy of .NET Applications: Assembly; Module; Type; Common type System; Custom types

Introduction to Visual Basic.Net : Visual Basic.NET Defined; Visual Basic.NET as a programming language; Visual Basic.NET used for writing Windows Applications; Event driven Programming; VB.NET as a object oriented programming language.

### **SECTION -II**

Understanding the development Environment : The .NET Framework; The Visual Studio Start Page;Creating and Opening Projects;Understanding Solutions; Visual Studio.Net work area ; Understanding Window Behaviour; Designing Visual Componenets; Using the task list; Customising the IDE

Event procedures , properties and controls : Event Procedure-Using the IDE to create an Event procedure; Writing code inside the Event Procedure;Viewing and changing properties; Adding controls to the form;The Toolbox ; Changing the Control's size , location using Form Designer

Visual Basic Programming Fundamentals : Declaring and naming variables; Naming Conventions; Changes to the Dim statement; Understanding Data types; Working with numeric data types; Data type Conversion;  
Assignment and Arithmetic Operators :Division operators; Operator precedence;Comparison and Logical operators;  
Assignment Operator; The Location of the Assignment Statement; The Left

### **SECTION -III**

Controlling the flow of your program : Understanding the if statements; The single if statements; Using multiple Commands with an If Block; Working with false Condition; Working with Multiple if statements; Using Boolean logic in If condition; Using Select case; Working with loops; for loops; Do loops; Arrays: Declaring an array; Useful array functions; Resizing an array;

Managing program tasks with procedures : Types of procedures; Working with sub procedure; Executing a procedure; passing data to a procedure with arguments; Working with function procedures; Understanding scope and Accessibility;

User Interface : Message boxes; Dialog boxes; Menus and Toolbars; Creating a menu;Context Menu; Adding Toolbars and buttons;Defining an icon for a toolbar button;Adding Functionality to the Toolbar;

Error Handling : System Exception Handling and debugging; Structured Exception Handling; The try .. Catch ... Finally statement

## **MCA-504-A SYSTEM SIMULATION & MODELLING (Elective III)**

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### **INSTRUCTIONS FOR PAPER-SETTER**

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The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.  
Use of non-programmable scientific calculator is allowed

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### **SECTION-I**

System Models: Concept Environment, Continuous and discrete systems, Types of Models; Subsystems, System Analysis, System design; System simulation: Technique, method types.

### **SECTION-II**

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Probability concepts in simulation: Stochastic variables and probability functions; Discrete system simulation; fixed time step v/s event-to-event model, Generation of **Random numbers, Monte Carlo Computation V/S Stochastic simulation.**

### **SECTION-III**

Simulation of Queuing system, Simulation of single and two server queue, Network Model of a project. Case study: Simulation of an autopilot, Telephone system & Inventory system. ,Introduction to GPSS.

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## **MCA-504-B ADVANCED MICRO PROCESSORS SYSTEMS (Elective III)**

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### **INSTRUCTIONS FOR PAPER-SETTER**

The question paper will consist of Two parts, A and B. Part A will have 15 short answer questions (40-60 words) of 2 marks each. Part B will have 12 long answer questions of 5 marks each.

The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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### **SECTION -I**

#### **8086/8088 Hardware specifications**

Introduction; Pin out and Pin functions; Clock Generator(8284a); Bus buffering and Latching; Bus timing; READY and Wait State; Minimum mode vs Maximum Mode;

#### **Memory Interface**

Memory Devices; Address Decoding; 8088; 80188(8-Bit) Memory Interface; 8086; 80816; 80286; 80386x(16-bit) interface; 80486 (32-bit) Memory Interface; Pentium and Pentium Pro Memory Interface; Dynamic Ram

### **SECTION -II**

#### **Basic I/O Interface**

Introduction to I/O Interface ; port address decoding; Programmable peripheral Interface; Programmable Keyboard; Programmable Communication Interface; ADC and DAC Converters.

#### **Interrupts**

Basic Interrupt Processing; Hardware Interrupts; Expanding Interrupt Structure; Programmable Interrupt Controller;

#### **Direct Memory Access**

Basic DMA Operations; The 8237 DMA Controller; Shared Bus Operations; Disk Memory Systems; Video Displays;

## **SECTION -III**

### **The 80186,80188,80286 Microprocessors**

80186/80188 Architecture; Enhancements; Introduction to 80286

### **The 80386 and 80486 Microprocessors**

Introduction to 80386 Microprocessors; special 80386 Registers;80386 Memory Management; Moving to protected Mode; virtual Mode; Memory Paging Mechanism; Introduction to 80486 Microprocessors;

### **The Pentium and Pentium Pro MicroProcessors**

Introduction to Pentium MicroProcessors; Special Pentium Registers; Pentium Memory Management ; New Pentium Instructions; Introduction to Pentium Pro Microprocessors; Special Pentium Pro Features.

## **MCA-504-C LINUX OPERATING SYSTEM (Elective –III)**

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### **INSTRUCTIONS FOR PAPER-SETTER**

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The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

### **INSTRUCTION FOR CANDIDATES**

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

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## **SECTION -I**

**INSTALLING LINUX AS A SERVER :** Linux and Linux Distributions ;Major differences between Windows 2000 and Linux; Single Users vs Multiusers vs Network Users; Separation of the GUI and the Kernel; Domains; Active Directory

**INSTALLING LINUX IN A SERVER CONFIGURATION :** Before Installation; Hardware; Server Design ; Dual-Booting Issues; Methods of Installation; Installing Red Hat Linux; Creating a Boot Disk; Starting the Installation; Welcome of Red Hat Linux

**GNOME AND KDE :** The History of X Windows; The Downside; Enter KDE and GNOME; About KDE ; Licensing issues; Starting X Windows and KDE; KDE Basics; The KDE Control Center; About GNOME ; Starting X Windows and GNOME; GNOME Basics; The GNOME Configuration Tool.

## **SECTION -II**

**INSTALLING SOFTWARE :** The Red Hat Package Manager; Installing a New Package; Querying a Package; Uninstalling a Package; gnoRPM; Compiling Software; Getting and Unpacking the Package; Looking for Documentation ;Configuring the Package; Compiling Your Package; Installing the Package

**MANAGING USERS:** Home Directories ;Passwords; Shells; Startup Scripts; Mail; User Databases; The / etc /passwd File; The / etc / shadow File; The / etc /group File; User Management Tools; Command-Line User Management; User LinuxConf to Manipulate Users and Groups; SetUID and SetGID Programs

THE COMMAND LINE : An Introduction to BASH; Job Control; Environment Variables; Pipes; Redirection; Command-Line Shortcuts; Documentation Tools; The man Command; the text info System; File Listings; Owner ships and permissions; Listing Files; File and Directory Types; Change Ownership ;Change Group; Change Mode ; File Management and Manipulstion; Process Manipulation; Miscellaneous Tools;

### **SECTION -III**

BOOTING AND SHUTTING DOWN : LILO ;Configuring LILO; Additional LILO options; Adding a New Kernel to Boot ; Running LILO;The Steps of Booting; Enabling and disabling Services

FILE SYSTEMS : The Make up File Systems ; Managing File Systems; Adding and Partitioning a Disk; Network File Systems; Quota Management;

CORE SYSTEM SERVICES : The init Service ; The inetd and xinetd Processess;The syslogd Daemon;The cron Program

PRINTING : The Basic of lpd; Installing LPRng; Configuring /etc/printcap; The /ETC/lpd.perms File; Clients of lpd

## **MCA-601 PROJECT**

### **GUIDELINES**

Project in a Computer Organization/University computer Center/Dept. of Computer Science, etc, as decided by the Head of the Department.

Project: 400 Marks

Internal Assessment : 100 Marks

External Assessment : 300 Marks

The evaluation committee will distribute these marks for seminar/viva/voce/Project report and for any other activity, which the committee thinks to be proper.

Joint project will be allowed and joint project report will be also being accepted. In case of Joint Project the team should not consist of more than 3 members. Individual project will be recognized and the student should highlight their contribution in a joint project report.

Committee for evaluation of project report / work:

- External examiner.
- Centre Head
- Internal guide (if any) faculty

### **Format Of Project Report**

- Title Cover
- Certificate from organization about your stay (Project Duration) at that place and about submission of work done under external guide at the place of training.
- Certificate from your guide about the submission of work done under his/her guidance, Internal Supervisor.
- Table of Contents, abstract of the project (abstract of actual workdone).
- A brief overview of the organization (regarding function area, location, division in which you are working, turnover)

- Profile of problems assigned.
- Study of existing system, if any.
- System requirements
  - ○ Product Definition
    - Problem Statement
    - Function to be Provided
    - Processing Environment: H/W, S/W.
    - Solution Strategy
    - Acceptance Criteria
  - ○ Feasibility Analysis
  - ○ Project Plan
    - Team Structure
    - Development Schedule
    - Programming Languages And Development Tools
- System Requirement Specifications
  - ○ Developing / Operating / Maintenance Environments
  - ○ External Interface And Data Flows
    - User display and report format, user command summary
    - High level DFD and data dictionary
  - ○ Functional and performance specifications
- Design
  - ○ Detailed DFD's and structure diagrams
  - ○ Data structures, database and file specifications
  - ○ Pseudo Code
- Test Plan
  - ○ Functional, Performance, Stress tests etc.
- Implementation / Conversion Plan
- Project Legacy
  - ○ Current status of project
  - ○ Remaining areas of concern
  - ○ Technical and managerial lessons learnt
  - ○ Future recommendations
- Bibliography
- Source Code (if available)

**Note: - The above is meant to serve as a guideline for preparation of the project report. The students may add to, modify or omit some of the above-mentioned points depending upon their relevance to the project and with the consultation of the project guide for the same.**