



Punjab Technical University

Jalandhar

Syllabus Scheme

(1st & 2nd Semester)

For

Post Graduate Diploma in
Computer Applications

Implemented

From Aug. 2005 and onward

PUNJAB TECHNICAL UNIVERSITY, JALANDHAR

SCHEME OF TEACHING FOR PGDCA

SEMESTER-I

COURSE NO.	SUBJECT	L	P	TOTAL	MARKS		TOTAL MARKS
					INT.	EXT.	
MSIT-101	Computer Fundamentals	24	24	48	25	75	100
MSIT-102	Programming in C	24	24	48	25	75	100
MSIT-103	C++ & data structures	24	24	48	25	75	100
MSIT-104	Web Technologies	24	24	48	25	75	100
MSIT-105	Operating Systems	48	0	48	25	75	100
MSIT-106	Communication & Soft Skills	30	0	30	50	-	50
MSIT-107	Software Lab-I (C & C++)	-	-	-	25	75	100
TOTAL		174	96	270	200	450	650

SEMESTER-II

COURSE NO.	SUBJECT	L	P	TOTAL	MARKS		TOTAL MARKS
					INT.	EXT.	
MSIT-201	Computer Networks	48	0	48	25	75	100
MSIT-202	RDBMS	36	36	72	25	75	100
MSIT-203	Software Engineering & Project Management	48	0	48	25	75	100
MSIT-204	Visual Basic Programming	36	36	72	25	75	100
MSIT-205	Project (RDBMS & VB) & Viva	-	-	-	25	75	100
TOTAL		168	72	240	125	375	500

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.

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 (80-120 words) 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.

Section-I

Introduction : Characteristics of Computers; The Evolution of Computers; The Computer Generations (First Generation(1942-1955), Second Generation (1955 – 1964), Third Generation (1964 – 1975), Fourth Generation (1975 – 1989), Fifth Generation (1989 – Present)).

Basic Computer Organization : Input Unit; Output Unit; Storage Unit; Arithmetic Logic Unit; Control Unit; Central Processing Unit; The System Concept.

Number Systems: Non-Positional Number Systems; Positional Number Systems (Binary Number System, Octal Number System, Hexadecimal Number System); Converting One number System to Another (Converting to Decimal from Another Base, Converting from Decimal to Another Base (Division-Remainder Technique), Converting from a Base Other Than 10 to a Base Other Than 10, Shortcut Method for Binary to Octal Conversion, Shortcut Method for Octal to Binary Conversion, Shortcut Method for Binary to Hexadecimal Conversion, Shortcut Method for Hexadecimal to Binary Conversion); Fractional Numbers.

Processor and Memory : The Central Processing Unit (CPU) (The Control Unit, The Arithmetic Logic Unit (ALU), Instruction Set, Registers, Processor Speed, Types of Processors); The Main Memory (Storage Evaluation Criteria, Main Memory Organization, Main Memory Capacity, RAM, ROM, PROM and EPROM, Cache Memory).

Secondary Storage Devices : Sequential and Direct-Access Devices; Magnetic Tape (Basic Principles of Operation, Types of Magnetic Tapes, Advantages and Limitations of Magnetic Tapes, Uses of Magnetic Disks); Optical Disk (Basic Principles of Operation, Types of Optical Disks, Advantages and Limitations of Optical Disks, Uses of Optical

Disks); Mass Storage Devices (Disk Array, Automated Tape Library, CD-ROM Jukebox); Storage Hierarchy.

Input-Output Devices : Input Devices (Keyboard Devices, Point-and-Draw Devices, Data Scanning Devices, Digitizer, Electronic Card Reader, Voice Recognition Devices, Vision-Input System); Output Devices (Monitors, Printers, Plotters, Screen Image Projector, Voice Response Systems).

Section-II

Computer Languages : Analogy with Natural Languages; Machine Language (Advantages and Limitations of Machine Language); Assembly Language (Assembler, Advantages of Assembly Language over Machine Language, Limitations of Assembly Language, Assembly Languages with Macro Instructions); High-Level Language (Compiler, Linker, Interpreter, Advantages and Limitations of High-Level Languages); Object-Oriented Programming Languages; Some High-Level Languages (FORTRAN, COBOL, BASIC, Pascal); Some More High-Level Languages (C and C++, Java, RPG, LISP, SNOBOL); Characteristics of a Good Programming Language; Selecting a Language for Coding an Application; Subprogram.

Application Software Packages : Word-Processing Package (What it is?, Commonly Supported Features); Spreadsheet Package (What it is?, Commonly Supported Features); Graphics Package (What it is?, Commonly Supported Features); Personal Assistance Package (What it is?, Commonly Supported Features).

The Internet : Definition (What it is?); Brief History; It's Basic Services (Electronic Mail, File Transfer Protocol, Telnet, Usenet News, The World Wide Web); WWW Browsers; Uses of the Internet.

Classification of Computers : Notebook Computers; Personal Computers (PCs); Workstations; Mainframe Systems; Supercomputers; Clients and Servers.

Section-III

MICROSOFT OFFICE 2000

Microsoft Office 2000 : Introduction; Microsoft Word 2000; Microsoft Excel 2000; Microsoft Access 2000; Microsoft Powerpoint 2000, Microsoft Outlook 2000; Internet Explorer 5.0; Microsoft FrontPage 2000; Microsoft Publisher 2000; Microsoft PhotoDraw 2000; Microsoft Office Bar; Using the Mouse (To Click, To double-click, To select, To drag, To scroll, To choose from a menu, To move a window, To resize a window, To minimize a window, To restore a minimized window, To maximize a window, To switch windows, To close a window, Remember); Microsoft Office 2000 and Web (Microsoft Word 2000, Microsoft Excel 2000, Microsoft Access 2000, Microsoft Powerpoint 2000, Microsoft Outlook 2000, Microsoft FrontPage 2000); Common Keyboard Commands.

Creating Your Document in Word 2000 : Introduction; Saving the file; Formatting the text, Alignment of Text; Applying Fonts; Spell Checking; Consulting Thesaurus; Assign Character Styles (Assign a Character Style, Create a character style); Borders and

Shading (Apply Borders and Shading); Closing of the File; Save as option; Open File (From File menu, From Open Icon); Printing Your Document.

Proofing Your Document in Word 2000 : Introduction; Editing Tools; AutoCorrect (Add AutoCorrect Entries Without Formatting, Add New AutoCorrect Entries with Formatting); Auto Text (Creating an AutoText Entry, AutoComplete Option); AutoFormat (AutoFormat as You Type, AutoFormat on Command, AutoFormatting Text); Find and Replace; Find; Replace Text; Page Numbering; Header and Footer (Adding a Header or Footer in Your Document); Footnotes and Endnotes (Add a Footnote or Endnote).

Creating a Worksheet in Excel 2000 : Introduction; Copying Formula.

Advanced Techniques of Excel 2000 : Introduction; Auditing a Workbook (To Trace the Precedents for a Formula); Comment Inserting (To Insert a Comment); Formulas That Make Decisions (How the If function works); Headers and Footers; Merging Workbooks (To merge workbooks); Outlines (Outline a Worksheet Automatically, Clear Entire Outline, Show or Hide Outline Symbols, Group Rows or Columns in an Outline, Ungroup Rows or Columns in an Outline, Remove Group from Outline, Set Outline Options); Printing Column and Row Labels on Every Page; Protecting a Workbook (To unlock cells so that others can edit the cell contents, To protect a workbook, To share a workbook); Ranges, Naming (To name a range); References (Absolute references, Mixed references); Seeking Goals (To seek a goal); Sheets Naming (To Name a Sheet); Working with Workbooks (Copying Entries Between Workbooks, Moving Sheets Between Workbooks, Deleting Sheets).

Creating Presentation Using AutoContent Wizard, Creating New Presentation, Creating Presentation from Template, Changing views.

MSIT -102 PROGRAMMING IN C

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.

Section-I

Origin & Introduction to C : About C, Evolution of C, Programming languages, Structure of a C program, Compiling a C program, Compiler & interpreters, Pseudocodes, Simple C program, Character set in C, Keywords in C, Hierarchy of operators, Basic data types, Qualifiers used with basic data types, Variables in C, Type declaration, Output function, Input function and format specifiers, arithmetic operators, Unary operators, Relational and logical operators, Constraints in C.

Decision Making, Branching & looping: Why control statements, The if statement, if else statement, for statement, while loop, do while statements, break statements, continue statements, switch statement, goto statement, ternary operators.

Section-II

Arrays & String Handling : Introduction to arrays, advantages of arrays, types of arrays, array declaration, array initialization, accessing data from array, array inside the memory, multidimensional arrays, Character arrays, Array overflow, String Variables, Reading & writing strings, string handling functions.

User Defined Functions : Introduction to functions, advantages of functions, declaring a function, calling a function, variables, passing arguments to a function, nested functions, passing array to functions, recursion in functions, Call by value and Call by reference.

Section-III

Pointers : Introduction to pointers, pointer variations, dynamic memory allocation, pointers and arrays, pointers to pointers, functions returning pointers, 2 dimensional arrays and pointers, array of pointers.

Structures & Unions : Structure definition, Structure initialization, arrays of structures, arrays within structures, structures & functions, Unions.

File Management in C : Defining & opening a file, closing a file, I/O operations on file, error handling during I/O operations, Random Access Files.

MSIT -103 C++ & DATA STRUCTURES

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.

Section-I

DATA TYPES, OPERATORS AND STATEMENTS : Identifiers and Keywords, Constants (String constants, Numeric constants, Character constants), C++ Operators (Arithmetic operators, Assignment operators, Comparison and logical operators, Bitwise logical operator, Special operators), Type Conversion.

WRITING A PROGRAM IN C++ : Declaration of Variables, Statements, Simple C++ Programs, Features of iostream.h, Keyboard and screen I/O, Manipulator Functions, Predefined manipulators, Input and Output (I/O) Stream Flags.

CONTROL STATEMENTS : Conditional Expressions (if statement, if - else statement), switch Statement, Loop Statements(for loop, while loop, do-while loop), Breaking Control Statements(break statement, continue statement, goto statement).

FUNCTIONS AND PROGRAM STRUCTURES : Defining a Function, return Statement, Types of Functions, Actual and Formal Arguments, Local and Global Variables, *Default Arguments*, Multifunction Program, Storage Class Specifiers (Automatic variable, Register variable, Static variable, External variable), *Recursive Function*, *Preprocessors* (Simple macro definitions, Macro with parameters, Other Processing Techniques, Conditional Compilation), Header Files, Standard Functions.

ARRAYS : Array Notation, Array Declaration, Array Initialization, Processing with Array, Arrays and Functions, Multidimensional Arrays, Character Array.

POINTERS : Pointer Declaration (Pointer operator, Address operator, Pointer expressions), Pointer Arithmetic, Pointers and Functions (Call by value, Call by reference, Pointers to functions, Passing a function to another function), Pointers and Arrays, Pointer and one dimensional array, Pointer and multidimensional array, Pointers and Strings, Array of Pointers, Pointers to Pointers.

Section-II

CLASSES AND OBJECTS : Structures and Classes, Declaration of Class, Member Functions, Defining the Object of a Class, Accessing a Member of Class, Array of Class Objects, Pointers and Classes, Unions and Classes, Classes within Classes {Nested Class}, Constructors (Copy constructors, Default constructors), Destructors, Inline Member Functions, Static Class Members (Static data member, Static member functions), Friend Functions, Dynamic Memory Allocations, this Pointer.

INHERITANCE : Single Inheritance, Types of Base Classes (Direct base classes, Indirect base classes), Types of Derivation (Public inheritance, Private inheritance, Protected inheritance), Ambiguity in Single Inheritance, Array of Class Objects and Single Inheritance, Multiple Inheritance (Array of class objects and multiple inheritance, Ambiguity in the multiple inheritance), Container Classes, Member Access Control (Accessing the public data, Accessing the private data, Accessing the protected data, Accessing private member by friend class).

OVERLOADING : Function Overloading (Function overloading with various data types, Function overloading with arguments, Scoping rules for function overloading, Special features of function Overloading), Operator Overloading, Overloading assignment

operator, Overloading of Binary Operators, Overloading arithmetic operators, Overloading of comparison Operators, Overloading of Unary Operators).

POLYMORPHISM : Polymorphism, Early Binding, Polymorphism with Pointers, Virtual Functions, *Late Binding*, Pure Virtual Functions, Abstract Base Classes, Constructors under Inheritance, Destructors under Inheritance, Virtual Destructors, Virtual Base class.

Section-III

DATA FILE OPERATIONS : Opening & closing of files (Opening a file, Closing a File), Stream State Member functions, reading/Writing a character from a file, Binary file operations, Classes & file operations, Array of class objects & file operations, Nested classes & file operations, Random Access File processing.

IMPLEMENTING DATA STRUCTURES : Linked Lists (Introduction, Traversing, Insertion, Updation & Deletion), Stacks (Introduction, Push, Pop), Queues (Introduction, Addition, deletion), Introduction to Trees, Binary Trees (Introduction, Traversal, Deletion, Addition).

MSIT -104 WEB TECHNOLOGIES

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.

Section-I

INTRODUCTION TO HTML : Information Files Creation; Web Server; Web Client/Browser (Understanding how a Browser communicates with a Web Server); Hyper Text Markup Language (HTML) (HTML Tags, Paired Tags); Commonly used HTML Commands (The structure of an HTML program, Document Head, Document Body); Titles and Footers; Text Formatting (Paragraph Breaks, Line Breaks); Emphasizing Material in a Web Page (Heading Styles, Drawing Lines); Text Styles (Bold, Italics, Underline); Other Text Effects (Centering (Text, Images etc.); Spacing (Indenting Text).

Lists :Types of Lists (Unordered List (Bullets), Ordered Lists (Numbering), Definition Lists).

Adding Graphics to HTML Documents :Using the Border attribute; Using the Width and Height Attribute; Using the Align Attribute; Using the ALT Attribute.

Tables : Introduction (Header, Data rows, The Caption Tag); Using the Width and Border Attribute; Using the Cellpadding Attribute; Using the Cellspacing Attribute; Using the BGCOLOR Attribute; Using the COLSPAN and ROWSPAN Attributes.

Linking Documents :Links (External Document References, Internal Document References); Images as Hyperlinks (Image Maps).

Frames : Introduction to Frames (The <FRAMESET> tag, The <FRAME> tag, Targeting Named Frames.

Section-II

INTRODUCTION TO JAVASCRIPT : JavaScript in Web Pages (Netscape and JavaScript, Database Connectivity, Client side JavaScript, Capturing User Input); The Advantages of JavaScript (An Interpreted Language, Embedded within HTML, Minimal Syntax - Easy to Learn, Quick Development, Designed for Simple, Small Programs, Performance, Procedural Capabilities, Designed for Programming User Events, Easy Debugging and Testing, Platform Independence/Architecture Neutral); Writing JavaScript into HTML; Building Up JavaScript Syntax; Basic Programming Techniques (Data Types and Literal, Type Casting, Creating Variables, Incorporating variables in a Script, The JavaScript Array, The Elements of an Array, The JavaScript Array and its length Property); Operators and Expressions in JavaScript (Arithmetic Operators, Logical Operators, Comparison Operators, String Operators, Assignment Operators, The Conditional Expression Ternary Operator, Special Operators); JavaScript Programming Constructs; Conditional Checking (If - then - else, Immediate If (Conditional expression); Super Controlled - Endless Loops (For Loop); Functions in JavaScript (Built-in Functions, User Defined functions, Declaring functions, Place of Declaration, Passing Parameters, Variable Scope, Return Values, Recursive Functions); Placing text in a Browser; Dialog Boxes (The Alert dialog box, The Prompt dialog box, The Confirm dialog box).

Section-III

The JavaScript Document Object Model : Introduction (Instance, Hierarchy); The JavaScript Assisted Style Sheets DOM (JSSS DOM); Understanding Objects in HTML (Properties of HTML objects, Methods of HTML objects); Browser Objects (The Web Page HTML Object Hierarchy, Access to Elements of a Web Page, How a Web Page Element is Manipulated); Handling (WEB PAGE) Events Using JavaScript (Named JavaScript Event handlers).

Forms Used by a Web Site : The Form Object; The Form Object's Methods (The Text Element, The Password Element, The Button Element, The Submit (Button) Element, The Reset (Button) Element, The Checkbox Element, The Radio Element, The TextArea Element, The Select and Option Element, The Multi Choice Select Lists Element); Other

Built-In Objects in JavaScript (The String Object, The Math Object, The Date Object); User Defined Objects (Creating a User Defined Object, Instances, Objects within Objects).

Cookies : What are Cookies; Setting a Cookie.

MSIT -105 OPERATING SYSTEMS

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

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Section-I

History of Operating Systems : Zeroeth Generation : Mechanical Parts; First Generation (1945-1955): Vacuum Tubes; Second Generation (1955 – 1965): Transistors; Third Generation (1965 – 1980) : Integrated Circuits; Fourth Generation (1980 – 1990) : Large Scale Integration.

Computer Architecture : Introduction; 4GL Program; 3GL (HLL) Program; 2GL (Assembly) Program; 1GL (Machine Language) Program; 0GL (Hardware Level); The Context of a Program; Interrupts.

Section-II

Operating System Functions : What is an Operating System?; Different Services of Operating Systems; Uses of System Calls; The Issue of Portability; User's view of Operating Systems; Graphical User Interface (GUI); The Kernel; Booting.

Information Management : Introduction; The File System; Device Driver (DD).

Process Management : Introduction; What is a Process?; Evolution of Multi-Programming; Context Switching; Process States; Process States Transitions; Process Control Block (PCB); Suspend/Resume Operations; Process Scheduling; Multitasking.

Inter-Process Communication : The Producer – Consumer Problems; Solutions; Classical IPC Problems.

Section-III

Dead-locks : Introduction; Graphical Representation of a Dead-lock; Deadlock prerequisites; Deadlock Strategies.

Memory Management : Introduction; Single Contiguous Memory Management; Fixed Partition Memory Management; Variable Partitions; Non-Contiguous Allocation – General Concepts; Paging; Segmentation; Combined Systems; Virtual Memory Management Systems.

MSIT-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)

SEMESTER - 2

MSIT -201	COMPUTER NETWORKS
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INSTRUCTION FOR CANDIDATES

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Section-I

DATA COMMUNICATIONS : Multiplexing, Signaling, Encoding & Decoding, Error Detection & Recovery, Flow Control, Sliding Window, Congestion Management.

COMMUNICATION NETWORKS : Introduction to networking, OSI Model for Networking, Internet, ATM, Network Components (Cables, Hubs, Bridges, Switches, Routers), Network Topologies, Shared Medium, Peer to Peer, Hybrid Technology.

Section-II

NETWORK TECHNOLOGIES : Local Area Network Technologies, Ethernet Technologies, Ethernet Versions, Token Ring Technologies, Wide Area Network Technologies (Frame Relay, SMDS, ISDN, SONET, PPP, HDLC, LLC), Wireless Networks (Radio Frequencies, Microwave Frequencies, Infrared Waves).

MULTIPLE ACCESS : Design Issues, Distributed & Centralized Design, Circuit Mode & Packet Mode Design, Implementation Issues, Performance Considerations, Base Technology (FDMA, TDMA, CDMA, Centralized Access, Circuit Mode Access, Poling or Packet Mode Access, Reservation Based Access), Distributed Access (decentralized polling, CSMA, CSMA/CA, CSMA/CD, Busy Tone Multiple Access & Multiple Access Collision Avoidance, Token Passing, ALOHA, Slotted ALOHA, Reservation ALOHA), Hardware Addressing

Section-III

SWITCHING : Circuit Switching (Time Division switching, Space division switching, time space switching, time space time switching), Packet Switching (Port Mappers, Blocking, ATM Switching, Switching Fabric (Crossbar, Broadcast, Switching Fabric Elements), Bridges (Transparent bridges, Spanning Tree Algorithm, Virtual LANS), Switches.

NAMING & ADDRESSING : Hierarchical Naming, Addressing, Telephone Networks, Internet, IPv4, Subnetting Ipv4 Networks, Private Networks, Asynchronous Transfer Mode, Name Resolution, Address Resolution Protocol (Arp), RARP

ROUTING : Routing Information, Routing Protocols, Hierarchical Routing, Multicast Routing.

SERVICES & APPLICATIONS : File transfer protocol, TFTP, Domain Name System, DHCP, SNMP, Electronic Mail, WWW, HTML, HTTP, RPC & Middleware.

SECURITY : Threats, Encryption/Decryption, Firewalls, IP Security, Web Security, E-Mail Security.

MSIT -202	RDBMS
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INSTRUCTIONS FOR PAPER-SETTER

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INSTRUCTION FOR CANDIDATES

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Section I

An Overview of DBMS and DB Systems Architecture : Introduction to Database Management systems; Data Models; Database System Architecture; Relational Database Management systems; Candidate Key and Primary Key in a Relation; Foreign Keys; Relational Operators; Set Operations on Relations; Attribute domains and their Implementation.

The Normalization Process : Introduction; first Normal Form; data Anomalies in 1NF Relations; Partial Dependencies; Second Normal Form; data Anomalies in 2NF Relations; Transitive Dependencies; Third Normal Form; data Anomalies in 3NF Relations;

The Entity Relation Ship Model : The Entity Relationship Model; Entities and Attributes; Relationships; One-One Relationships; Many-to-one Relationships; Normalizing the Model; Table instance charts.

Section-II

Interactive SQL : SQL commands ; Data Definition Language Commands; Data Manipulation Language Commands; The Data types a cell can hold; insertion of data into the tables; Viewing of data into the tables; Deletion operations; updating the contents of the table; modifying the structure of the table; renaming table; destroying tables; Data Constraints; Type of Data Constraint; Column Level Constraint; Table Level Constraint; Null value Concepts; The UNIQUE Constraint; The PRIMARY constraint; The FOREIGN key constraint; The CHECK Constraint; Viewing the User Constraints

Viewing The Data : Computations on Table Data; Arithmetic Operators; Logical Operators; Comparison Operators; Range Searching; Pattern Searching; ORACLE FUNCTIONS; Number Functions; Group Functions; Scalar Functions; Data Conversion Functions; Manipulating Dates in SQL ; Character Functions;

Sub queries and Joins : Joins; Equi Joins; Non Equi Joins; Self Joins; Outer Joins; SubQueries; Correlated Queries; Using Set Operators:- Union , Intersect; Minus ;

Views and Indexes : Definition and Advantages Views; Creating and Altering Views; Using Views; Indexed Views; Partitioned views; Definition and Advantages of Indexes; Composite Index and Unique Indexes; Accessing Data With and without Indexes; Creating Indexes and Statistics.

Section-III

Introduction to PL/SQL : Advantage of PL/SQL; The Generic PL/SQL Block; The Declaration Section; The Begin Section; The End Section; The Character set; Literals; PL/SQL Data types; Variables; Constants; Logical Comparison; Conditional Control in PL/SQL; Iterative Control;

Advanced PL/SQL : Types of Cursors; Implicit Cursor; Explicit Cursor; Explicit Cursor attributes; Cursor For Loop; Parameterized Cursor; Error Handling in PL/sql; Internal Exceptions; User Defined Exceptions

Database Objects : Sequences, Creating Sequences; Referencing Sequences; altering a Sequence; Dropping a Sequence, Stored Procedures and Functions:- Advantages of using a Procedure or Function; Procedure Versus Functions; Creating stored Procedures and Functions; Parameters to Procedures and Functions; Deleting a Stored Procedure or a Functions; Packages:- Components of a Package; Package Objects; Private and Public ; Package state; Package Dependency; Triggers:- Use of Database Triggers; Database Triggers V/s Procedures; Database Triggers V/S Integrity constraints; RAISE_APPLICATION_ERROR PROCEDURE; Types of Triggers:- Row Triggers, statement Triggers; Before V/S After Triggers; Deleting a Trigger;

Object Types and Varying Arrays :User Defined Data Types, Creating a Type, Varying Array, Creating and Using a Varying array, Nested Tables.

Objects/Basic Database Administration : Basic Data Base Administration; Creating User; Using Tables in Another schema; Creating roles for Applications; Granting and Revoking privileges; System and Object Privileges;

MSIT -203 SOFTWARE ENGINEERING AND PROJECT MANAGEMENT

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.

Section-I

Introduction : The Software Problem (Software is Expensive, Late, Costly and Unreliable, Problem of Change and Rework); Software Engineering Problem (The Problem of Scale, Cost, Schedule and Quality, The Problem of Consistency); The Software Engineering Approach (Phased Development Process, Project Management and Metrics).

Software Processes : Software Process (Processes, Projects, and Products, Component Software Processes); Characteristics of a Software Process (Predictability, Support Testability and Maintainability, Early Defect Removal and Defect Prevention, Process Improvement); Software Development Process (A Process Step Specification, Waterfall Model, Iterative Enhancement, The Spiral Model); Project Management Process (Phases of Management Process, Metrics, Measurement and Models); Software Configuration Management Process (Configuration Identification, Change Control, Status Accounting and Auditing); Process Management Process (Building Estimation Models, Process Improvement and Maturity).

Software Requirements Analysis and Specification : Software Requirements (Need for SRS, Requirement Process); Problem Analysis (Analysis Issues, Informal Approach, Structured Analysis, Object-Oriented Modeling, Other Modeling Approaches, Prototyping, Requirement Specification (Characteristics of an SRS, Components of an SRS, Specification Languages, Structure of a Requirement Document); Validation (Requirement Reviews, Other Methods); Metrics (Size Measures, Quality Metrics).

Section-II

Planning a Software Project : Cost Estimation (Uncertainties in Cost Estimation, Building Cost Estimation Models, On Size Estimation, COCOMO Model, An Example); Project Scheduling (Average Duration Estimation, Project Scheduling and Milestones, Example Continued); Staffing and Personnel Planning (Rayleigh Curve, Personnel Plan, Example Continued, Team Structure); Software Configuration Management Plans; Quality Assurance Plans (Verification and Validation (V&V), Inspections and Reviews);

Project Monitoring Plans (Time Sheets, Reviews, Cost-Schedule-Milestone Graph, Earned Value Method, Unit Development Folder); Risk Management (Risk Management Overview, Risk Assessment, Risk Control).

Function-Oriented Design : Design Principles (Problem Partitioning and Hierarchy, Abstraction, Modularity, Top-Down and Bottom-Up Strategies); Module-Level Concepts (Coupling, Cohesion); Design Notation and Specification (Structure Charts, Specification); Structured Design Methodology (Restate the Problem as a Data Flow Diagram, Identify the Most Abstract Input and Output Data Elements, First-Level Factoring, Factoring the Input, Output, and Transform Branches, Design Heuristics, Transaction Analysis, Discussion); Verification (Design Reviews, Automated Cross-Checking); Metrics (Network Metrics, Stability Metrics, Information Flow Metrics).

Detailed Design : Module Specifications (Specifying Functional Modules, Specifying Classes); Detailed Design (PDL, Logic/Algorithm Design, State Modeling of Classes), Verification (Design Walkthroughs, Critical Design Review, Consistency Checkers); Metrics (Cyclomatic Complexity, Data Bindings, Cohesion Metric).

Section-III

Coding : Programming Practice (Top-Down and Bottom-Up, Structured Programming, Information Hiding, Programming Style, Internal Documentation, Law of Demeter for OO Programs); Verification (Code Reading, Static Analysis, Symbolic Execution, Proving Correctness, Code Inspections or Reviews, Unit Testing); Metrics (Size Measures, Complexity Metrics, Style Metrics).

Testing : Testing Fundamentals (Error, Fault and Failure, Test Oracles, Top-Down and Bottom-Up Approaches, Test Cases and Test Criteria, Psychology of Testing); Functional Testing (Equivalence Class Partitioning, Boundary Value Analysis, Cause-Effect Graphing, Special Cases); Structural Testing (Control Flow – Based Criteria, Data Flow – Based Testing, An Example, Mutation Testing, Test Case Generation and Tool Support); Testing Object-Oriented Programs (Issues in Testing Classes, State-Based Testing, Incremental Testing for Subclasses); Testing Process (Comparison of Different Techniques, Levels of Testing, Test Plan, Test Case Specifications, Test Case Execution and Analysis);

MSIT -204 VISUAL BASIC PROGRAMMING

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 (80-120 words) 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.

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;

Section-II

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

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;

Section-III

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.

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.